Energy Efficiency

Volume II: Evidence

Ordered to be printed 5 July and published 15 July 2005

Published by the Authority of the House of Lords

London: The Stationery Office Limited

£25.50

HL Paper 21-II
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TAKEN BEFORE THE SCIENCE AND TECHNOLOGY COMMITTEE
WEDNESDAY 3 NOVEMBER 2004

Present
Lewis of Newnham, L Platt of Writtle, B
Lindsay, E Sharp of Guildford, B
Patel, L Wade of Chorlton, L
Paul, L Winston, L
Perry of Southwark, B Young of Graffham, L
(Chairman)

Memorandum by Defra

INTRODUCTION

1. Energy Efficiency has been identified as the most cost effective way to deliver all four of the Government’s energy policy goals, as set out in the Energy White Paper: reducing carbon emissions, and ensuring security of supply, competitiveness and that every home is adequately and affordably heated.


3. The Action Plan stands as an up-to-date compilation of the Government’s delivery plans, but a number of significant developments have taken place since its publication:

   — Defra consulted publicly on the proposals for the next phase of the Energy Efficiency Commitment (EEC) between May and August. The proposal for the 2005–08 phase of EEC was in line with that outlined in the Action Plan. The details of the scheme will be finalised in a Statutory Instrument to be laid before the end of the year;

   — In July, ODPM issued the public consultation document on Part L of the Building Regulations. Consultation concluded on 22 October;

   — In July, the Government issued its response to the Sustainable Buildings Task Group, agreeing, amongst other things, to develop a Code for Sustainable Buildings, going beyond the minimum standard set through regulations. Key elements of the Government’s response are included at Annex 4.1;

   — In September, Defra announced the terms of reference for the review of the Climate Change Programme. A period of public consultation is due to start in November, with an updated programme published in the first half of 2005. The review will offer the opportunity to update the UK’s emission and energy projections, evaluate existing policies and appraise options for new or enhanced policies and measures.

SUMMARY OF THE GOVERNMENT’S EXISTING ENERGY EFFICIENCY POLICIES

4. In the Energy White Paper we announced our long-term goal to reduce the UK’s carbon emissions by some 60 per cent by around 2050, with real progress by 2020. This will build on our existing goal of moving towards a 20 per cent reduction in carbon dioxide by 2010. We will need to make a step change in the rate of improvement in energy efficiency if we are to successfully make this transition to a low-carbon economy.

1 www.official-documents.co.uk/document/cm61/6168/6168.htm
2 Available at www.odpm.gov.uk/stellent/groups/odpm_buildreg/documents/page/odpm_breg_029821.hcsp
5. Energy efficiency has been improving steadily over recent years, but the technical potential to further reduce energy use, using tried and tested technologies, is well established. Across the economy as a whole it is estimated\(^3\) that we could reduce energy use by around 30 per cent. The White Paper identified potential savings of around 10 million tonnes of carbon (MtC) by 2010, and a similar quantity by 2020. The Energy Efficiency Action Plan set out how we will achieve such a step-change and deliver these savings, with a particular focus on the period to 2010.

6. Although huge opportunities exist to improve energy efficiency in a cost-effective way, they are not being taken up at the rate we need. Individuals and businesses could make financial savings by using energy more efficiently, yet they frequently do not do so despite measures being cost-effective. The key barriers to action are behavioural and organisational, such as lack of senior board level commitment in large organisations; the landlord/tenant barrier in commercial property; and the hassle-factor in private homes. Barriers such as lack of awareness of the most cost-effective options, or financial ones, such as the lack of up-front capital, are all aggravated by a relatively weak energy price incentive which, for most consumers, is a small element of overall expenditure. Low energy prices have, of course, had major benefits for other objectives such as fuel poverty and competitiveness. Recent price rises may help to stimulate increased interest in energy saving, but it is too early to determine whether this is the case. Other barriers may include: the perception that energy use is an uncontrollable overhead; the fact that its use is often driven by habits which may not be cognitive; and products, systems and emotional needs which lock us into particular behaviours; all of which may not be amenable to solutions based on rational choice, but which may respond to enabling measures transforming the market.

7. The key lesson we have drawn from our experience and research to date is that individuals and organisations respond best to a combination of strong, consistent government action including regulatory mechanisms, fiscal incentives, leadership, awareness-raising and education, coupled with effective market-facing support programmes delivered by organisations like the Carbon Trust and the Energy Saving Trust. The Action Plan set out a balanced package of measures designed to overcome these barriers to energy efficiency.

8. Key elements of the Plan, updated where relevant, are:

   — In households we aim to deliver savings of around 4.2MtC per year by 2010\(^4\). Activity levels for the Energy Efficiency Commitment (EEC) over the period 2005–11 will be roughly double those under the current EEC, with targets set in two phases: 2005–08 and 2008–11. In finalising the target for 2008–11 through a review in 2007, we will wish to ensure we have the most up-to-date information on measures, costs and industry capacity, as well as considering whether other possible carbon abatement options (such as emissions trading) could support the delivery of the EEC target. We would expect even further energy activity in this phase, but we cannot set a firm target now.

   — The Decent Homes programme will continue to improve the energy standards in social housing, while our fuel poverty programme, Warm Front, tackles heating and insulation standards in the homes of those affected by fuel poverty. The recent spending round included an additional £140million for fuel poverty, which means a total of £251million of Government funding to tackle fuel poverty in 2007–08. Further detail on this will be included in the forthcoming Fuel Poverty Action Plan, to be published later this year. We will also continue to support community heating through grants from the existing Community Energy Programme.

   — Fiscal incentives already reduce the cost of professionally installed insulation in homes. Budget 2004 announced additional economic incentives for energy efficiency, including a Landlords Energy Savings Allowance for installing insulation; active consideration of a “Green Landlord Scheme”; a reduced rate of VAT on ground-source heat pumps, and possibly on microCHP, subject to the outcome of field trials.

   — The Energy Saving Trust (EST) will continue to inform, advise and support household energy efficiency, including through its network of 51 energy efficiency advice centres. We have recently announced additional funding for EST of £3million for this financial year to support the introduction of the ambitious new targets under the EEC next April.

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\(^3\) [www.number-10.gov.uk/su/energy/1.html](http://www.number-10.gov.uk/su/energy/1.html)

\(^4\) This is a UK-wide objective. As required by the Sustainable Energy Act 2003, a formal aim for England has also been designated—corresponding to 3.5 MtC savings by 2010.
— The revision to Part L of the Building Regulations in 2005–06\(^1\) is expected to further raise the standards of new and refurbished buildings by around 25 per cent in terms of their carbon emissions. Implementation of the Energy Performance of Buildings Directive, with its requirement for energy surveys and certification of all buildings, with labelling of certain public buildings, will bring an opportunity to unlock market demand for higher energy performance. A major new training scheme for heating installers has been introduced, to precede the revision of the boiler provisions in the Building Regulations in April 2005.

— In July, the Government accepted the key recommendations of the Sustainable Building Task Group, including the development of a Code for Sustainable Buildings. This will set standards for energy, water, waste and other environmental issues, going beyond the minimum standards set out in the Building Regulations.

— The launch of the EU Emissions Trading Scheme, to come into effect next year, will signal the advent of an increasingly carbon-constrained world. Covering just below 50 per cent of UK CO\(_2\) emissions, the scheme will help to ensure that carbon emissions and energy efficiency have an increasingly high place in companies’ strategic priorities. With the Climate Change Agreements, Climate Change Levy and other targeted tax allowances, it will ensure that our most energy intensive industries and the power generation sector have strong incentives to reduce their emissions in the most cost-effective way.

— Strong leadership in the public sector. We have recently announced new energy targets for the central government estate which, among other goals, will mean cutting our carbon emissions by some 29 per cent between 1990 and 2011, going even further than our domestic goal. We also intend to send a strong signal to the commercial property market through the buildings we procure, and the Action Plan contained a new commitment by the Government to procure only top quartile energy performance buildings where this is cost-effective.

— Continuing to raise product standards through our Market Transformation Programme. We will also continue to negotiate rising standards via EU-wide agreements and policy instruments, including a proposed Eco-design of Energy Using Products Directive.

— Continuing to work closely with local authorities, regional assemblies and Regional Development Agencies to support the development of innovative local and regional approaches to energy efficiency and to promote exemplars of best practice through the new Beacon Councils theme on Sustainable Energy, set to run in 2005–06.

— Continuing to inform, advise and support businesses and the public sector through the activities of the Carbon Trust. Additional funding for the Carbon Trust of £60million over the period 2005–08 was announced in Spending Review 2004, to support its innovation and loans programmes and advice, information and support services.

— A clear recognition that it is vital to raise awareness more widely of the links between climate change, energy policy and the choices and behaviour of every individual, business and public sector organisation. We are considering the ways to communicate better about climate change at every level. Communications consultants are currently developing a Climate Change Communications Strategy to help the Government do this in the most effective way.

— In the short term, our focus is to get existing cost-effective products and technologies to be taken up widely in every sector. But to ensure that we continue to deliver efficiency gains in the future we will need to ensure that new technologies allow us to design buildings with low or zero carbon emissions, to retrofit difficult to tackle homes such as those with solid walls, and to introduce low-energy products such as Light Emitting Diode (LED) lighting. We will continue to support innovation in low carbon technologies, in particular through the Carbon Trust’s Innovation Programme. Working closely with the Carbon and Energy Saving Trusts, we will continue to explore the way that we support the research, design, demonstration and commercialisation of new technologies in the most cost-effective way.

9. Although the role of transport sector is not being covered by this inquiry, we believe that transport has an important role to play in helping the Government to achieve its domestic target with regard to reducing greenhouse gas emissions. For that reason, DfT has agreed to share the Government’s target on climate

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\(^1\) Boiler Standards alone will be raised from April 2005, while other elements of Part L will be revised from January 2006.
change (already held by Defra and DTI), and also to reflect the efforts DfT is already making towards more sustainable transport—for example, the department is already involved in the setting of emissions standards, development of biofuels, and encouraging alternative modes of travel.

10. In total, we expect the measures set out in the Action Plan to deliver over 12MtC savings by 2010 relative to the baseline for the Climate Change Programme, slightly more than the objectives we set out in the White Paper. This will save consumers over £3billion from their bills by 2010. But the Plan is also realistic about the challenges ahead. The Government’s aim is to deliver a step-change in energy efficiency on a scale not achieved before in the UK, and to do this in the face of increasing demand for energy. Many of the measures in the Plan depend on voluntary take up by homeowners and businesses, so promoting demand for energy efficient products and services is a priority. As part of the Climate Change Programme review we are in the process of updating our energy projections, which may have implications for our future energy efficiency programmes.

11. The Government will continue to work in partnership with the devolved administrations who lead on the promotion of energy efficiency in Scotland, Wales and Northern Ireland. The Government will also continue to take an active role internationally, sharing information and learning from international partners, including through the International Energy Agency and the UK-initiated Renewable Energy and Energy Efficiency Partnership.

The Committee have highlighted a number of areas of particular interest. The Annexes set out below contain further detailed responses to each of these:

1. The most appropriate measure of energy efficiency, and the relationship between improvements in energy efficiency and overall energy use and carbon emissions.
   Annexes 1.0, 1.1

2. The behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings.
   Annex 2.0

3. The scope and incentives for improving energy efficiency, and reducing waste, across the economy, in both private and public sectors.
   Annex 3.0

4. The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented.
   Annexes 4.0, 4.1

5. The development and promotion of energy-efficient consumer goods.
   Annex 5.0

6. Innovative schemes to use district heating or CHP in order to reduce overall energy demand.
   Annexes 6.0, 6.1

7. The funding and coordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications.
   Annex 7.0

Annex 1.0

Measures of Energy Efficiency and Links to Energy Use and Carbon Emissions

The link from improved energy efficiency to reductions in carbon emissions is conceptually reasonably straightforward.

Traditionally, energy intensity (ie energy consumption per household, or per unit GDP generated) has been used as a proxy for energy efficiency. So total consumption equals intensity times number of consuming “units” (ie households, GDP), and carbon emissions follow using agreed carbon factors for each fuel and for electricity.

However, changes in energy intensity can occur because of energy efficiency improvements or structural changes in a sector, including changes in demand for different “energy services” per household (eg comfort, hot water usage), or a combination of the two. So we are now trying to separate intensity into an efficiency
factor and a “service demand” factor, and support each strand with new series of monitored data. So changes in total energy consumption can be directly linked (more or less) to corresponding changes in efficiency, service demand and “consumption units” (ie GDP, no. of households).

The approach involves the following:

— Separate indicators are generated for the household, industry and services sectors;
— Each sectoral indicator is a composite from individual sub-sectors or energy end-users;
— (Where possible), the energy efficiency indicator for a sub-sector/end-use is built up from the theoretical maximum energy savings for individual technologies and techniques (ie with no change in the level of “energy service” provided, eg household comfort or hot water usage); however, for changes in energy consumption, we may need to allow for “rebound” effects, eg apply a “comfort factor” where households choose to take part of the overall improvement as increased comfort rather than as a reduction in consumption because heating is now effectively cheaper;
— (Where possible), a separate indicator of energy service demand is also constructed.

Work is in hand to develop indicators for the household and industry sectors, and the attached paper sets out the current state of play for the former. The initial household indicators are expected to be available for publication on Defra’s website before the end of 2004 while we hope to publish the industry sector indicators by Easter 2005.

Annex 1.1

INDUSTRY INDICATORS: PROGRESS REPORT OCTOBER 2004

1. This note gives a brief summary of work for Defra by Future Energy Solutions to develop indicators of energy efficiency in industry. It covers the overall approach, progress to date and proposals for future work.

Overall Approach

2. The overall approach taken for industry is consistent with that used for the domestic sector and is based on the use of chained Fisher indices to calculate trends in specific energy consumption at a sub-sector and sector level.

3. The starting point for the derivation of the indices is work previously undertaken by Future Energy Solutions (then ETSU) on industrial energy use and CO₂ emissions for GA Division of Defra (the so-called GAD Project). This work covered manufacturing industry, split into 16 sectors as shown in Table 1 below and estimated year-by-year historical data for production and energy use for the period 1990–98, using the best available information collated from a number of different sources. Of the energy consumption within the DUKEs “Industry” classification, it covered approximately 95 per cent, the excluded sub-sectors were Construction, Water and Salt.

4. The core of the analytical approach used in the GAD project is the relationship: Energy Consumption \( \propto \) Useful Energy Demand (UED) × Specific Energy Consumption (SEC) where UED is taken to be proportional to the output volume at product level.

5. In the current work, the data series have been revised by taking account of new information on industrial production and energy use and extended to include more recent years (up to 2002 in most cases).

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6 In this scheme, throughput level for processes involving standing losses (esp. furnaces) is not accounted for explicitly, so any effect of altered throughput is manifested via the SEC parameter. Hence low throughput during a recession can result in an increased SEC until output is restored or the usage of process capacity is rationalised.
6. The chained indices for energy efficiency, as measured by the specific energy consumption, are then derived as follows:

\[
\frac{SEC [2]}{SEC [1]} = \sqrt{\frac{\sum_i E_i [1] \times \frac{SEC [1]}{SEC_i [2]}}{\sum_i E_i [2] \times \frac{SEC [1]}{SEC_i [2]}}} \frac{\sum_i E_i [2]}{\sum_i E_i [1]}
\]

where \( E \) is energy consumption, [1] and [2] refer to the first and second years of each pair, and the sums are over all sub-sectors \( i \).

7. The corresponding demand (escalation factor) indices are then given by:

\[
\frac{UED[2]}{UED[1]} = \frac{E[2]}{SEC[2]} \frac{SEC[1]}{E[1]}
\]

Table 1
GAD PROJECT INDUSTRY SECTORS

<table>
<thead>
<tr>
<th>Sector</th>
<th>SIC Codes</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Iron and Steel</td>
<td>27, excluding 27.4, 27.53, 27.54</td>
<td>Follows ISSB definition. Includes ferrous foundries.</td>
</tr>
<tr>
<td>Non-Ferrous Metals</td>
<td>27.4, 27.53, 27.54</td>
<td>Includes non-ferrous foundries.</td>
</tr>
<tr>
<td>Non-Metallic Minerals</td>
<td>14, 26.6, 26.8</td>
<td>Quarrying, plus concrete and mineral products.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excludes mining and salt.</td>
</tr>
<tr>
<td>Bricks</td>
<td>26.4</td>
<td></td>
</tr>
<tr>
<td>Cement, Lime and Plaster</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>Glass and Glassware</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>Pottery</td>
<td>26.2, 26.3</td>
<td>Includes refractories.</td>
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<td>Chemicals</td>
<td>24</td>
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<td>Mechanical Engineering</td>
<td>28, 29</td>
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<tr>
<td>Electrical Engineering</td>
<td>30, 31, 32, 33</td>
<td></td>
</tr>
<tr>
<td>Vehicle Manufacture</td>
<td>34, 35</td>
<td></td>
</tr>
<tr>
<td>Food, Drink and Tobacco</td>
<td>15, 16</td>
<td>Tobacco represents only 1.5 per cent of energy use.</td>
</tr>
<tr>
<td>Textiles, Leather and Clothing</td>
<td>17, 18, 19</td>
<td>Mainly wood products and furniture.</td>
</tr>
<tr>
<td>Other Industries</td>
<td>20, 36</td>
<td></td>
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<tr>
<td>Paper Manufacture and Utilisation</td>
<td>21, 22</td>
<td>Includes printing and publishing as well as paper and board production</td>
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<tr>
<td>Plastics and Rubber</td>
<td>25</td>
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Progress to Date

8. Work to date has focussed on collecting the necessary data to update and extend the information on industrial output and energy use and make a “first-cut” at calculating the chained indices at both the sub-sector (as per Table 1) and sector (manufacturing industry) level. Information that has been used for the analysis includes:

- DUKES and more disaggregated energy data available from the DTI website based on the Purchases Inquiry.
- Annual Business Inquiry for information on gross value added and total turnover at base prices.
- National statistics online data for producer price index.
- DTI production statistics.
- Energy Consumption Guides from Action Energy.
- Industry specific sources (e.g., cement, steel, paper).

9. Further information that would be very helpful to the construction of these indicators is also potentially available from the Climate Change Agreements and Defra will be writing to the Sector Associations to seek their agreement for aggregated data from the CCA’s to be used in this analysis.

10. Initial chained indices have been produced for each sub-sector and aggregated to give an overall index for manufacturing industry. These results are now being checked for accuracy and consistency. However, it is intended that the results will also be discussed with the Sector Associations, once the CCA data issues have been resolved.

Proposals for Future Work

11. The proposed future work centres around two activities:

- Checking and refining the top-down indicator analysis.
- Reconciling the top-down results with a bottom-up technology based analysis using the ENUSIM framework.

12. Obtaining permission to use the CCA data will be key to providing a robust basis for many of the sub-sector indices and further cross-checking of all sub-sector results will be carried out. Work also planned to extend the analysis to 2002, where such data was not previously available.

13. Once a satisfactory top-down analysis has been completed, this will be reconciled against a bottom-up technology analysis using the ENUSIM framework. Detailed proposals for this second phase have still to be developed.

Annex 2.0

Behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings.

1. The end use of energy can ultimately be explained as the product of energy-using appliances, their numbers, and the way they are utilised. The decisions and actions of individuals and organisations lie at the heart of all energy efficiency measures—whether these involve choosing energy-efficient products, services or buildings, or choosing how to use them. At their most fundamental level, all policies to improve energy efficiency must therefore change our behaviour, but there are many different ways to attain this, and provision of information is only one tool out of many.

How do energy efficiency policies change behaviour?

2. At one end of the spectrum, regulation typically seeks to limit consumer choice by removing the worst options altogether: building regulations mandate minimum standards for energy performance, and product standards can remove the worst performing appliances. But all other policies depend to a greater or lesser extent on encouraging changes in behaviour, where this is possible. However habits, which involve no thought, may be very resistant to change, and the design of appliances or buildings may effectively “lock in” behaviours and limit choice.
3. Policies such as the Climate Change Agreements and emissions trading specify a desired outcome, but the exact method a company chooses to attain this outcome remains flexible, and may or may not involve energy efficiency. But the evidence to date shows that these programmes, by exerting strong economic incentives, have successfully encouraged companies to understand and manage their energy consumption, including through improved energy efficiency.

4. The Energy Efficiency Commitment (EEC), whilst setting overall targets for energy suppliers, does not specify where and how the required savings are to be delivered. Take-up of suppliers’ offers depends on voluntary acceptance by homeowners. Suppliers are on course to achieve their targets for the current phase of EEC, which ends in March 2005, so have been successful in delivering a range of different energy saving measures. However, much of the success of the EEC scheme and its predecessors to date has been in social housing where individual landlords make decisions affecting large numbers or homes. Future savings will increasingly depend on persuading individual owner-occupiers to accept energy saving offers. Of particular importance is cavity wall insulation. This is expected to make the single biggest contribution to the next phase of EEC, but it has proved difficult in the past to persuade homeowners to accept insulation offers, even with subsidies approaching 100 per cent. The Government is now working closely with the Energy Saving Trust and energy suppliers to address the issue of demand for cavity wall insulation.

5. Economic incentives seek to overcome barriers resulting from the price of energy efficient options. The reduced rate of VAT on professionally installed insulation, for example, is designed to make a householder’s decision to install insulation more attractive. Reduced VAT on technologies such as ground source heat pumps or micro CHP are designed to reduce the price differential between these and more conventional, less efficient technologies that are prevalent. The financial incentives offered by suppliers under EEC are designed to reduce the price differential between A-rated appliances and lower performing models. The success of market transformation for several key household appliances attests to the efficacy of this mechanism. The Enhanced Capital Allowances scheme is designed to reduce the price premium of the most efficient equipment used by businesses by giving an upfront allowance on specific energy saving capital purchases. This also has the advantage of providing information on the best performing products through the list of approved products. This list now stretches to over 6,000 products in 16 categories. Grants, such as those offered through the Warm Front or Community Energy programmes support the installation of heating and other measures that recipients could not otherwise afford.

6. At the “soft” end of the spectrum outlined above lie policies which aim to change behaviour through advice and information:

   — Product labelling is designed to effect market transformation through consumer choice: by informing consumers about the energy performance of household appliances, for example, they can make an informed choice taking account of the running costs of the different options. The most significant energy-using household appliances are now sold with a mandatory A-G rating, and the Energy Saving Trust’s “Energy Efficiency Recommended” label identifies the top performing models within each appliance market. When coupled with financial incentives on the best, and regulation to remove the worst, these schemes have proved very successful at shifting consumer purchases towards the top end of the scale (further information can be found in Annex 5). It is hoped that the same can be true of buildings. The Energy Performance of Buildings Directive will introduce mandatory energy rating and certification of all buildings at the point of sale or rental, with a requirement for public display of labels for some public buildings. By enabling the occupiers and owners of buildings to see more clearly how their building performs, and therefore to choose higher performance options, this could, over time, start to transform the market.

   — The Carbon Trust and the Energy Saving Trust run programmes designed to inform and encourage energy users to change their behaviour. EST, for example, runs 51 advice centres, offering information on energy efficient products, grants available to support installation of particular options, and information on installers and suppliers. The Carbon Trust programmes offer information to companies and public sector organisations, ranging from a simple energy audit and advice on cost-effective solutions, through to a highly tailored “Carbon Management” programme. Both trusts run public campaigns designed to raise awareness of energy and encourage conservation and efficient usage.

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7 This measure may be introduced subject to the outcome of the current mCHP field trials.
8 Further information is available at www.eca.gov.uk/etl/homepage.asp
9 Appliances covered: refrigerators, freezers and fridge-freezer combinations, washing machines, electric tumble dryers, combined washer-dryers, dishwashers, lamps, electric ovens and air conditioners. Boilers are also rated under the UK’s SEDBUK scheme.
Is the public sufficiently knowledgeable and motivated to achieve energy savings?

7. The answer to the latter part of this question is almost certainly no—the evidence to date is that energy savings are not yet being delivered across the economy on a scale matching the technological and economic potential. Although there is evidence that we are making this transition in some areas—the savings delivered by the Climate Change Agreements and the Energy Efficiency Commitment do represent a step-change in their respective sectors—there remains huge potential to achieve sustained savings in the future. The Energy Efficiency Action Plan acknowledged the need to make this step change more widely, and set out a package of policies designed to start this process.

8. But to what extent does this result from a lack of information? Current research highlights an “attitude-behaviour gap”, implying that information failure is rarely the key problem. This is borne out by the report “Carrots, Sticks and Sermons” commissioned by Defra from Demos and Green Alliance in 2003. In this study on influencing behaviour change for environmental objectives, a clear conclusion is that while communication is important, communication alone is unlikely to be successful in changing behaviour, and needs to be carried out as part of a coherent package of measures.

9. It is likely that the very low price of energy in recent years has had a negative influence on energy efficiency behaviour (though of course it has had major benefits for other objectives such as fuel poverty and competitiveness). For most consumers energy represents a very small proportion of their overall expenditure: in households typical bills are around £600 per year, less than their spending on alcohol.

Figure 1. Energy Costs have been a declining share of household spending for more than 10 years.

10. For office-based businesses, energy costs are typically 0.5–1 per cent of turnover, slightly higher for light industry, but rising above a few per cent points only for the most energy-intensive process industries such as metal production, glass, cement and paper production etc. As long as this remains true, there is only a limited incentive to pay attention to information about saving energy and to act on it.

11. Defra has been looking in detail at the issue of changing behaviour in conjunction with the consultation and review of the Sustainable Development Strategy. Many of the emerging findings are directly relevant to the question of influencing energy-related behaviours, and reinforce the suggestion that information is not necessarily the key to achieving effective behaviour change. Five themes on behaviour change have been proposed to guide development of the new Sustainable Development Strategy:

(i) Incentives. To examine the range and most effective use of techniques to incentivise behaviour change—that might include information and labelling, economic instruments, peer pressure and league tables and the role of regulation.

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10 http://www.green-alliance.org.uk/publications/PubCarrotsSticksSermons/
11 The Energy Products Directive (2003/96/EC) uses 3 per cent of turnover as the threshold to define energy intensiveness.
Engagement. Current research findings cite an “attitude-behaviour gap”, implying that information failure is rarely the key problem, but other barriers may be more important. Public awareness campaigns such as “Are you doing your bit” are only marginally effective in long term behaviour change and information plays a much less important role than approaches that engage—with the aim of stimulating motivation, creating an emotional reaction, or otherwise securing buy-in to a change of behaviour.

Enablers. Many unsustainable behaviours are locked-in and normalised by the way that we produce and consume and the absence of easily attainable alternatives. Unless the context in which people live and work is changed to enable different behavioural choices they have no reason to try to change as the barriers are too great. The use of techniques such as hypothecation to link fiscal incentives and provision of enablers creates attractive coherent ‘fair’ propositions that may prove attractive to the public.

Catalysts. Unsustainable behaviours may be embedded in systems that are deeply entrenched and resistant to change. To disrupt the status quo and promote a new sustainable pathway may require catalysts that help to bring about a broad change. The other elements are all—probably—necessary conditions for success—but the catalyst is what persuades someone to break with habit. It is particularly important in this model to look at the point of intervention—the point where key decisions are made that can lead to future lock in.

Dynamism. The purpose of addressing behaviour change is to secure change that becomes embedded, self-reinforcing and creates new norms and default behaviours over time. We conceptualise this as a process that may unfold over months, years or, in the case of the most radical behaviour shifts, decades.

What additional information can we provide to consumers?

12. The Government is currently taking forward work in several areas relevant to this issue:

— A climate change communications programme. There is a recognition that greater awareness of climate change, and the impacts of the everyday actions of individuals would underpin with some audiences the more narrowly focussed communications efforts aimed at improving energy efficiency, changing attitudes to renewable power and raising awareness of the need for climate change adaptation, as well as improving attitudes to new or strengthened policies and measures in the future. The Government has therefore commissioned independent communications consultants to advise on an evidence-based Climate Change Communications Strategy. The objective of this strategy is to raise public awareness in the first instance, but with the next stages—changing attitudes and changing behaviour—in mind as the ultimate goal. This project is due to conclude in November. The first stage, an evidence base for climate change communication, has recently been completed. A summary entitled “The Rules of the Game” is available at www.futerra.org

— Provision of information on consumer bills. There is growing recognition that the provision of better information to consumers can lead to energy savings. A desk study carried out for Ofgem, based on evidence from overseas, concluded that sustained savings of 5–10 per cent could be achieved by presenting clear historical information on bills.12 More recent research, carried out through focus groups in the UK, revealed a preference for simple graphically presented data on recent consumption.13 Defra, DTI and Ofgem, under the auspices of the Joint Working Group on Energy and the Environment are currently reviewing the evidence and options for action.

— Provision of information through social learning. A variety of evidence on the complexity of behaviour, and changing it, is being considered within the current review “Taking It On” of the Government’s Sustainable Development Strategy. This identifies the significance of social norms and peer pressures among other factors, and social learning (or education by example and experiment) may be another area of information to be explored through community-led projects and local initiatives (supported possibly by Defra’s Environmental Action Fund).

12 “Towards effective energy information improving consumer feedback on energy consumption”. Centre for Sustainable Energy 2003.
The scope and incentives for improving energy efficiency, and reducing waste, across the economy, in both private and public sectors.

The Scope for Improving Energy Efficiency

1. In February 2002, the Energy Review by the PIU (now the PM’s Strategy Unit) reported an overall economic potential for energy efficiency of some 30 per cent. This varied over different sectors: Services—21 per cent; Industry—24 per cent; Transport—35 per cent; Households—37 per cent.14

2. In September 2002, Defra produced an internal paper “Improving Domestic Energy Efficiency—A Technical Overview”, containing a detailed discussion of the different potentials (technical, economic) for the household sector.15

3. Taking the year 2000 as its baseline, Defra estimated the technical potential—from all measures then on the market, whether cost-effective or not—to be around 40 per cent on an energy basis (and 45 per cent on a carbon basis). This was at the low end of the range from various analysts, but Defra argued that some of the higher values probably had not allowed for interactions between particular measures which reduced the net effect.

4. Defra also took a narrower definition of the economic potential by looking at those measures which could be installed cost-effectively by a particular date in the future. This then excluded equipment replacement before the end of its normal life; for example, with typical boiler lifetimes of 15 years, over the period 2000–10, only two-thirds of all boiler replacements by condensing boilers could be counted. On this basis, the economic potential by 2010 was estimated to be in the range 21–25 per cent, but by 2020 it was 35–39 per cent, corresponding closely with the PIU figure.

5. We have not recently carried out a similar detailed analysis for the other sectors for particular years. However, similar considerations are expected to apply, especially regarding equipment replacement. So the corresponding potentials for 2010 relative to 2000 are estimated to be in the region of 15 per cent for both Industry and Services. For 2020, the PIU figures are likely to apply.

6. In practice, not all of the economic potential is achievable, particularly for 2010, because of the time required to make the transition from pre-Climate Change Programme (CCP) market conditions. One major constraint is the time required to build up the capacity of the supply side, whether it be on production of goods or overcoming skills shortages in the installation industries.

7. The potential by 2010 from late 2004 will depend on several factors. Under “normal” circumstances, ie with no special push on energy efficiency as in the Climate Change Programme, energy efficiency improvements do take place as old equipment is replaced by new, more efficient models. But innovation gradually introduces even more efficient models, and historically, the innovation rate at one end of the spectrum seems to have matched the “take-up” rate at the other, leaving the potential generally unchanged. The PIU also remarked on this. In some ways, this “dynamic equilibrium” is not surprising in an effective market: manufacturers will be aware how well products sell and will try to pace their own development work accordingly.

The Incentives for Improving Energy Efficiency

8. Perhaps the most obvious incentive to improve energy efficiency is the potential to save money on fuel bills. Even against relatively short repayment criteria, many energy efficiency measures are cost effective (Net Present Value positive). However, it is evident that this incentive alone is rarely sufficient. A number of barriers slow or prevent the most energy efficient outcomes.

9. In the 1980s we thought that the barriers for uptake of energy efficiency measures by the business sectors were largely technical and economic. Our thinking has changed since then and we now know that organisational and behavioural barriers are equally important. For example, organisations do not see energy as being a core issue when set against other priorities, especially with historically low energy prices. Whilst investing in energy efficiency may be cost effective, it often involves payback periods of a number of years, which are beyond many organisations’ capital constraints, and also has to compete for capital against other business activities. For smaller organisations which have many more pressing worries, energy efficiency is simply not a concern.

14 see Annex 6, Table 1 of PIU report—available at: www.number-10.gov.uk/su/energy/1.html
15 Available at www.defra.gov.uk/environment/energy/review/pdf/tech-overview.pdf
10. Historically the relationship between energy prices and energy consumption has been weak, in terms of elasticity of demand. The available evidence indicates that energy consumption in the UK is relatively inelastic, especially in the short term. Similarly, the take up of energy efficiency measures does not seem to be very sensitive to energy prices. In other words, households and businesses have not tended to alter their behaviour in response to changes in energy prices, either in terms of energy consumption or of investment in energy efficiency.

11. Research conducted by the Carbon Trust across the private and public sectors highlights that the barriers to energy efficiency are different in every organisation. However, most barriers fall into one of three categories: organisational commitment, capital constraints and technical know-how. In all cases, organisations need a reason to change, and require both support and guidance in knowing how to change their actions before energy efficiency measures can be effectively implemented.

12. In the household sector, there are different barriers to improving energy efficiency, with high upfront costs, and hassle and disruption as two prominent ones.

13. Most householders are not aware of, and often not interested in, the connection between energy efficiency measures such as insulation and high-efficiency boilers, and reduced fuel bills, and their impact on the environment. Even relatively well informed consumers are often more interested in renewable energy as a sustainable energy issue, but will not install cost effective energy efficiency measures in their own homes. Overcoming this apathy is not easy.

14. As a result, tackling energy efficiency involves overcoming barriers that can interact and which vary considerably on a case-by-case basis.

15. Other incentives to improve energy efficiency include regulatory and fiscal incentives.

**Regulation**

16. Some forms of regulation seek to limit consumer choice by removing the worst options altogether: building regulations mandate minimum standards for energy performance, and product standards can remove the worst performing appliances.

17. There are few other regulations that directly mandate energy efficiency standards. Policies such as the UK and EU Emissions Trading Schemes, voluntary agreements and the Energy Efficiency Commitment have degrees of regulatory underpinning, but do not prescribe how their respective targets should be met.

**Fiscal Incentives**

18. The Government has introduced a number of fiscal measures to incentivise energy efficiency.

For business/industry, this has principally focused around:

- the Climate Change Levy and associated measures, such as the Climate Change Agreements (CCAs);
- Enhanced capital allowances for energy saving technology, introduced following the Marshall report; and
- more recently the new capital allowances for landlords (the Landlords Energy Saving Allowance) who insulate their properties.

In the domestic sector, the Government has focused its action around greater insulation in properties and as well as the extensive grant-based programmes such as Warm Front and Decent Homes, has used fiscal measures, including:

- the introduction of a reduced rate of VAT on the installation of energy saving materials, such as loft insulation and draught proofing; and
- a capital allowances scheme incentivising the installation of energy efficient boilers in low income homes, currently managed by Transco.

19. These incentives have been a strong driver to improving the energy efficiency of the UK as a whole, and will continue to play an important role in helping the Government deliver carbon savings.

20. The Government has also identified possible further options for the future, including:

- the introduction of a reduced rate of VAT on domestic CHP, taking account of the emerging findings of the ongoing field trials; and
- a Green Landlord Scheme to further incentivise improvements in the efficiency rating of the private rented sector.
21. At an international level, the Government has also been pressing for the right to use reduced rates of VAT more widely to encourage the purchase of energy efficient products.

22. Information on the costs and benefits of individual fiscal measures can be found in the Budget and PBR publications.

Consumer Information

[This issue is covered at greater length in annex 5, on the development and promotion of energy-efficient consumer goods, and annex 2, on behaviour.]

23. Where consumers have the opportunity to choose between different products, information on their energy impacts may provide an incentive to choose higher performance options. Product labelling, as is current for key classes of household appliances, allows consumers to make an informed choice taking account of the running costs of the different options. When coupled with financial incentives to remove or minimise the price premium for highly rated products, and regulation to remove the worst, these schemes have proved very successful at shifting consumer purchases towards the top end of the A-G scale. It is hoped that the same principle can apply to buildings. The Energy Performance of Buildings Directive will introduce mandatory energy rating and certification of all buildings at the point of sale or rental, with a requirement for public display of labels for some public buildings. By enabling the occupiers and owners of buildings to see more clearly how their building performs, and therefore to choose higher performance options, this could, over time, start to transform the market.

Annex 4.0

The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented.

1. Improving the energy efficiency of buildings is crucial. The Energy White Paper rightly identifies energy efficiency as the most cost-effective way of delivering all of our energy policy objectives, including making progress towards the challenging target of a reduction in CO₂ of some 60 per cent emissions by around 2050. As buildings contribute almost half—about 46 per cent—of the UK’s CO₂ emissions, it is clear that we need to greatly improve the energy efficiency of our buildings if we are to achieve the target. Both the Government’s Energy White Paper and Energy Efficiency Action Plan highlighted the key contribution that buildings have to make.

2. Better design and construction of buildings can lead to significant energy savings through reduced energy consumption. The importance of improving the energy efficiency of buildings was re-affirmed by the Prime Minister in his speech in September on the challenge presented by climate change. The Government is working to raise standards in buildings and to encourage innovation in building design and construction.

WHAT GOVERNMENT IS DOING

3. There has already been significant progress in promoting more sustainable energy use in buildings. Improvements in the housing stock between 1997–2001 have resulted in an annual reduction of 1.7MtC. The current provisions of the Building Regulations which came into effect in 2002 are expected to deliver a 25 per cent improvement in energy efficiency.

4. The Energy White Paper included a commitment to review the Building Regulations and in particular to require condensing boilers in new dwellings and replacement works. These show a 20 per cent efficiency improvement over conventional boilers. The boiler requirements will come into effect from 1 April 2005. It was always expected that there would be exceptions to the new boiler requirement for reasons of cost or practical restrictions. The Government recently announced that it has decided to keep these exceptions to a minimum. The overall effect will be that from 1 April next year around 95 per cent of boiler installations will be high efficiency condensing boilers. This will result in about 7.6 million new condensing boilers being installed and carbon savings of about 1.3MtC per year by the end of 2010.
5. The Government has recently consulted (ended 22 October 2004) on the proposed new Regulations, which will come into effect in 2005 and on its plans to implement the Energy Performance of Buildings Directive which has to be implemented by 2006. The purpose of the Directive is to promote the improvement of the energy performance of buildings within the European Community. It lays down requirements regarding the application of minimum requirements on the energy performance of new buildings and on the performance of large existing buildings undergoing major renovation. Importantly, it also requires the presentation of energy performance certificates when buildings are constructed, sold or rented out, and the display of these certificates in public buildings over 1,000m².

6. Implementation of the Directive and the new Regulations will further raise the energy performance of new and refurbished buildings performance by around another 25 per cent, delivering a saving in national carbon emissions in 2010 of around 1.4MtC per year.

7. Between 2010 and 2020, the Government aims to update the Building regulations every five years or so and at each update will clearly signal what the next stage is likely to be, leading to incremental increases in the energy standards of new and refurbished buildings. As standards rise, it is likely that buildings will need to incorporate an increasing number of cost-effective, low or zero carbon technologies including: absorption cooling; biomass/wood heating; CHP and micro CHP; ground source heating and cooling; photovoltaic generation; and passive solar heating and shading. The Government has published a paper focussing on what might be appropriate for a further amendment to the Building Regulations around 2010. This was published as part of this summer’s consultation on the 2005 Building Regulations.¹⁶

8. The Building Regulations do not currently address significant portions of the fabric of existing building stock, which dominates the overall impact of buildings. The Government will therefore continue to rely on other programmes to encourage building owners to upgrade their property—fiscal measures, access to finance, energy audits, information, and improved access to utility metering data and more reliable billing.

9. However, the successful passage this summer of the Sustainable and Secure Buildings Bill, which Government supported, will expand the scope for Building Regulations to promote more sustainable measures including energy efficiency. The Bill received Royal Assent on 16 September 2004. This new Act allows for the addition of new purposes for which building regulations can be made, including environmental protection and sustainable development. It will allow building regulations that help reduce carbon emissions to apply to existing buildings in more circumstances.

10. In July, the Government published its response to the Sustainable Building Task Group report “Better Buildings—Better Lives” published in May. The Task Group was established jointly by the Deputy Prime Minister, Environment Secretary Margaret Beckett and Trade and Industry Secretary Patricia Hewitt to spearhead efforts to raise the sustainability of buildings. At the heart of the Government’s response to the Task Group was a green light to the headline recommendation to develop a Code for Sustainable Buildings. More broadly, Government accepted the Task Group’s recommendations as a valuable and timely contribution to the evolving sustainable buildings debate and issued a call to the building industry to embrace the report. The key energy-related responses and recommendations are at Annex 4.1. The Code itself will set standards for energy, water, waste and other environmental issues, going beyond the minimum standards set out in the Building Regulations. The Government is developing the Code in collaboration with industry and key stakeholders and will work with local authorities and developers to ensure that a sufficient number of demonstration schemes in the Thames Gateway, and potentially elsewhere, are established. Subject to a full Regulatory Impact Assessment Government will look to complete the Code by the end of 2005, in order to take action on national rollout by early 2006.

11. As well as playing a key role in minimising greenhouse gas emissions, new buildings must also take into account the changes in our climate, including rising temperatures and altered patterns of rainfall. Section 9 of ODPM’s recent consultation sets out the ways in which future revisions to Building Regulations may take these factors into account.¹⁷

¹⁶ Available at www.odpm.gov.uk/stellent/groups/odpm_buildreg/documents/page/odpm_breg_029821.hcsp
¹⁷ Available at www.odpm.gov.uk/stellent/groups/odpm_buildreg/documents/page/odpm_breg_029821.hcsp
Annex 4.1

Government response to specific energy related recommendations made by the Sustainable Buildings Task Group

A summary of recommendations, with the relevant paragraph number from the Task Group report, precedes each section of the response.

A. CODE FOR SUSTAINABLE BUILDINGS

(2.4) A single national Code for Sustainable Building (CSB) be established; (2.9) the CSB be based on the BRE Environmental Assessment method (BREEAM) and incorporate clearly specified minimum standards in key resource efficiency criteria (energy and water efficiency, waste and use of materials);
(2.17) Government and industry set up, within three months, a joint venture body to develop and establish the CSB. Once the CSB is established the Group recommends that the management and maintenance of the CSB should be undertaken by this body together with the consolidated advisory bodies that emerge from the review recommended in para 1.8; (2.18) the public sector continue to lead the way by using the CSB on all its building projects; (2.19) for procurement of buildings, these standards (the common minimum standards for public sector procurement) should be aligned with the CSB;
(2.20) the Government continues leading by example, and procures buildings on a whole life cost basis;
(5.2) the Code for Sustainable Buildings should be developed to apply to major refurbishments.

1. We support the Task Group’s view that a level playing field is needed across industry and the public sector on the standards to which buildings can and should be constructed, and which could also allow for a consistent and comprehensive means of measuring such performance. Those involved in the building process, whether new build or refurbishment, should be encouraged, where appropriate, to reach higher levels of environmental performance than those stipulated by regulation. We believe that the Task Group’s recommendation for the development of a Code is a constructive approach to achieving this. However, a decision on the most suitable body to take on long-term management and maintenance of any future Code will be taken once a full understanding of the resource requirements and impacts has been established. This will be one of the main areas for consideration by a senior steering group comprising representatives from across industry and government.

2. We fully recognise the need to maintain the momentum on this agenda, and specifically the principal recommendation for a Code. ODPM, with support from Defra, DTI and OGC, will therefore take the lead for Government in immediately setting up a project team to establish the senior steering group and develop the Code. We believe that it is essential that there is full involvement of industry and other stakeholders in developing this Code. Therefore, in taking forward this work we welcome direct industry involvement in the project team as it will be crucial that any proposed Code has the support and commitment of industry. The project team will consider carefully how best to involve all the relevant stakeholders.

3. We will work closely with local authorities and developers to ensure that a full-scale demonstration of how the Code will be applied in practice is available across the Thames Gateway, and in a range of other locations. The Senior Steering Group will be established as soon as possible and we aim to publish a first outline of the Code in time for the Sustainable Communities Summit in January 2005. Our aim is to complete the Code by the end of 2005, and to take action on the national rollout by early 2006.

4. It is essential that any Code is practical, cost-effective and flexible enough to be achievable by all. Part of the demonstration process will be to carry out a full Regulatory Impact Assessment and economic assessment. Also, as part of this, we will research into the standards, good practice and technical expertise already available and being promoted by industry. We will therefore look to ensure that we do not “reinvent wheels” unnecessarily. As the report also made clear we will consider how best to build upon the excellent work already undertaken by BRE (Building Research Establishment) on BREEAM (BRE Environmental Assessment Method) as well as other work including our successful Millennium Communities programme on which we work with English Partnerships, to ensure there is synergy.

5. Planning and Building Regulations set the basic standards to which construction must adhere. Beyond that, the Senior Officials Policy Group (SOPG), chaired by the Office for Government Commerce, is working to set out common minimum standards that should apply to public sector procurement.

6. The SOPG’s common minimum standards for the procurement of built environments are broad ranging and cover a wide range of issues across the entire sustainability spectrum and beyond. The standards will, once finalised, set out a series of requirements with which public sector projects will be expected to comply.
Government will, as far as possible, seek to ensure that the Code and the common minimum standards are aligned.

7. Government already has considerable best practice guidance within the “Achieving Excellence in Construction” initiative, as well as overall targets for improvement in performance in the “Framework for Sustainable Development of the Government Estate”. This existing best practice already calls for all new build projects to achieve a BREEAM “Excellent” rating and for refurbishment projects to achieve “Very Good”.

8. It is important that Government lead the way for public sector procurement but it is also crucial that industry is able and willing to participate fully. The development of the Code must look to test how best to achieve widespread buy-in. However, the Code has the scope to be a vital tool in allowing a single integrated and focused assessment of sustainability performance.

9. The Government’s aim is to help achieve a Code that is broad based, achievable and cost effective and which will allow government, as a key stakeholder, to include it as a key part of OGC’s Achieving Excellence in Construction best practice guidance. This forms the recognised best practice guidance on construction procurement for government departments, supported as such by the National Audit Office, and will enable the Code to be used widely across the public sector. We shall also ensure that the Code is consistent with the Government’s policy for renewable energy and considers the environmental impact of materials across their entire life cycle. Our intention is to examine the mechanisms that will maximise the take-up of the Code.

10. Government procurement policy, as set out in “HM Treasury Procurement Policy Guidelines, Government Accounting Chapter 22”, make clear that all public procurement of goods and services, including works, is to be based on value for money, having due regard for propriety and regularity. Value for money is defined as being the optimum balance of whole life cost and quality (or fitness for purpose) to achieve the user requirements. The procurement of buildings must follow these guidelines.

11. We support the Group’s view that there needs to be a focus on the existing housing stock if we are to achieve the savings and quality of build that we are aiming for. This will be a major consideration during the development of the Code.

12. In the meantime, and to assist with this consideration, ODPM has asked the Sustainable Development Commission to develop a project to explore ways to improve the sustainability of the existing building stock.

C. Building regulation

(3.2) If for any reason the (Sustainable and Secure Buildings) Bill should fall, Government should legislate at the earliest possible opportunity to ensure that the legislative objective is achieved;
(3.4) Government should set out promptly how it intends to ensure this process is completed (the passage of the Sustainable and Secure Buildings Bill).

13. We are optimistic about this Bill reaching the statute books as it is well supported inside and outside government. We are working hard to support this Bill in its passage through Parliament. We cannot, of course, pre-judge the outcome of this Bill. It is therefore not possible at this early stage to draw up plans to prepare another Bill, should the Sustainable and Secure Buildings Bill not be enacted. However, should this Bill fall, ODPM will certainly look for other suitable legislative opportunities to take the Bill’s provisions into law.

14. The Bill is currently in the House of Lords. It must receive Royal Assent by the end of October 2004 or it will not become law. The provisions dealing with sustainability issues will come into force two months after Royal Assent. The powers will be usable from then onwards.

15. It is at this stage that the Government would set out the regulations it might wish to make under the new powers. The proposals would then be developed and subject to full public consultation. At that point a draft approved document (ie formal guidance on what was being proposed) and a draft Regulatory Impact Assessment would be completed. Both of these, understandably, will take time.

16. If the Bill is successful we will work hard to ensure that Regulations using the new powers are effective as soon as is feasibly possible after Royal Assent.

[Note: the Bill received Royal Assent in September 2004]

(3.7) A 25 per cent energy efficiency improvement under Part L should be delivered by the Government through the Building Regulations by 2005.
17. In line with the commitments in the Energy White Paper the Building Regulations energy efficiency provisions are being reviewed with the aim of raising standards over the decade and bringing the next major revision into effect in 2005 whilst remaining proportionate, cost effective, sufficiently flexible for designers and free of unacceptable technical risks. Consultations are now proceeding and proposals for amendments in 2005 include provisions for low and zero carbon systems including the use of solar energy. The consultation will include a forward look to further improvements that could be introduced around 2010. We are therefore receptive to the Task Group’s recommendation for a 25 per cent energy efficiency improvement in 2005 and will take it into account in the review process.

(3.14) The Government and Local Authorities should review the enforcement of the Building Regulations to ensure the regulators have the resources and training to conduct reliable post-completion checks on a proportion of all new and refurbished buildings.

18. Government agrees that there are certain issues surrounding the enforcement of Building Regulations that could be considered further in order to strengthen and ensure correct implementation of the Regulations. The Energy White Paper makes it clear that Building Regulations play an important role in delivering improvements in energy efficiency. The planned consultation due in summer 2004 on aspects of Building Regulations will include consideration of enforcement issues.

(5.3) Government should consider further amending Schedule 1 of the Building Regulations, extending their scope to cover a wider range of sustainability issues when refurbishing the existing building stock.

19. At present there is no power in the Building Act 1984 to amend Schedule 1 of the Building Regulations 2000 (as amended) to cover sustainability issues beyond the conservation of fuel and power or the conservation of water, whether in new or existing buildings. However, the Sustainable and Secure Buildings Bill currently before Parliament will, if it becomes law, enable the full range of sustainability issues to be addressed in Building Regulations and to be applied to existing buildings in many more circumstances than at present. The Government is optimistic about the Bill becoming law as it has been well supported both inside and outside government. If successful we will consider what scope there is for including issues surrounding sustainability not only for new build but also in refurbishment.

D. PLANNING

(4.8) Government should produce, as a matter of urgency, a best practice guide for delivering sustainable buildings to accompany PPS1 “Creating Sustainable Communities”.

20. Government is supportive of the principle of producing best practice guides, believing that these are a useful way of sharing knowledge and improving practice.

21. We therefore recognise the argument for this recommendation.

22. Consultation on the draft PPS1 finished on 21 May and we are currently considering and analysing all the responses. Alongside this we will consider carefully the points made by the Sustainable Buildings Task Group. In the first instance, we will need to concentrate on revising PPS1, but will consider what further good practice guidance could be produced to support the document.

23. To accelerate the delivery of high quality housing we will also consider the possibility of including eco-efficiency measures in the development of Urban Design Codes, currently being tested through a pilot project established by ODPM, in partnership with CABE and English Partnerships.

24. We are also consulting widely with stakeholders on the way forward with the recommendations which came out of the Barker review, which include specific proposals for the introduction of a planning gain supplement. We will make clear our approach on this in autumn 2005.

25. Practitioners should also be aware that there is an existing guide, “Planning for sustainable development: towards better practice” (DETR 1998, reprint 2000).
E. **Recommendations to Industry**

(7.5) The Construction Products Association (CPA) and the DIY suppliers in consultation with the Government’s Advisory Committee on Consumer Products and the Environment (ACCPE) look at the feasibility of introducing an Environmental Product Declaration scheme for sustainable construction products and materials that is applicable to both the consumer and professional market and is relevant at both product and building level. Such a scheme should be based on ISO 14020 in order to be internationally acceptable.

26. We welcome this proposal and planned further exploration by the industry. Encouraging more sustainable consumption and production is an important policy area in the UK, and Defra has made it one of its five key strategic priorities. “Changing patterns: UK Government framework for Sustainable Consumption and Production” was launched in September 2003. A key element of the Framework is informed individual and corporate consumers, alongside encouraging wider take up of “corporate transparency”, including environmental reporting and environmental management systems.

27. Clear and reliable labelling schemes can help both stimulate purchases of more sustainable goods, and promote the market for environmentally improved products. An environment product declaration scheme could potentially contain a lot of detail and might be more applicable in the business to business market. We would expect the CPA and DIY suppliers to consult relevant experts as they look at the issues in more detail—including, as the report acknowledges, our Advisory Committee on Consumer Products and the Environment who provide advice on policies to reduce the environmental impacts of goods and services. We will look to take forward any outputs in parallel with our Market Transformation Programme.

28. We look forward to industry coming up with proposals on what a scheme could look like and how it might work in practice.

F. **Training and Research**

(3.16) Government should, through the Learning and Skills Council (LSC) and Sector Skills Council (SSC), encourage sustainability in the construction industry through improved training and increased capacity.

29. Government recognises that the construction industry must be forward looking in developing its skills base, including sustainability aspects. Government officials have emphasised the importance of Skills for the Future with the LSC and the SSC. The Councils have accepted this as a key element of their forward strategies and that it is relevant to the Sector Skills Agreements being developed, although appropriate mechanisms for delivery will need to be considered carefully.

30. The Barker review highlighted a range of skills shortages in the construction sector and challenged CITB-Construction Skills and the industry to develop a strategy for substantially increasing the take-up of apprenticeships alongside improvements to the level and availability of training.

(2.13) There should be an emphasis by Government and industry on an integrated programme of built environment research to underpin the implementation of its recommendations; (5.5) Government and industry jointly fund further research into cost-effectively improving the thermal efficiency of the existing building stock.

31. The Government recognises the need to radically improve the thermal efficiency of existing buildings. It is a vital component of government targets for carbon savings and eradicating fuel poverty.

32. Research can have an important role in bringing forward, and raising confidence in new and emerging energy efficiency technologies and measures. By the end of 2004, the Government will review their current research output, in consultation with industry where appropriate, to ensure that the development of research programmes is sufficiently integrated. However, we are already making good progress within this area. Government:

— has funded over £2 million worth of projects aiming to improve sustainable refurbishment and benchmarking the whole life performance of buildings, including energy efficiency. Its current portfolio includes projects developing design guidance for the environmental refurbishment of residential towers and demonstrating how the environmental and social performance of existing...
housing can be improved during the refurbishment process. The SBTG report will help inform the development of priorities for future calls for proposals under the DTI Technology Strategy;

— is supporting the Carbon Trust who lead in low carbon technology innovation across all sectors, working in partnership with other funding bodies and venture capital funds to support a range of energy efficiency and low carbon technologies. Its Innovation Programme aims to accelerate the development of these technologies in the UK, and provides a funding continuum across the low carbon innovation process that invests in projects and leverages further funding. The Carbon Trust will be developing its Innovation programme, to ensure new low-carbon technologies will become available on the market in the coming decade, and beyond;

— will establish the National Centre for Sustainable Communities Skills, announced by the Deputy Prime Minister in April 2004, to promote world class skills sets for everyone engaged in the sustainable communities agenda, including those involved in sustainable design and use;

— is considering the scope for research to be carried out later this year on how local authorities are planning and implementing work to meet the Decent Homes Standard. This will include how local authorities are improving the thermal efficiency of their stock to and above the standard and will inform the evidence base for assessing the impact of this work on carbon emissions and fuel poverty as well as the decent homes target; and

— is managing the English House Condition Survey which monitors how the condition and the energy efficiency of the housing stock is changing. This ongoing survey will continue to provide key evidence for assessing overall progress in improving the energy efficiency of the stock, alongside progress towards meeting our decent homes target.

G. Energy

(6.2) Existing buildings should have an operational rating, as this could help to identify inadequate building management. Such a requirement would encourage building owners/occupiers to improve their knowledge of their actual energy consumption.

33. ODPM has overall responsibility for implementing the EU Directive on the Energy Performance of Buildings, looking at both residential and non-residential premises. The Energy Performance of Buildings Directive, which has to be implemented in European Member States by 4 January 2006, will require building energy performance certificates (not more than 10 years old including an asset rating) to be made available when certain buildings are constructed, sold or rented out. It will also require larger buildings accommodating certain public organisations that deal in person with the public to have certificates including an operational rating updated on a regular basis and clearly displayed.

34. Proposals for implementation will be included in the Building Regulations Part L amendment consultation document due to be published in summer 2004. Government will need to assess carefully the options for going beyond the requirements of the Directive. It may be possible, if the Sustainable and Secure Buildings Bill is enacted, to enable regular recertification during occupation to be required more widely. However, we are not able to pre-judge the outcome at this early stage, and would also need to consider whether it is possible to develop appropriately tailored regulations.

(6.3) The Group supports the proposals for energy efficiency in the (Housing) Bill and recommends that similar requirements need to be applied to the sale of new houses.

35. We believe that proposals in the Energy Performance of Buildings Directive (EPBD), which has to be implemented in European Member States by 4 January 2006, will adequately deal with the requirement to make the level of energy efficiency of a home more accessible. The EPBD will require building energy performance certificates (including an energy rating not more than 10 years old), to be made available for dwellings (including new houses) and other buildings when they are constructed, sold or rented out.

K. Fiscal incentives

(2.31) Government should further consider tax credits or other financial or fiscal adjustments, which would enable development in accordance with the CSB; (8.2) New homes built in accordance with the CSB should be subject to a reduced rate of Stamp Duty; (8.4) Government should consider amending the Stamp Duty regime so that a rebate is made available to those homebuyers who carry out such works within a reasonable time frame. When sufficiently good information is available, this rebate could be extended to cover water efficiency investments.
36. Incentives for improving the environmental performance of buildings are routinely considered as part of the Chancellor’s ongoing review of all tax policy, and the suggestions and views of the Task Group will be taken into account when taking decisions for the Budget.

37. The Government has already made significant progress in restructuring the fiscal system of the UK to increase the incentives for better environmental performance for buildings. Examples include the reduced rate of VAT which applies to the professional installation of insulation, enhanced capital allowances for the use of certain energy and water savings technologies and the newly introduced landlords energy saving allowance. As indicated in this year’s “Energy Efficiency: The Government’s Plan for Action”, in taking account of social, environmental and economic factors, the Government does see a role for the use of fiscal incentives to incentivise high environmental standards as an instrument for securing further development. In particular, the proposed green landlord scheme is an incentive that could be linked to the environmental standard of the individual property.

(8.3) Government should continue to negotiate in the EU to establish amendments to the VAT Directive that allows lower VAT rates to be applicable to a wider range of environmentally efficient products.

38. In line with the Task Group’s thinking on this, in the current negotiations on the VAT Directive the Government has argued for a reduced rate of VAT on the purchase of energy saving materials and energy efficient products. However, this has not been agreed, and nor does it appear likely to be, by other Member States and as a Directive that governs the treatment of a tax, agreement must be reached by unanimity. The Government will however, continue to press for the necessary changes to allow greater flexibility in using VAT rates to incentivise the purchase of energy efficient products and energy saving materials.

Annex 5.0

The Development and Promotion of Energy-efficient Consumer Goods

1. The Government’s Market Transformation Programme (MTP) was established in 1998 to help achieve sustainable improvements in the energy efficiency of consumer goods. The approach, generally, was to gear up and support product innovation and competition on energy efficiency issues. The core of the programme was an open consultative process to develop a common, public domain evidence base and outcome modelling capability. That would be used to engage with business and other stakeholders to build a broad consensus on the main risks and issues and to stimulate an industry response to bring forward improved products. MTP would also support practical integrated programmes of mandatory and voluntary measures, such as energy labels, minimum standards and formal industry innovation targets, to help assure sustained progress.

2. The intention now is to extend the scope of this work in line with Defra’s Sustainable Consumption and Production framework. Practical activities will include monitoring market and technological developments across a broader field of household, commercial and industrial products, establishing the scope for improvement, projecting baselines and policy outcomes and providing practical support to “product” policies and programmes. Much of the work will focus on assembling, maintaining and examining the evidence on market trends and technological development to identify future policy risks and opportunities and on the construction and implementation of “critical policy paths” to deliver the outcomes required by government objectives. Policy support activities will include developing product performance methodologies and indices, ensuring reliable consumer information and effective standards for the resource efficiency and for the more general eco-design of volume-traded goods and services.

3. Following the principles of open government and transparent, evidence-based policy, virtually all information, analysis and policy modelling tools, managed by the Market Transformation Programme, are made available via its web site www.mtprog.com.

By engaging at UK, EU and International levels with business, independent experts, policy and programme managers at an early stage, both to develop the policy evidence base and the highly specific response strategies, we are able to interpret and communicate government policy intentions in a way that allows businesses to make their own commercial risk assessments and to take appropriate pre-emptive or anticipatory action. For example, businesses might gear up their innovation processes and marketing plans, initiate or subscribe to EU-wide industry self-commitments, as an alternative to regulatory measures, or help develop the underlying technical testing and labelling methodologies which establish the competitive field and which are a practical pre-requisite for many product policy measures (eg economic measures). Development and communication of the Government’s evidence base therefore is an effective and powerful policy measure in its own right.
4. Our experience is that we cannot rely on any one single policy measure to achieve sustainable progress. In general, we need a combination of measures working together to address generic market failures such as low innovation rates or poor demand, that the balance of those measures will be different in different sectors and will need to change over time as markets mature and our policies take effect. Strategies which are forward looking, and which seek to identify and provide a timely response to opportunities and risks, can avoid potentially costly “fire-fighting” policy interventions where policy options are more limited, exit strategies can be difficult and where there are higher risks from distorting the market.

5. Relating this to the innovation process, the “market transformation approach” may be characterised as seeking to modify environmental outcomes by transparent and well-communicated long-term strategies and integrated product policy (IPP) programmes. The guiding principles are to influence supply chain behaviour by reducing the risks to innovators and increasing the risks to non-innovators.

6. To date, this approach has been applied in support of energy efficiency policy objectives. MTP supports the cross-cutting policy area within the Energy White Paper implementation plan. In addition to developing and maintaining the public domain products policy evidence base, important energy-efficiency policy measures include:

**Reliable Product Information**

7. The now familiar mandatory EU “A-G” energy labelling regime establishes the technical performance-based measurement methodologies and basis for competition for a range of important household appliances, including lighting. ([www.defra.gov.uk/environment/consumerprod/energylabels/index.html](http://www.defra.gov.uk/environment/consumerprod/energylabels/index.html), for more details). The most important part of the label, which is now much copied, is the energy efficiency rating scale, which provides a simple index of efficiency from A (most efficient) to G (least efficient). A similar, voluntary scheme has been implemented in the UK to describe boilers and is integrated with the performance indices used to support building regulations. The EU labelling regime is supplemented in the UK by the Energy Saving Trust’s voluntary Energy Efficiency Recommended (EER) logo which identifies and endorses the more energy efficient domestic products. Other product performance indices have been developed in support of enhanced capital allowances and the Energy Efficiency Commitment.

8. The voluntary energy star scheme is established, for office equipment, by EU regulation. This aims to identify and promote energy efficient office equipment such as personal computers, monitors, fax machines, scanners, photocopiers and printers. The focus is on how much electricity these appliance types consume when in stand-by mode.

9. The EU eco-labelling regulation establishes a voluntary labelling regime which endorses products that can meet demanding environmental performance criteria, including energy consumption, based on whole life (cradle to grave) impacts.

10. MTP’s Product Standards Information Base (PSIB) captures existing and projected future information methodologies and will provide a commentary on their reliability and suitability for practical policy applications.

**Product Standards**

11. As a member of the single European Market, there is limited scope for the Government, unilaterally, to set product standards for traded goods. In general, mandatory standards and equivalent industry voluntary agreements must be negotiated at EU level. Mandatory standards to remove inefficient boilers, fridges and fluorescent lamp ballasts from the market are already in force and have been very effective. For example, even the least efficient new fridge freezer in the EU now consumes only half as much energy compared to products that were still on the market five years ago. The proposed framework directive for the eco-design of energy using products (the EUP Directive) will, in principle, enable standards to be set for all energy-using products, except transport. It has estimated that such measures could save around 10 per cent of total EU energy consumption by 2020. In the Energy White Paper, the Government committed to support these proposals and to work proactively to influence and speed their delivery.

12. In parallel, EU-wide industry voluntary agreements have also been negotiated with product manufacturers to improve the energy performance of digital TV services, external power supplies, televisions and DVD players; and to remove inefficient domestic washing machines and dishwashers from the market. It is estimated that the digital TV services agreement alone has enabled the UK to avoid additional annual carbon emissions of around 400,000 tonnes.
Green procurement

13. Since 1 November 2003 Government policy has been for all central government departments to apply minimum environmental standards when buying certain types of product. The current (2003) “Quick Wins” list includes 27 product types and the environmental requirements cover eco-design and performance issues such as energy efficiency, recycled content and biodegradability.

The Government has indicated it will update and extend the list of environmental requirements in line with its general policy framework for sustainable consumption and production. The Market Transformation Programme has been working to identify candidates for a revised list of products and environmental requirements which are consistent with delivery of the Government’s energy efficiency and wider environmental policy objectives.

Annex 6.0

INNOVATIVE SCHEMES TO USE DISTRICT HEATING OR CHP IN ORDER TO REDUCE OVERALL ENERGY DEMAND: PART 1

This paper sets out details of the Government’s Community Energy programme, through which it supports community heating.

Brief Summary

1. Community energy is a grant fund programme to support the installation of new and refurbishment of existing community heating systems, primarily through the use of CHP across the UK. Treasury’s Capital Modernisation Fund (CMF) provided Defra with a £50 million grant fund for the programme over the three years 2002–03 to 2004–05.

Purpose of the Programme

2. The programme increases the development and installation of community heating schemes by addressing two key barriers: a lack of investment capital and a lack of knowledge on how to deliver the benefits of community heating. This is achieved by exploring two types of opportunities:

   — Parts of the UK with high heat-density (eg blocks of flats in close proximity)—where community heating offers the best environmental and economic savings. Often these areas coincide with the areas of greatest fuel poverty.
   
   — Areas that already have an existing but ageing community heating network. A nation-wide survey of existing community heating schemes showed they already served 250,000 homes and 175,000 units of multi-residential accommodation as well as education, health, government and local authority buildings. However, many of these schemes are up to 40 years old. Few of these have CHP—the most cost-effective way of improving energy efficiency. Additionally, many have inadequate temperature controls, need improvements in the level of insulation or the pipework was originally installed to very poor standards.

3. Community Energy is designed to make a significant contribution to several key government policy objects, spanning the responsibilities of DTI, DoH and DfEE, as well as Defra:

   — tackling climate change by reducing carbon emissions;
   
   — contributing to urban regeneration by up-grading the quality of the housing stock;
   
   — reducing energy costs of hospitals, universities, local authority and government buildings, schools and households (so combating fuel poverty); and
   
   — improving the health of communities by reducing fuel poverty.

Targets/Aims and Management

4. The community energy programme makes provision of up to £2 million for development support within the £50 million programme pot, leaving £48 million for capital grants. The development support is in the form of funding up to 50 per cent for feasibility studies and business plans to underpin later capital grant bids. The programme itself is managed by the Energy Saving and Carbon Trusts.
5. The programme as approved by Treasury was for the two years 2002–03 and 2003–04. The first bidding round for the programme was in January 2002 and it quickly became apparent that spend would run a couple of years beyond the allocation period to cover a slower rate of bids and delayed spend, given the complex capital works involved. Treasury agreed to an extension to the spend period to 2005–06 and, concurrently, to a third year—2004–05—for allocating funds. In early 2004, with more contracts in place and the earliest contracts now well advanced, it has become increasingly clear that contractual spend periods were optimistic and we secured a further extension from Treasury in the spend period to 2006–07 (The extended time period can be ascribed to a number of reasons, including the timescale involved in obtaining planning permission to lay the pipework. With no precedents by ways of community heating or similar programmes, the timescale of these delays had not been anticipated when drawing up the CMF bid).

6. The key aims of the programme included in the CMF bid were to deliver:

— environmental benefits by reductions of 150,000 tonnes of carbon in carbon emissions, primarily through installing 130 MW of CHP;
— social benefits by helping 100,000 people on low incomes heat their homes; and
— economic benefits by cost savings for public services in fuel bills and by attracting up to £200 million in match funding for schemes from other sources.

7. Current indications are that the programme will deliver the following outputs, which have not been announced publicly:

— 80,000 tonnes of carbon emissions saved per annum using the appropriate emission factor for current fuel use at 0.183kg/C/kWh for electricity);
— 80 MW of new installed CHP capacity;
— 100,000 people on low incomes helped; and
— £138 million of funding from other sources attracted.

8. In addition to the estimated outputs above, it worth noting that whilst the programme’s schemes are mainly based on CHP, innovative schemes are also encouraged. The first seven rounds have seen 12 schemes funded with a renewables fired element which generate a total of 58,000 MW of heat per annum.

Process and Evaluation

9. Capital applications are accepted for assessment on a quarterly basis. In the first nine bidding rounds almost 250 applications have been received, of which over 60, or around a quarter, have been awarded grants. These grants total £50 million. This exceeds the £48 million budget for capital grants, so we have agreed up to £4 million over allocation, to reflect the current drop out rate of approved bids. This leaves less than £2 million for the two remaining bidding rounds as a result of which the penultimate round will not now be run and the final bidding round—closing on 31st January 2005—will mop up the remaining unallocated budget.

10. Community energy utilises a whole life costing methodology in line with Treasury green book guidance to assess that proposed schemes represent best value for the public purse. A set of indicators has been published that successful applicants are expected to meet: eg tonnes of carbon saved per £ of grant monies allocated.

11. Applications are comprehensively assessed for both technical and financial rigor by a team of experts employed by community energy. They must also demonstrate that they will complete within the lifetime of the programme. On the basis of this detailed analysis, EST recommends a level of funding estimated to be the minimum necessary to ensure the scheme will proceed and ensure CE meets its overall objectives. Grant is offered up to a maximum of 40 per cent of the capital costs for a scheme including the boiler/CHP engine, pipe work etc. Grants average around 25 per cent of scheme costs.

12. Recommendations are then presented to an independent advisory panel, drawn from the CHP industry, Defra, the devolved administrations, local authorities, the programme managers (Energy Saving Trust and Carbon Trust) and the social housing sector. The panel meets quarterly and makes a set of final recommendations. These are then presented to Lord Whitty, the Minister with responsibility for sustainable energy, for final approval.
Annex 6.1

INNOVATIVE SCHEMES TO USE DISTRICT HEATING OR CHP IN ORDER TO REDUCE OVERALL ENERGY DEMAND: PART 2

This paper sets out progress to date on the introduction of micro CHP.

INTRODUCTION

1. Micro-CHP or domestic scale combined heat and power is the simultaneous generation of heat and power in a unit about the same size as a domestic heating boiler. Many believe the technology offers the potential for significant reductions in household energy bills and carbon emissions. The Government supports the development of this new technology and the potential it offers for significant energy savings. In the Energy White Paper, the Government made a commitment to support field trials to evaluate the benefits of micro CHP. Following the recent passage of the Energy Act the Government has also committed to producing a strategy to promote micro-generation as a whole.

MANUFACTURERS’ CLAIMS

2. Manufacturers claim that a micro CHP unit could save a typical UK household around £150 on their energy bills and cut carbon dioxide emissions by 1.5 tonnes per household per annum. These are significant savings but there is no independent data to support the claim and there remains considerable uncertainty regarding the environmental benefits of micro CHP. The emissions reduction potential of the technology could be significant given the high efficiency (about 90 per cent) with which the fuel is used. However, this is only when there is a demand for both heat and power. If the units were to be used when there was no requirement for heat, the carbon dioxide emissions associated with the power generated would be higher than grid electricity.

3. The lack of independent, objective data makes it difficult for potential investors in the technology to assess manufacturers’ claims and for policy makers to develop instruments to encourage deployment of the new technology.

4. The micro CHP industry has made representations to government on the need to encourage this technology and achieve critical manufacturing mass through a temporary “kick start” for the industry using the second round of the Energy Efficiency Commitment (EEC)—due to begin in April 2005— and through a reduction in VAT to 5 per cent for micro CHP units.

5. The Government’s response has been positive. In the budget 2004, the Chancellor announced the possibility of introducing a reduced rate of VAT for micro CHP, taking account of the emerging findings of the field trials and will consider introducing this in 2005. Furthermore, in the consultation on the next phase of the Energy Efficiency Commitment (May 2004), the Government stated that it intends to await the outcome of the field trials before making a decision about incentives for micro CHP under the EEC.

6. The field trials are therefore critical.

FIELD TRIALS

7. In last February’s Energy White Paper, the Government made a commitment to support field trials to evaluate the benefits of micro CHP. The trial, being conducted by the Carbon Trust in consultation with the Energy Saving Trust, began earlier this year. It aims to obtain robust, independent performance data from a range of impartially procured equipment in real operating environments. The installation sites are chosen by the manufacturers involved in the trial to a Carbon Trust specification so they are representative of UK building stock. This project will help determine what future trials or measures, if any, are necessary to tap the micro CHP potential of a wider domestic environment.

8. The results from the field trials will help to identify the optimum conditions for the units to maximize the carbon benefits. It was expected that early results would be available at the end of 2004 and would help inform policy development.
Delays

9. The success of the field trials depends fundamentally on the ability of manufacturers to provide the number of micro CHP units they proposed as part of their tenders to the Carbon Trust. It is now clear that manufacturers are having difficulty meeting the installation timetables they proposed. At the time of writing, only four units have been installed and none has yet delivered useful data. This is against the 60 to 100 units which should have been installed by now.

10. The Carbon Trust is working closely with the industry in order to try and increase the number of installations. It has also recently initiated a second round of bidding from interested suppliers of small CHP equipment to accelerate the process of gathering data. It is hoped that this will lead to a material increase in numbers of installations by the end of November.

11. However, industry delays mean that with the situation as it stands, the earliest we can expect any results to emerge from the trials is the end of 2006.

Conclusion

12. The case for government intervention to assist the market penetration of this technology must be compelling. The technology not only has to be fit for purpose and market ready in the UK context, but it must also deliver cost effective carbon savings under normal operating conditions. The Government and the Carbon Trust are working closely with industry, through the field trials, to help clarify these issues.

Annex 7.0

THE FUNDING AND CO-ORDINATION OF RESEARCH INTO ENERGY EFFICIENCY MEASURES IN THE DOMESTIC AND INDUSTRIAL SECTORS, AND HOW WELL RESEARCH IS TRANSFERRED INTO APPLICATIONS

1. Energy efficiency is central to UK efforts to meet its energy and greenhouse gas emissions targets. Estimates show that energy efficiency can deliver over half of the cuts in CO2 emissions needed by 2020 to be on track for the UK’s goal of CO2 reductions of some 60 per cent by around 2050. However, in order to meet our targets to 2010 and beyond there is a need to double the rate of energy efficiency improvement compared with our performance in previous decades. RD&D into energy efficiency technologies, and support for socio-economic and behavioural research, will be essential if we are to maintain this doubling beyond 2010. It will also help to build a low carbon goods and services sector to capitalise on home and overseas market opportunities.

2. There is a clear role in the energy efficiency sector for publicly funded RD&D programmes. Firstly, to provide coherence and focus for energy efficiency across the sector. The energy efficiency sector, with a few notable exceptions, is not a readily-identifiable industry like renewables. Many of the technologies (eg boilers, lamps, motors) are simply the most efficient models in a manufacturer’s range, and are regarded as the “best” models by both suppliers and customers, rather than “energy efficient” products per se. Secondly, the market pull for energy efficiency is weak. Market based signals on their own are insufficient and too short term to stimulate the private sector to invest at the necessary level to bring forward step-change technologies, which might have a 10–20 year timeframe. Publicly funded programmes help bridge the RD&D funding gap and stimulate market interest.

3. In the short run (to 2010) the key priority will be to stimulate the uptake of existing energy efficiency technologies developed over the last 20 years but which are not being widely deployed. The focus will be on the following:

— Demonstration of how these technologies perform in real life situations to give market and user confidence to use unfamiliar technologies. In the non-domestic buildings sector, demonstration is needed at the design stage, and at the operational stage where large-scale commercial demonstrations are needed.

— New research to help understand the impact of energy efficiency measures and overcome inertia in the market. “Whole systems” research is needed which takes into account market dynamics, industrial structures, policy incentives/regulation, changing lifestyles/expectations, and other factors that could change sectoral and individual behaviour. This research would help to identify the most effective combination of policy instruments, and quantify their costs and potential economic, social and environmental benefits. It would need to complement or be closely connected with existing programmes (eg the Research Councils’ “Towards a Sustainable Energy Economy” programme). In this context, more research is also needed to monitor and evaluate energy efficiency measures, eg the £5.4 million Carbon Vision programme “Buildings for Low Carbon Communities”.


4. In the longer term (to 2020 and beyond), two categories of R&D are needed to stimulate the technological development of energy efficiency and low carbon technologies:

— Incremental R&D to reduce the capital cost and transaction costs associated with existing energy efficiency technologies, and accelerate existing technologies along the cost reduction/experience curves. The time lines for this kind of R&D should be within 3–5 years—for example, the T5 lamp, advanced insulation materials, and compressed air systems could significantly improve energy efficiency. Incremental reductions in capital costs and incremental improvements in the efficiency/quality of these products would bring them far closer to market.

— Step change R&D to bring forward pioneering technologies which have potentially a major impact in the long term. As the time frames for advancing this sort of technology is much longer—typically 10–20 years—R&D has to be stimulated now, for example, to develop integrated process control systems for low carbon buildings and new low carbon products. Examples include: light emitting diodes (LED); control and combustion technologies for the industrial sector; process intensification; materials science to stimulate the development of new insulation materials and processes; and electrochemistry.

5. Total funding provided by government (excluding the research councils) is summarised below:

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6. Working closely with the Carbon and Energy Saving Trust, Defra will continue to explore the way that we support the research, design, demonstration and commercialisation of new technologies in the most cost-effective way.

### The Contribution of the Research Councils

7. Energy efficiency research is a theme which receives support under a number of Research Council programmes, through funding provided by the Office of Science and Technology. Research Councils’ investment of £28 million in basic and strategic research in support of sustainable energy will help to identify and develop “whole system” solutions to meet 2010 and longer term targets. This “Towards a Sustainable Energy Economy” programme builds on ongoing Research Council investments in “blue skies research” and in related programmes such as SuperGen, Carbon Vision (in collaboration with the Carbon Trust), the Sustainable Technologies Initiative and the work of the Tyndall Centre. Details of Research Council investments and views in respect of energy efficiency research are being made in a separate submission from Research Councils UK.

8. Under the TSEC programme the Research Councils have established the UK Energy Research Centre, with the aim that it should provide leadership in energy research and assist in giving coherence and co-ordination to the UK energy research agenda. As well as undertaking its own programme of whole systems energy research (including issues of demand reduction), it will draw together a National Energy Research Network, develop a research atlas and provide independent advice on energy issues relevant to policy development.”
Examination of Witnesses

Witnesses: Mr Jeremy Eppel, Head, Sustainable Energy Policy Division, Dr Hunter Danskin, Technical Support and Analysis, Sustainable Energy Policy Division, Mr Chris Baker, Head, Market Transformation Unit, Environmental Business and Consumers Division, Ms Marie Pender, Head, Climate Change Agreements, National Climate Change Policy Division, Mr Paul Chambers, Sustainable Energy Strategy, Sustainable Energy Policy Division, Defra; and Mr Simon Barnes, Buildings Division, ODPM, examined.

Q1 Chairman: Can I welcome our guests and thank them very much for coming to see us this afternoon. I apologise for having kept you waiting for a few minutes while voting was going on but I am sure we will have plenty of time to ask you lots of questions and for you to answer them. We have all benefited very much from being able to read your submission, which was very helpful indeed. Thank you very much for that. One last thing to say before we start the questions is that the acoustics in this room are very bad so could I ask everyone when they speak please to speak extremely loudly because everything disappears into the ceiling and unless you speak very loudly people cannot hear. We were very interested in what you had said particularly in Annex 1 of your submission about the link between improved energy efficiency and reducing carbon emissions. That really led me to want to ask you: when you say that the Energy Efficiency Action Plan puts energy efficiency “at the heart of UK energy policy”, could you tell us exactly what you mean by energy efficiency in that context and how does it relate to your other policy goals? A subsidiary question is is primary energy or delivered energy your principal focus? Before you answer, just for the record, can you say who you are and whom you represent.

Mr Eppel: Perhaps I should introduce myself then. I am Jeremy Eppel and I am Head of the Sustainable Energy Policy Division in the Department of Environment, Food and Rural Affairs.

Q2 Chairman: Perhaps you would be kind enough to introduce your colleagues.

Mr Eppel: I am happy to introduce all of them if you like. On my right is Paul Chambers who is in the Energy Strategy Branch of my division working particularly on the Energy White Paper and Action Plan. On his right is Simon and I will let Simon introduce himself.

Mr Barnes: I am Simon Barnes from the Office of the Deputy Prime Minister. I head up a branch of the Buildings Division principally looking after sustainability issues.

Mr Eppel: On my left is Dr Hunter Danskin who is the Head of our Technical and Analytical Branch in my division. On his left is Marie Pender who looks after Climate Change Agreements in what is now a separate division called the National Climate Change Policies Division. On her left is Mr Chris Baker who is the leading person in charge of the Market Transformation Programme which sits in another part of Defra as well.

Q3 Chairman: Thank you very much. If you can still remember the question!

Mr Eppel: Yes, I think I can. In putting energy efficiency at the heart of UK energy policy what we were really trying to underline was the change in emphasis that the Energy White Paper last year brought about. For many years the emphasis has been very much on the supply side and on fuel and power rather than on the totality of systemic energy policy, and what we were really trying to do was to rebalance the emphasis in the White Paper increasingly towards the uses of energy, the demand side, and a key part of that is using energy more efficiently, for a whole variety of reasons and benefits that it can bring about. The emphasis therefore was on energy efficiency as a contribution to a sustainable energy policy which in itself is part of moving towards sustainable development, which is Defra’s overarching objective, and by that we mean trying to encourage environmental progress, economic development and social progress, particularly in the context of fuel poverty, and also ensuring energy security. So energy has the three dimensions of sustainable development but it also has that energy security one. We think the evidence is clear that energy efficiency contributes significantly to each of those, and for that reason energy efficiency was seen as a very important issue and a very important priority to bring much more to the centre of overall energy policy and that is what the White Paper did and that is what the Action Plan has further advanced.

Q4 Chairman: Thank you for that. When you talk about energy efficiency are you really talking about the amount of energy which consumers use? Would you think that an interpretation of what you are saying?

Mr Eppel: Put simply, we are saying that energy efficiency is a way of measuring how much energy you need to deliver a particular service, whether it is lighting, heating, production of goods and services, so it is the quantity of energy needed to do the job. If you can use less energy to do a particular job then that is a more efficient use of that particular resource, not only for energy but clearly energy is one of the most important resources available to us. The focus is on final energy use more than primary energy use.
Primary energy use where it is primary energy conversion from fuels into power and heat is clearly an area where there are efficiency savings to be had but the new emphasis is on end use efficiency. **Chairman:** Thank you very much. I think my colleagues will be pressing you on some of the implications of what you have said. Lord Young?

**Q5 Lord Young of Graffham:** On the concept of energy efficiency, first of all, is there a single best measure? Is there something that everybody would agree is a measure of energy efficiency? If there is not, how can its contribution to meeting energy objectives be measured? Is energy efficiency really the right term to be using in the context of the Government’s other policy which is reducing carbon emissions which is quite different in many ways policy objective.

**Mr Eppel:** You can certainly have a good measure of energy efficiency in each different part of the economy. You cannot of course have exactly the same measure because different parts of the economy have different inputs and outputs, but energy efficiency is a relevant and useful measure in each context, and that is important. It is also a partial proxy for increased carbon savings. It is not the only factor that has to be brought in when one looks at the carbon impact but a more efficient use of energy, all else being equal, will certainly result in relative carbon savings. I do not know if my colleague Dr Danskin wants to add anything on measures.

**Dr Danskin:** The main thing is that we can measure changes in energy efficiency. The other thing we have to balance this against is changes in the underlying demand for energy services like comfort or illumination or production in industry. At the moment in the household sector we have energy efficiency improving at the rate of about one per cent per annum but we have the underlying demand going up at one and a half per cent per annum so the net effect is an increase in energy consumption. If we can double the rate of energy efficiency then we can have the half per cent per annum in our favour and energy consumption will then fall. So we have to take both into account.

**Q6 Lord Young of Graffham:** If I may, Chairman, there is no direct connection between energy efficiency and carbon use. For example, if you improve the efficiency of nuclear or the efficiency of windmill generation, it would have no effect on carbon emissions but in fact produce more power.

**Mr Eppel:** In those particular examples that is true but if you are talking about a carbon free or largely carbon free original source of energy of the kind you describe there may still be benefits from being more efficient in the use of energy in cost and other environmental impacts. Certainly strictly in carbon terms it may not have much impact but the majority of energy supply in this country is not derived from those entirely carbon-free sources so for a very long time we envisage energy efficiency always having some carbon benefit and depending on, as Dr Danskin said, the rate at which consumption is growing having a more or less significant carbon benefit.

**Q7 Lord Lewis of Newnham:** Could I ask you to amplify your statement about efficiency and consumption because there seems to be an indication that as the efficiency goes up the consumption follows it, so your remark about two per cent and 1.5 per cent can in fact be interpreted the other way round. If you become more efficient then people have got a) more money to be able to spend and b) will then utilise it on other types of energy consumption, so how do you uncouple these two particular relationships?

**Mr Eppel:** Dr Danskin may want to add something to this but in reducing relative energy consumption through efficiency you are more likely to reduce the carbon content of the activity than the additional carbon generated by something else which people’s money might be spent on. In other words, there are not many things that are more carbon intensive than energy for heating homes or lighting or powering machinery. If they were to spend it on a whole variety of other things few of those would be as carbon intensive, so the chances are that by improving energy efficiency in the areas you are concentrating on you are going to have a bigger carbon impact even with the effects you are suggesting.

**Q8 Lord Lewis of Newnham:** Surely the Industrial Revolution is a prime example of where by getting more efficient what was done was to increase the number of engines rather than actually reduce the number of engines and so we turned out a much greater amount of product?

**Mr Eppel:** I am not sure the two were necessarily a direct cause and effect. Economic growth and industrial change/the Industrial Revolution was not just a product of a more efficient use of the input and energy resources. The two may have occurred simultaneously but they were not necessarily one the result of the other. I am not sure that more efficient use of energy would in itself necessarily generate so much additional wealth that the consumption caused would, as a direct result of that, increase. It might well increase for a whole variety of other reasons to do with social and economic change but not as a result solely of energy efficiency improvement.

**Q9 Baroness Sharp of Guildford:** Have you got any evidence to show that this is actually currently happening? With the exception of a period in the
1970s when the real prices of energy went up very substantially, we have never seen a very substantial drop in the consumption of energy. Have you got any evidence to support this relationship between energy efficiency and consumption which you are projecting here?

**Mr Eppel:** I will ask Dr Danskin to comment here but there is good data on the impact of previous improvements in energy efficiency on absolute levels of consumption. Perhaps you would like to highlight what has happened in the last decade or two.

**Dr Danskin:** We do build into our projections an allowance for a certain amount of comfort taking, for example in households, which means that consumers may spend perhaps up to 30 per cent of the saving on additional comfort.

**Chairman:** Forgive me, that is really not the point. The point is if you decide to take a trip on an aeroplane with your £100 saving you are still going to be using far more energy. However much of the £100 is represented by the fuel it is far more than you would have saved in domestic usage.

**Dr Danskin:** You are sharing that plane with 100 or 200 other people as well. You have to bear that in mind.

**Q13 Chairman:** On that basis there would be no gain whatsoever in producing more efficient cars, would there? If you are saying the majority of the energy use is in the things which have nothing to do with the product—then why do we worry about producing more efficient cars?

**Dr Danskin:** I am looking at first of all the energy that goes into making the product and if you buy an expensive car than if you buy a standard model. If, however, with your saved £100 you spend £100 more in petrol then you will clearly emit more carbon, but it is less carbon than gas because petrol is about three times as expensive per unit of carbon emitted than natural gas. The price of car petrol is very high because of the tax.
Q16 Lord Paul: What are we trying to get energy efficiency for? Is it to be able to use more or it is to genuinely reduce energy consumption? If it is to genuinely reduce consumption I think we need a full education process because for a long time we have been trying to promote more consumption of energy, more than average in Europe but certainly never the idea that total energy consumption should be reduced. When are we going to start the process of telling people that we need to consume less energy because that has not come in your paper or the calculation?

Mr Eppel: I think the question is a fair one. The approach historically of governments has been to address the degree to which energy is needed to produce particular economic and social benefits, so it is the key efficiency, the resource efficiency, how little energy can you use to do the good thing that you want to do. The issue of how many in absolute terms do you need or is appropriate is, it is fair to say, not one that has been totally addressed, I think by this paper or any previous ones, and it is certainly a legitimate question. I do not have the precise answer to it because it is clearly a complex economic, social, technical and political issue and I would not pretend to be able to give you a satisfactory answer, but I think the question is a legitimate one. At what point does efficiency alone not deal with the particular challenges, whether in climate change, energy security or fuel poverty? Those are questions that we clearly want to keep in mind but this particular plan does not purport to answer that question. It purports to try and set forth the most effective current package of measures to deal with a significant part of that issue which is how efficiently can we use the energy that is going in and what are the policy levers and other tools that can be used to achieve that.

Q17 Lord Paul: That is exactly why I want to ask the question: what is the motive behind the whole paper if the idea is to make everything more efficient? This exercise of trying to make everything more efficient, whether it is energy consumption or useful, has been going on for the last 50 years. If the purpose is environmental, if the purpose is reduced carbon emissions then the only way that will happen is if there is less energy consumed. There is no way you can use the same amount of energy and reduce carbon emissions.

Mr Eppel: In absolute terms that is correct. If consumption stays the same or goes up energy efficiency, as my colleague has explained, will simply keep the lid on that. If you can make energy efficiency at a higher rate, which is what we are aiming to achieve through this programme, then you can, all else being equal, if consumption does not otherwise increase, reduce absolute emissions. That is true and that equation is always there. What we are trying to deal on the energy efficiency front is not only to deal with the carbon emissions, and that is why sustainable development is a complex, multi-dimensional concept because whilst trying to deal with carbon emissions we are also recognising that there are other priorities, which are economic costs, which are energy security, and which are social fuel poverty objectives, so energy efficiency, nevertheless, is one of the best ways to achieve a significant advance on each of those objectives simultaneously. It does not completely solve any of them.

Lord Paul: I think we shall be returning to this question of how you change people’s outlook in a few minutes’ time. Perhaps we should move on with some of the more basic questions now and Lord Lewis?

Q18 Lord Lewis of Newnham: I fully appreciate your point about energy efficiency. It must be good to have a more efficient energy system. Where I think I would disagree, as Lord Paul was saying, is whether that necessarily leads to a reduction in your carbon emissions because that presupposes that this would automatically reduce the amount of energy that was used. I do not think that necessarily follows but that is a point we are going to come back to. Could I get down to the point of what the baseline for the proposed carbon savings is? Against what are you measuring the actual carbon savings and are these really savings when you set these against current levels of emissions?

Mr Eppel: They are real relative savings. They are measured against the baseline that was projected as the business as usual projection in the November 2000 Climate Change Programme for 2010, so relative to that baseline, which is the standard baseline that we use for various policies related to carbon emissions, they are genuine reductions on what would otherwise have happened had these policies not been put in place.

Q19 Chairman: So that is a baseline of carbon emissions that you are using?

Mr Eppel: The emissions projections contained in the UK Climate Change Programme issued in November 2000.

Q20 Chairman: So how would that be affected, for example, by the target of 20 per cent of renewables, of non-carbon?

Mr Eppel: As the Energy White Paper sets out, different policy components in that White Paper are envisaged or expected to produce (within a range) different contributions of carbon towards that 20 per cent reduction. Energy efficiency is envisaged to
produce about half of those reductions, renewables something like 20 per cent.

**Q21 Chairman:** But you see the relationship to the earlier point, that if people were using more energy but using it in renewables and not in carbon emission fuels you would not necessarily have increased energy efficiency but you would be meeting your baseline on carbon emissions.

**Mr Eppel:** The energy efficiency bit is independent of that.

**Q22 Chairman:** So what is the baseline for energy efficiency?

**Mr Eppel:** It is still the “business as usual” projection which already had some energy efficiency built into it but what we were saying in the White Paper and the Action Plan was that we would step up the contribution of efficiency and thereby reduce what the baseline would otherwise have been independent of how much there was in the way of renewables.

**Q23 Chairman:** This is the “business as usual” in the White Paper?

**Mr Eppel:** The business as usual in the Climate Change Programme projections which were based on Energy Paper 68 which is the DTI energy projections.

**Chairman:** We are looking puzzled here. We are still puzzled about this relationship between energy efficiency and carbon emissions but perhaps we will return to that, as time is moving on. Lord Wade?

**Q24 Lord Wade of Chorlton:** It is widely believed that low energy prices in recent years have reduced the cost-effective of investment in energy efficiency in both domestic and industrial sectors. Would you agree with this? Is it possible to effect the necessary change in outlook without major price rises which would, in turn, of course affect the Government’s fuel poverty policy?

**Mr Eppel:** I think I do agree on the whole that low energy prices have certainly made the attractiveness of energy efficiency measures lower and the pay-back has been lower, and so their cost-effectiveness has not been as attractive. I think that is undeniable as a general proposition. That is not necessarily the same as saying that significant price increases are automatically the route to achieving greater energy efficiency. Indeed, the whole thrust of the White Paper and the Energy Efficiency Action plan is that whilst the price signal is certainly important it is neither appropriate nor necessary to use only the price mechanism and that to use it in combination with appropriate regulation, voluntary measures and information tools is a more realistic and more appropriate approach, and that is the policy that the Government has adopted. However, the price signal does have a role. For instance, the Climate Change Levy was intended to send exactly such a signal but the price signal alone was not in fact proved to be as useful as a price signal coupled with voluntary measures because the Climate Change Agreements proved to be much more successful as a combination with the Climate Change Levy than the Climate Change Levy alone in those sectors that were unable to enter into such agreements.

**Q25 Lord Wade of Chorlton:** When you looked at the various scenarios of the impact this policy would have, did you look at the impact of increasing prices and finding another way of relieving fuel poverty, which is quite easy to do?

**Mr Eppel:** Those kinds of examinations are always part of the system.

**Q26 Lord Wade of Chorlton:** But have you looked at it in that way?

**Mr Eppel:** Not specifically in those terms.

**Q27 Lord Wade of Chorlton:** And you have not come to a view as to what price increases might be effective or might be possible before they start to have economic effects?

**Mr Eppel:** It was not addressed in exactly those terms.

**Q28 Lord Wade of Chorlton:** Do you not think it should have been?

**Mr Eppel:** To look and see whether putting up prices directly . . . ?

**Q29 Lord Wade of Chorlton:** Yes, what would be the general impact of looking at that aspect. I do not know what the outcome might have been but would it not have been wise to have at least looked at the impact because, coming back to the previous question, the issue arises how does the average person measure efficiency? They mostly measure it by how much it costs them because that is the only measure that they know about. If you cannot measure something you cannot manage it. They normally measure by what it costs them. If costs went up then they would have to manage it. I would imagine that this would have been at least a scenario you would have looked at as an option to be considered?

**Mr Eppel:** What we most certainly looked at throughout all the analysis underlying this work was what would be the likely price impacts of the policies and how would those in their turn affect fuel poverty. The price impacts of undertaking energy efficiency policies—energy efficiency being very low cost—are not great. For instance, for the Energy Efficiency Commitment, which is a major part of the policy in the household sector, I think the figure was about two
to three per cent over the life of the entire policy. Have I got that figure right? Two to three per cent on household fuel bills over the three years of the policy which is pretty insignificant compared with the kind of price rises which have come through from external factors, and so the view was taken by the Government that the benefits of introducing these policies considerably outweighed the small additional price effect and impact that would have on fuel poverty. So we certainly looked at that. We did not specifically look to see how much we would have to raise prices in order to solely use the price effect and measure what impact that had on fuel policy because I do not think that was politically or practically realistic to do.

Q30 Lord Wade of Chorlton: You could find another way to deal with the fuel poverty which happens in other activities.

Mr Eppel: We have a major programme of Government investment in fuel poverty (the Warm Front programme) which has just been increased and which acts directly to try and improve the energy efficiency and the heating systems of people either in fuel poverty or at risk of being in fuel poverty, so the chosen route is that one primarily.

Dr Danskin: There is a point on the business side. Modelling was done on the impact of the raised energy prices on business by putting the Climate Change Levy on, and, as Jeremy has said, the impact of the Levy alone and then the impact of the Levy coupled with the voluntary climate change agreements. The latter combination has been considerably more effective in achieving energy efficiency improvements, but on the business side it was modelled.

Q31 Chairman: Part of what Lord Wade asked was how can you change people’s outlook without price rises and that takes us back to Lord Paul’s questioning really. It is not clear from your paper what it is you intend to do to change people’s attitudes to the use of energy.

Mr Eppel: I think it is certainly a challenge to try and get people to take up energy efficiency measures even when they are cost-effective. Part of that is related to low prices but a lot of it is related to other barriers that people see to undertaking this. The whole Action Plan is directed at trying to encourage people to take up measures either through more effective offerings from energy supply companies through the Energy Efficiency Commitment or through information and awareness raising and advice from the energy efficiency advice centres, and through the Energy Saving Trust, and so on. In a sense that is a key issue and it is one that we are very concerned to address further. It is one of the reasons why the Government is examining a new approach to overall communications about climate change so that people have better context because just addressing energy efficiency in terms of cost savings for many households, not necessarily for those in fuel poverty but for better off households, has proved to be an insufficient motivation to get people to either invest or to do things which would clearly save them money. Money is insufficient as a motivating factor on its own so you need to do other things. You need to appeal to different factors which will influence their choices, whether it is concern about the environment or concern about future generations or concern about their lifestyle choices, how their home looks, how it feels, how good it will be when they come to sell. Those are the kinds of areas, and they are complex areas, they are not easy silver bullets, but they are the kind of areas we want to continue to focus on.

Q32 Baroness Sharp of Guildford: Taking the example of the Carbon Levy and the voluntary agreements, you have got a prime example here of where a price mechanism by itself actually works less efficiently than one where you have a coherent programme of organising exhortation. What you are really saying is other than this we have got a whole programme of exhortation and we are hoping it is going to work in one way or another. Do the voluntary agreements on the Climate Change Levy not indicate that you have to have something more coherent than just a whole lot of exhortation?

Mr Eppel: I do not think I would agree with you it is just a lot of exhortation. I do not think the Energy Efficiency Commitment, which is going to be doubled from next April and continue for at least six years at roughly that double level, is merely exhortation. It is a very significant investment and marketing programme.

Q33 Baroness Sharp of Guildford: It is an aspiration. It may be a commitment but a commitment by whom, the Government?

Mr Eppel: No, it is a legal obligation on the energy supply companies individually with individual targets set out in a statutory instrument, the new version of which will shortly be laid in both Houses, and which Ofgem, the energy regulator, administers and monitors and reports on quarterly. What has been both interesting and encouraging is that in each of the previous rounds for the three-year periods of this commitment, at the beginning all the energy suppliers have said, “This is going to be very tough, this is going to be a very difficult target for us to meet, you have set the bar too high,” and each time they have succeeded in meeting it. The reason that has happened is because they have had to begin to think
about how they are marketing these energy efficiency products, are they really getting the message through to the consumers. Because of their obligation and legal requirement they have had to work much harder. It will be challenging again next time because we are doubling it but we know from the evaluation of it that it both works and is a practical and cost-effective way to do it. I do not know if you want to add anything about EEC and how well it has worked up to now.

Dr Danskin: We know that reports from Ofgem say that two of the companies have met their targets six months early and are now working on the next programme because the rules allow them to carry over savings. I think other companies are still working towards that target but they are independently monitored and the targets are set in a way that means they have to install a given number of insulation measures or high efficiency boilers or similar things and Ofgem keeps a careful track of progress. If you look at the historic rates of installation of these measures there has been a significant rise since the beginning of the programme.

Q34 Baroness Platt of Writtle: What are the main barriers to improving energy efficiency across domestic and industrial sectors and what is being done to address them?

Mr Eppel: I think the barriers are different in each of the sectors. There are some common themes but I think they fall into three broad categories essentially. I think one is organisational commitment, a second is probably constraints on finance or capital, and a third is really whether the technical know-how is available to undertake the work. That is particularly true I think in the way I have described in the business and public sector but there are also equivalent barriers in the household sector. There it is lack of information on what can you do and what would make a difference and there is a perceived (not always a real) cost up-front to do something, which clearly the Energy Efficiency Commitment, for instance, is designed to help overcome because that is the basis on which the costs are significantly reduced. Also I think we must be very realistic about this. People think it going to be too much trouble. It is a big hassle. “I do not want people coming in messing up my house even if it is good for the climate or good for my bills.” Those kind of problems really require some quite innovative and smart solutions about how you can get round that because when people do have these measures installed, whether it is insulation or more efficient lighting or heating, whatever it is, they appreciate them, they welcome them, they are glad they are done but they would like it to happen just like that without anything disrupting their daily lives. One of the things that I think would be interesting is if some more creative business models were applied to this and some businesses came in which thought there was some money to be made in this and could offer the kind of turnkey solution that would take away a lot of that hassle factor. People would go out in the morning and come back in the evening and it would all be done.

Q35 Baroness Platt of Writtle: It probably cannot be like that but I did notice one of the paragraphs in your paper (which I must say I did find a bit repetitive, it went on and on and on) about training and skills, and it probably is a very important thing so that these kinds of things are done efficiently?

Mr Eppel: Certainly I think skills and training in the energy sector as a whole has never been as high as it should be and on the energy efficiency side of the equation, partly because of an historic lack of attention to this area, it has certainly not been as good as it could be, and those are indeed some important barriers that we have tried to address in the Action Plan with other partners. The Government is not going to solve this problem on its own but it can facilitate these things, particularly installing high efficiency boilers and condensing boilers. We saw that as a very specific and important barrier so we worked with the Energy Saving Trust and the Learning and Skills Council who had the money to pay for the training, and Corgi, the gas installers’ body, to devise a short, accessible and low cost but relevant programme for gas fitters to learn the benefits, not necessarily about the technicalities but whether the gas fitters are motivated to say to potential customers, “Yes, I would have a condensing boiler.” Often they turn people off by suggesting they are not as good as they should be. It is getting those 50,000/60,000/70,000 gas installers willing to reach out to the customers to say, “This is a good thing to do,” and then to be in a position to do it technically in a way that is not going to cause problems. That programme is underway and more than 10,000 have now been through this course and it is carrying on throughout this year so when next April the changed regulations to boilers come in there will be sufficient people able to operate it. In some other sectors there are similar skills and training needs but we identified that one as being most urgent.

Q36 Baroness Sharp of Guildford: It is acknowledged in the Action Plan that consumers may be tempted—and we referred to this earlier—to reap the benefit of improved energy efficiency by ‘comfort taking’. How does the Government propose to change the behaviour of consumers, apart from exhortation? Is public information enough or is the Government prepared to contemplate either new fiscal incentives
or other strategies focusing largely on energy efficiency, for instance personal carbon allowances?  
Mr Eppel: Well, we are not relying on a change in behaviour in terms of comfort taking to produce the carbon savings. We build the information about comfort taking—and it varies between households according to their income and the state of the property and we have very specific research data available to us on how much comfort taking there is—into the projections of how much energy and carbon would be saved by particular policy programmes. That is, as it were, taken as a given. We are certainly not trying to say to people you should be colder or you should not increase your comfort if you consider that is what you want to do. I do not think it is for the Government to, as it were, tell people what the right temperature is although ultimately they may find it so hot in their homes that they do need to turn down the thermostat. Turning the thermostat down to a reasonable level is not bad advice, however, it is not the principal approach that we are taking. What we are saying is there is a whole range of things we could do in terms of technology and installation that will make the home more efficient but at the same level of comfort. In terms of how to incentivise that energy efficient behaviour, there is a whole range of things and fiscal incentives are a part of that package. It is very much, as I am sure you well know, the domain of the Treasury but we have worked very closely with the Treasury over the last couple of years and have had two consultation papers on using economic instruments in this field jointly between the Treasury and Defra, and there have been a number of announcements in Budgets about particular fiscal incentives to help with this, but they have been largely confined to VAT changes for particular products, they have not been of a major kind. Without the Treasury here I am not really in a position to speculate on what further possibilities there are but it is clear that fiscal incentives have potential and we have not ruled out examining how those might contribute.

Q37 Chairman: Have you looked at some of the tougher things like personal carbon allowances?  
Mr Eppel: We have not directly examined personal carbon allowances. It is an interesting idea. It is not something we have explored up to now. Thank you for the suggestion. It is not one that is ruled out a priori.

Q38 Baroness Platt of Writtle: Going back to the VAT you mentioned, of course you have probably got to take that through Europe because Europe does not like changes in VAT for one country?  
Mr Eppel: That is indeed one of the constraints and I think the Chancellor made that clear. There are a number of things the Sixth VAT Directive precludes us from doing on particular categories of product.

Q39 Lord Winston: Even though it makes sense, it is not realistic?  
Mr Eppel: To change the VAT Directive? I think it is the stated policy of the Government that we would like to see the VAT Directive changed so that we could have greater flexibility in relation to energy efficiency. That is something that was expressed in the last Budget so it is an ambition to try and do that. Without achieving that we cannot do so much on the VAT side.

Q40 Lord Lewis of Newnham: There is a basic problem that I was unaware of until I read these papers and that is that the average residence time between people moving houses is something of the order of seven years. Seven years by the time you look at the return that you are going to get if you go in for insulation and the various other things is not a very attractive timescale, so if it were possible to include in the sale of your property some fiscal benefit from the fact that during your period there you have had sufficient insulation installed with the appropriate documentation, would this not in part start helping?  
Mr Eppel: It is certainly an issue that needs to continue to be looked at and it was one of the ones that was identified as a possibility in the last consultation paper. It is not currently actively on the front burner but it has not been completely dismissed either.

Chairman: Do you want to continue with that Lord Winston?

Q41 Lord Winston: On the same theme of the difficulty in the domestic sector of stimulating demand for efficiency measures, even with subsidies and given that the pay-back time might be relatively short, there is still a problem, and clearly one of the issues is how you are trying to overcome that issue.  
Mr Eppel: What we are trying to do is to use all policy tools available to us in combination. Getting the optimum combinations is not always easy because there is degree of adjustment as you go forward and see how things work, but we are trying to use the regulatory side. Clearly building regulations are getting tougher all the time and my colleague will talk about that shortly, I imagine, but using the work of the energy suppliers and advice and information is another but also information, for instance, through the home information pack, assuming that remains part of the Housing Bill, is an area where consumers will automatically have much more information.
about the energy performance of their home in a way they do not at the moment.

Q42 Lord Winston: How much are you able to measure the impact of those sorts of measures and have you done so?
Mr Eppel: You mean installing cavity wall insulation?

Q43 Lord Winston: No, just the information you give out to domestic consumers.
Mr Eppel: The work that is done by the Energy Efficiency Advice Centres, there are 52 of those around the country, is measured in terms of the number of people who they contact and also there is a follow-up to see how many people have taken any action as a result of that advice they were given. It is not bad actually.

Q44 Lord Winston: Can you give us an idea of what it is likely to be?
Mr Eppel: About one-third of the people who got the advice take some action. That may only be putting in energy-efficient light bulbs but it may also be putting in a new boiler.

Q45 Lord Winston: Or putting in new insulation?
Mr Eppel: Yes and if you were interested in more detail on what the Energy Saving Trust's analysis of the impact of those advice centres has been I would be happy to write to you.
Chairman: Thank you.

Q46 Lord Winston: I think we would be interested to see that stuff actually.
Mr Eppel: The Energy Saving Trust is also exploring (with our blessing) the idea of sustainable energy centres so going beyond just straight energy efficiency advice. This in a sense comes back to some of your earlier questions about the overall energy package which would also offer advice on household, renewables, and potentially on transport.

Q47 Lord Winston: How efficient is advertising in this context?
Mr Eppel: I am not aware personally of any specific research on advertising in relation to energy efficiency but again if the Energy Saving Trust has undertaken any of that research I would be happy to cover that in writing to you.

Q48 Lord Lewis of Newnham: We understand that the efficiency standards within the EU for a range of appliances are below those that are required in countries such as Japan, Canada and the United States. Similarly, if you take the standards for new buildings they are lower than those, for instance, in Scandinavia. What steps are the Government taking to address these problems?
Mr Eppel: I think you are right to identify standards as a key issue. We have not touched on it a great deal up to now but it is part of that regulatory/voluntary interface within the package. What I would like to do, if I may, is ask two of my colleagues to respond on particular aspects of that; Chris Baker on the product standards and Simon Barnes on buildings because they come from very different perspectives on those two issues.
Mr Baker: You asked about EU standards and it would be a fair assessment to say that the current level of standard setting in the EU is behind that in other major countries across the world, both in the numbers and perhaps the levels that are set. The EU actually only has three regulatory restrictions on sale and trade in inefficient goods and that is on domestic boilers, domestic refrigeration and something called lighting ballasts, which determine the energy efficiency of fluorescent light. We do have a number of voluntary agreements and it depends on your perspective whether these are adequate or not. They are certainly very old and could do with updating probably. The perspective is really one of whether we need to get rid of the worst performing goods in Europe or whether the agenda is about our stimulating innovation and that is a slightly different question and the policy options rather open up at that point.
Mr Eppel: Now on buildings, Simon.
Mr Barnes: I think the first thing is that clearly there are countries with better standards than us for buildings, whether it is energy efficiency or other issues. Certainly within Europe we are working closely with our EU friends looking at what they are doing and learning from them. We are quite well up in the list you might say but certainly not at the top. I think the review we are doing of Part L and implementation of the Energy Performance and Buildings Directive will certainly bring us pretty high up the list so we are moving in the right direction. As I say, not only are we moving in the right direction but we are working with our European neighbours to see where we can learn from best practice and they are learning from us as well. If you take Scandinavia, for instance, there was obviously a lot of pressure there to improve energy efficiency a long time ago, not for carbon measures but just for saving energy, making things cheaper and keeping warmer. We do not have quite the same issue in this country and on the carbon side, which is pushing energy efficiency to a large extent, we have different problems in this country. We are a much wetter country, as you realise over the last few weeks, whereas some of the other countries have heat problems, such as Spain and Italy. So there are different issues we are having to deal with across
Europe but we are looking to see where we might gain some benefit. One of the issues we are going to have to handle in due course is possibly overheating because whilst we are worried about the cold in the winter at the moment, clearly if the temperatures do increase, even by a small amount, it may well be that we will be looking at cooling as a problem. So all these issues are being looked at and taken into account and certainly the review of standards we are undertaking at the moment will be pushing us up into the high area.

Q49 Lord Lewis of Newnham: I take the point which is implicit on air-conditioning and, if I understand it correctly, bringing the temperature down in air-conditioning by one degree costs you a lot more energy than pushing it up by one degree so, in fact, it could be that air-conditioning could become quite a significant problem in the energy balance.

Mr Barnes: Absolutely, and one of the things we are looking at very carefully at the moment is this issue of increasing temperatures and how one might deal with that in the way that buildings are constructed. There are buildings in other very hot countries which do not have air-conditioning and they cope very well. We need to look at the way—\( \text{I am getting into the detail here} - \) buildings are orientated and where the windows are, the size of windows, the materials used, and for instance the way that heat is got rid of at night from the mass of a building. I do not want to get too deeply into that but these are the sorts of things that we will be looking at and it clearly is an issue we need to understand.

Q50 Baroness Sharp of Guildford: Can I come in on both on these issues, on the climate and then on buildings. Are we perhaps not being too complacent? As I understand it, there is in Europe an A + and an A ++ level grade. We congratulate ourselves on having fridges with the A grade but in fact there are two grades above that which we just do not advertise in this country and we do not measure so people do not know about it. If you want a really good fridge you want an A ++ fridge but as a consumer I do not know whether a fridge I buy is A, A +, or A ++. Can I come back on the building regulations. Is it not also true that while we have the regulations they are frequently flouted? What is the good of regulations if they are not being upheld?

Mr Barnes: Absolutely, I could not agree with you more there. One of the things that came out of the Energy White Paper was that we were to look at Part L, which is the energy efficiency of buildings bit, to see how we might improve and deal with compliance with the regulations, and it is something that we are taking very seriously. At the moment we are talking to the local authorities, talking to the building control people, talking to everyone we think has got a handle on this trying to get to grips with how we might improve compliance right the way across the board. You are absolutely right, there is no point in us doing all this work if we cannot make it happen out there in reality, so your point is well made and we are working hard to try to get to grips with this.

Q51 Earl of Lindsay: I was wanting to ask about compliance as well as about the content of Part L. Just staying on compliance, you say you are thinking very hard about it, you are talking very intently with local authorities and their building control departments, but with what confidence do you think you the objectives this regulation is designed to achieve will be achieved?

Mr Barnes: I feel fairly confident. We have a little bit of armoury up our sleeve now with the Sustainable and Secure Buildings Act which I think you have a little bit of information on and I can say a little bit more about. With other bits and pieces we are looking at, that will give us more strength to our elbow to ensure that we get better compliance.

Q52 Earl of Lindsay: So if you are telling us that you are confident that where compliance needs to be improved it will be improved, I take it that there is a subtext here: namely that local authorities feel they have adequate resources and adequate motivation and prioritisation, and that you can address such matters. Can we turn to the content. You have been consulting on changes to Part L of the building regulations. What have the results been of that consultation?

Mr Barnes: The consultation finished just over a week ago on 22 October and we have had some 300 responses so far. We expect to have almost double that by the time everyone has got theirs in. We allow a little bit of grace. I have to be honest, we have no analysis on it yet as I understand it, there is in Europe an A + and an A ++ level grade. We congratulate ourselves on having fridges with the A grade but in fact there are two grades above that which we just do not advertise in this country and we do not measure so people do not know about it. If you think there are 300 responses, they have got 70 set questions, each with three possible answers, and on top of that they can make various comments as well, it is not something that I am afraid is going to happen very quickly. What I can say is from the responses I have seen so far and the discussions I have had with some of the major bodies, we have had some very positive responses. There is certainly some criticism in what we are doing but in general the overall principle of what we are trying to achieve has been very well supported so we feel pretty confident we are going in the right direction. We do accept there is detail—and obviously the devil is in the detail always—that needs to be sorted out but we feel reasonably confident that we are going to cope with that.
Q53 Earl of Lindsay: Can you give us a timescale as to when the results of the consultation will become clear to yourselves and to us?

Mr Barnes: Yes. I do not know whether you are aware of the Buildings Regulations Advisory Committee but there is a statutory committee set up under the Buildings Act which advises the Secretary of State and we basically report to BRAC. We will be going to that committee with our preliminary results in December and with our final proposals in March. Those proposals will then go to the Secretary of State for his final decision, so that is the timescale.

Q54 Earl of Lindsay: Can I also follow up your reference to the recent passage of the Sustainable and Secure Buildings Act which has recently come before Parliament. I am assuming that this will lead to further consultation on building regulations specifically perhaps with a view to the introduction of the concept of sustainability. Can you confirm that? Can you confirm again what timescale such a consultation will be on?

Mr Barnes: First of all, the Sustainable and Secure Buildings Act, which came into force in September, I cannot remember what the date was, the 16th or something like that, is an amendment to the Buildings Act 1984. What it allows us to do is to make various changes which will reinforce the energy efficiency and sustainability measures. Any change that we make will have to be treated like any other SI that comes forward. We will have to have an RIA, it will have to go through all the full consultation processes that we normally would undertake. Now, there are some bits of the amendment to the Act that we have just got which will help us implement the Energy Performance Buildings Directive and the review of Part L which we are undertaking, so we will expect to bring those into force by the end of 2005, thus the process of consultation will take place throughout next year. Well, some parts of it, not all of it. Other parts we will be looking at as time goes on. I am unable to give you a timescale for how we are going to deal with those other bits and pieces at this present time because we are only now gearing ourselves up to look at how we will take it forward.

Q55 Earl of Lindsay: Can I ask one more question about compliance which is the question Baroness Sharp first introduced. You said earlier you were confident that the current discussions with the other key players, especially the local authorities, were going to achieve good compliance. What happens if your confidence turns out to be misplaced, either generally or specifically so the regulation is right but the compliance is disappointing? What powers does central government then have to achieve improved compliance?

Mr Barnes: To be honest, I do not know at the moment. We will have to look at the issues as they arise. We feel that we have the armoury and we have what we need to take things forward. If that does not work we will have to take stock and look at what other measures we will have to bring in. I think it is reasonable to say that with the extra measures we have under the Sustainable and Secure Buildings Act, we have sufficient there now to help us take things forward.

Q56 Lord Paul: I have just two questions. The first is it is fine with the design of new buildings, et cetera, but we still have a very large stock of pre-1939 buildings. What steps is the Government taking to promote new measures for energy efficiency? Secondly, compliance in the sector is fine but you install something, it meets with all the compliance, six months later there is a breakdown in the insulation, and the quality of repairmen is so poor at the moment they come and do all sorts of things that completely damage all the compliance, so what are we going to do about that?

Mr Eppel: Maybe you want to answer the compliance point and I perhaps could address the issue of dealing with the existing stock more generally.

Mr Barnes: Yes, I was going to say on the existing stock, the intention is (it is in our consultation document) that we will start to address that issue and certainly again with the Sustainable and Secure Buildings Act there is provision there for us to start to affect the existing stock. The sort of thing we are looking at is where, for example, someone is building an extension when they get the buildings regulations approval they will have to show that they are undertaking other works which will improve the energy efficiency of the building, work perhaps not brought on specifically by that extension. It may be that they will be required to insulate their roof if it is not already insulated and insulate their cavities if they are not already insulated, providing the requirement is reasonable. That is the sort of thing we will be looking at. That deals with part of the question.

Mr Eppel: I think that is a very important comment because that is a new departure in this new Act and with ODMP in the lead but working with them the Government is going to see how it can best use it.

Q57 Lord Paul: But the cost of bringing the old buildings to a reasonable level is huge compared to building a new one.

Mr Barnes: I am sorry?

Q58 Lord Paul: The cost of improving a building is far more than building a new one.
Mr Barnes: Yes, but the cost of energy efficiency measures like insulation are tiny compared with building a new kitchen or something like that so one is hoping these sorts of things are proportional and people will accept it.

“This is a waste of money, this is a waste of energy, this is pointless, and there are ways of overcoming it,” then all these other programmes should have an easier run. That would certainly be a hoped for silver lining to that cloud of higher prices.

Q59 Lord Paul: I am not sure about that. I wish I could agree with you.

Mr Eppel: Maybe I could try and partly answer the broader bit of your question which is how many of the government’s measures and programmes and policies in the Action Plan itself are addressing the existing housing stock in particular. Clearly what Simon Barnes has said about the potential of using this new Act is very important but even under the existing regulations one example is replacement boilers and windows, if you just replace the boiler or the windows then you have to bring them to a much higher energy efficiency standard than what was there. So those are important components of the building fabric of existing stock which the regulations of 2002 have already applied to and from next April the requirement to only install at least a B-rated condensing boiler, which has about 86 per cent efficiency, will be almost total. The recent announcement said that this will be widely based and there will be very few exceptions to that from next April. That is important and it has a very significant potential carbon impact on the existing housing stock because we replace about 1.2 to 1.3 million gas boilers in the UK every year. Many of the other programmes that we have touched on this afternoon—the Energy Efficiency Commitment, the Warm Front Programme, and indeed the broader programme which ODPM oversees, the Decent Homes Programme of which dealing with energy issues is a part—all of those are primarily addressing existing stock which, as you point out, is vital because we are only building about 150,000 new homes and the stock turnover will be very many years. Clearly it is important to get the high standards in new stock but we could not agree more that the existing stock is where enormous effort needs to go and that is what we have been trying to do and continue to look for ways to, as it were, tighten that potential carbon leakage.

Q60 Baroness Platt of Writtle: Presumably the fact that the price of oil and gas is going up will help you in that?

Mr Eppel: Well, to the extent that that makes people more aware of the benefits of energy efficiency and the issues we discussed earlier, yes, it should. That would certainly be the hope, although of course rising prices, as we have also discussed, have unintended and other consequences in terms of the social impact but to the extent to which it makes people think,

Q61 Lord Paul: On my second question when installation is done in compliance with modern regulations and somebody comes after a breakdown to repair it and damages all the compliance?

Mr Eppel: I am not sure insulation does breakdown. Part of it may eventually deteriorate if it has not been perfectly done but those are relatively rare instances. What we are trying to do with that installer training programme is to make sure that gas fitters and boiler engineers are in a position to fix the boiler and not leave it unfixed. That is clearly important. We have to address it on all fronts, which is where training comes in.

Q62 Lord Young of Graffham: Just one thing, talking about new housing stock and 150,000 houses a year, in our travels last year we came across district heating schemes which seemed to me to be very efficient in their actual use. Do you think district heating schemes have a contribution to make and what is the Government doing to encourage them?

Mr Eppel: We do think district heating schemes have a contribution to make but it is on a case-by-case basis because they do not always prove the best package either in cost terms or energy or carbon terms. There is certainly considerable potential, depending on the cost of money or the discount rate, and we paid for a study by the Energy Saving Trust a couple of years ago which looked at the potential across the UK (at different discount rates) for community heating and district heating, and it was pretty considerable, but the practicalities of getting that to come about are also quite challenging because a lot of different partners and players—local authorities, suppliers of pipes and systems of heating and boilers, and finance—have to come together at the same time. What the Government has done to try and encourage that is to introduce the Community Energy Programme which came in two and a half years ago with £50 million of capital grants, virtually all of which has now been allocated to schemes. It took quite a while to get going because of those complex partnership issues I was talking about. There have been nine bidding rounds now and virtually all that £50 million has been allocated and it does do good on all the energy criteria we have talked about—fuel poverty, carbon and indeed urban regeneration. We are looking to see whether there is a possibility of further continuing that but it depends on resource allocations that have yet to be made.
3 November 2004 Mr Jeremy Eppel, Dr Hunter Danskin, Mr Chris Baker, Ms Marie Pender, Mr Paul Chambers and Mr Simon Barnes

Q63 Baroness Sharp of Guildford: £50 million or £250 million?
Mr Eppel: It is £50 million of government money in capital grants but it has levered in over £200 million of private money as well so the total investment has been £250 million. It was a Treasury programme called Capital Modernisation Grants.

Q64 Baroness Sharp of Guildford: It was a form of PFI?
Mr Eppel: It is not a PFI in the sense it is not—

Q65 Baroness Sharp of Guildford: A PPP?
Mr Eppel: --- It is not about other people then owning the property but it is a partnership certainly.

Q66 Chairman: We are very grateful to you for answering so many of our questions. I am conscious that one that got lost through the cracks was Baroness Sharp’s question about improved efficiency in appliances. Could we ask you if you could let the Clerk have a note in writing with your reply to that some time in the near future. Would that be possible?
Mr Eppel: We are very happy to do that.

Q67 Chairman: The other one that fell through the cracks is our last question about research. I would also ask you to be kind enough to send us a written note.
Mr Eppel: Certainly.

Q68 Chairman: We have given you an exhausting hour and a half or so and we are very grateful indeed. We have a major task in hand and you have been very helpful to us in our inquiry.
Mr Eppel: Thank you and I think we appreciate the Committee’s interest and, hopefully, in the future support.
Chairman: I am sure we will be coming back to you with other questions over the course of our inquiry. We are very grateful to you and to all your colleagues from the other government departments for coming along to see us this afternoon. Thank you very much indeed.

Supplementary memorandum by Department for Environment, Food and Rural Affairs

On 3 November, the Select Committee on Science and Technology asked officials:

Q48 (Lord Lewis of Newnham)—We understand that efficiency standards within the EU for a range of appliances are below those that are required in countries such as Japan, Canada or the United States. Similarly, the standards for new buildings are lower than those in, for instance, Scandinavia. What steps is the Government taking to address these problems?

Q50 Baroness Sharp of Guildford:—Can I come in on both these issues, on the climate and then on Buildings. Are we not perhaps being too complacent? As I understand it, there is in Europe an A+ and A++ level grade. We congratulate ourselves on having fridges with the A grade but in fact there are two grades above that which we just do not advertise in this country and we do not measure so people do not know about it. If you want a really good fridge you want an A++ fridge but as a consumer I do not know whether a fridge I buy is A, A+ or A++.

There was no time for an answer to Q50; Defra officials were invited to provide a note to the Committee. I would also like to take the opportunity to elaborate on my brief answer to Q48.

Q48 Answer (EU Standards)

As I indicated in my oral answer, you are right to observe that, in general, EU standards are lower than in other countries, in the sense that, at present, the EU has few legal restrictions on trade in inefficient products.

So called “standards and labelling” activity is a growing and potentially powerful feature of environmental policy and is an area where co-operation at EU and International levels is both helpful in driving the innovation process and is necessary to ensure free trade in energy efficient products.

For comparison, information received indicates that:

54 countries internationally already have product Minimum Efficiency Performance Standards (MEPS) programmes; 17 more programmes are under development, covering 80 per cent of the world’s population.
MEPS activity is closely associated with product labelling programmes and with industry voluntary agreements or equivalent negotiations. Such agreements may involve major manufacturers phasing out poorer performing products or targets for improving industry-wide “fleet” averages, which allows niche markets to continue to be provided for but commits to overall improvements in the range, over time. The following summary indicates the level of MEPS activity around the world.

Canada  31 (mandatory).

USA   19 (mandatory), one voluntary.

Both USA and Canada include non-domestic products eg motors and HVAC.

North America has an Energy Efficiency Act of 1992 (EPAct) which is a piece of legislation for establishing minimum efficiency levels for electric motors manufactured or imported after October 1997. In some instances, the European Eff1 (Highest efficiency band) motor to EU tested using EU test standards would not meet, or would only just meet, the minimum standard criteria required by the American EPAct legislation and would also require testing to the more stringent NEMA test standard.

Japan  18 mandatory (has highest MEPS for air conditioners).

In terms of coverage Japan has efficiency standards for 18 different equipment types including cars, freight vehicles, transformers, office equipment, space heaters, air conditioners, TVs, water heaters, vending machines. Japan currently has labelling for 10 different products but also has labelling of retailers based on the fleet average efficiency of their sales.

China  8 mandatory plus endorsement labelling 23 products.

Korea, China, Taiwan, Philippines, and Mexico all have MEPS for air conditioning equipment.

Australia and New Zealand currently have MEPS for eight products but are developing them for many more; the Australian Greenhouse Gas Office has a general policy to adopt the highest available worldwide MEPS.

EU  3 mandatory standards (boilers, household refrigerators and lighting ballasts), five voluntary industry agreements (eg TVs and vcrs, electric motors, cold appliances, wet appliances, power supplies, digital TV equipment) plus mandatory labelling of eight household products (refrigeration, washing machines, tumble dryers, dishwashers, washer-dryers, ovens, light sources, air-conditioning).

It would be a reasonable to say that current EU mandatory standards are not particularly ambitious, neither in the numbers of standards set, nor in the performance levels they demand. The proposed framework directive on the Eco-Design of Energy Using Products (EUP) may eventually speed up delivery of standards and stimulate industry self-commitments to improve their products—but progress is slow. EUP may not now be adopted before late 2005, which means there are unlikely to be any new or updated mandatory EU energy efficiency standards before 2007 at the earliest.

Similarly, on labelling, while this policy has undoubtedly been successful in driving innovation and competition, progress at EU level has stagnated—hence the A+ and A++ stop-gap solution for refrigeration. The Energy Labelling Framework Directive 92/75EEC is in urgent need of updating to extend its coverage to a wider range of products, including non-domestic equipment, and to adapt to changing markets (eg Internet sales). But it now seems unlikely that the Commission will bring forward a revised directive before mid 2005 at the earliest.

**What the Government is Doing**

— Negotiating strongly to deliver effective EU policy measures—principally, the Energy Labelling framework directive, the proposed Eco-Design (EUP) framework directive and industry voluntary agreements.

— Supporting delivery of EU standards in the UK eg by gearing up market surveillance.

— Maintaining a strong, evidence-based position on product policy priorities and issues, and communicating that to EU Member States, industry and to other international standards-setting bodies.

— Developing and implementing UK standards by other means, for example, by embedding standards in other policy measures such as Building Regs, Endorsement, Procurement, EEC, ECAs etc.

— Working at international level to influence standards development and to identify and raise benchmarks.

— Supporting practical standards work to ensure the timely delivery of reliable product information, test methodologies and technical criteria.
There is a more encouraging story for EU-wide industry voluntary agreements. Industry may propose or update these at any time and some industries are clearly keen to do so. In particular, the EU Code of Conduct for Digital TV Services is an exemplar of what such initiatives, and what UK Government proactive support, can achieve. The resulting EU Code of Conduct on Digital TV Services establishes ambitious energy efficiency standards for set-top boxes and other related digital TV receiver equipment. We are similarly engaged in developing agreements for other consumer electronics products. TVs and power supplies and, via the Energy Star Regulation, in negotiating international standards for IT equipment.

In these areas, the EU, Government and UK Industry experts, in particular, can claim to be in the lead, worldwide. Through these activities, we are actively building working relationships with countries such as the USA, China and Australia which aim to set and raise global standards for these products.

Q50 Answer (A+, A++ Labels)

On product labelling, there are, indeed, now A+ and A++ appliances in Europe and these are also available to UK consumers. The UK Statutory Instrument which requires A+ and A++ products to be labelled came into force in July 2004 and contains equivalent labelling provisions to those in other EU Member States, so there should be no reason why consumers cannot find the most efficient available appliances.

Some manufacturers use their own advertising to draw attention to the A+ rating and the most efficient products are also promoted by the Energy Saving Trust’s “Energy Efficiency Recommended” certification scheme. Both the Energy Saving Trust and MTP are exploring the extent to which searchable product data bases could be constructed and which would make it easier for consumers to find the best products. But these tools would benefit from more promotion and support by manufacturers, by ensuring the product information is up-to-date. We are exploring with the Commission if the provision of such information by manufacturers should be made mandatory.

Energy labelling is a highly successful policy, but there are some issues with ensuring the effectiveness of labels which we are addressing. In our own surveys, only about 80 per cent of labels in shops and catalogues are fully compliant with the requirements of the directive—usually because labels are missing, on the wrong appliance or incomplete. The amount of consumer information on energy efficiency that is provided in advertising, especially via the Internet, is highly variable. Another problem is that it is difficult to challenge the accuracy of the technical information provided on the label, including the A-G rating, due to the inherent difficulties of physical performance testing of products and the expense of doing the tests.

The European Parliament and, indeed, some manufacturers are calling for policing to be improved to ensure fair competition. We are discussing via the EU labelling regulatory how best to co-ordinate policing at EU level and how the regulator and technical testing regimes could be improved in this respect. In the meantime, we plan to gear-up market surveillance activity and continue our dialogue with suppliers, dealers and with the enforcement agencies to improve compliance levels.

Overall, the current level of innovation and competition in the market, and the resulting improvements in the energy efficiency of appliances, is compelling evidence of the success and effectiveness of this product policy approach and, in particular, of EU A-G labelling and standards policy. Since 1990, this policy, which has been consistently and positively supported by Government, has radically transformed the market for consumer goods, consumer behaviour and the business culture of the whole supply chain to the point where energy efficiency is a central goal for product designers.

To Summarise

Far from being complacent, the Government is putting increasing resources into standards and labelling policy. This is identified as a cross-cutting issue for the Energy Efficiency Implementation Plan and is one of the central themes of Defra’s Sustainable Consumption and Production policy framework “Changing Patterns”. The evidence is that this is a powerful and effective driver for energy efficiency. The challenge now is to extend this approach to more products, to address broader non-energy environmental issues and to be more pro-active at EU and International levels.

The proposed Eco-Design for Energy Using Products Directive should help gear up EU standards activity. This is to establish a flexible framework for more general product standards policy for all energy-using products, and links with mandatory labelling regimes, but progress is slow. Ultimately, progress will depend on the resources that the Commission and Member States are prepared to put in to the development of and negotiation of specific measures.
Whilst we can continue to strongly support development of formal EU policy measures, there is scope, in parallel, for the Government to progress this policy via G8 and other high-level international channels and by engaging in practical co-operative projects to develop the technical standards. Where there are no effective EU measures, the Government may be able to deliver a similar outcome by embedding rising standards within UK policy measures such as Government procurement standards, Building Regulations and economic measures.

26 November 2004
WEDNESDAY 10 NOVEMBER 2004

Present: Lewis of Newnham, L
       Lindsay, E
       Patel, L
       Paul, L
       Perry of Southwark, B
       (Chairman)

Platt of Writtle, B
       Sharp of Guildford, B
       Wade of Chorlton, L
       Young of Graffham, L

Examination of Witnesses

Witnesses: Mr Tom Delay, Chief Executive, Mr Peter Mallaburn, Head of Government and International Affairs, Mr Michael Rea, Director of Strategy, and Mr David Vincent, Technology Director, The Carbon Trust, examined.

Q69 Chairman: Good afternoon. Could I welcome you all very much and welcome the members of the public who have come in with you to this public hearing of the inquiry into energy efficiency. I think you all have the information note, which amongst other things sets out the declared interests of Members of the Select Committee, so there is no need to repeat it all. Before we start, would you like to introduce yourselves and perhaps we could ask Mr Mallaburn to make the statement he has given us in writing about Dr David Vincent’s position.

Mr Delay: My name is Tom Delay. I am Chief Executive of the Carbon Trust. I have been fulfilling that role since the very beginning of our organisation three years ago.

Mr Vincent: I am David Vincent. I am the Technology Director of the Carbon Trust and I am on secondment from Defra.

Mr Mallaburn: I am Peter Mallaburn. I am Head of Government Affairs at the Carbon Trust.

Mr Rea: I am Michael Rea. I am Director of Strategy at the Carbon Trust.

Q70 Chairman: I should tell you that the acoustics in this room are appalling because the ceiling is very high and your voice sort of gets lost. So if you would just speak very loudly it would help us all very much indeed. Perhaps we could start on the questions by asking you first of all what priority, in your view, given how important it is in reducing carbon commerce, does the Government attach to energy efficiency in terms of carbon savings of measurement. The Government targets in the Energy Efficiency Plan for Action are described all the way through in terms of carbon savings. Is that the right metric to be using, or should there be more emphasis on overall energy consumption and reduction? Should we be thinking in terms of delievered energy or primary energy, and why, and could you as part of your answer tell us how the Carbon Trust’s objectives are set in terms of energy efficiency or carbon reduction?

Mr Delay: I think really carbon savings probably is the best metric that we can use because it is a very good driver of energy efficiency, certainly within the markets that we operate in and within business and commerce. In essence what we need to do is reflect on economic growth and find a way of decoupling our emissions over the next few generations from that economic growth without challenging substantially the rate at which we can achieve that. So there are basically three ways of doing it. The first measure is to simply recognise that there are times when we consume energy and we do not need to; there is no actual need for that service to be provided. I think we could probably all survive if the lights actually were turned off in this room. The second measure (which I think is complimentary to the first) is that recognising...
that we do need lights on in the room because maybe otherwise we would not be able to read our notes, we can at least ensure that the efficiency within which the primary electricity is transferred into light is as good as possible, and there is very much down to the energy efficiency of the equipment itself or of the provision of the service. The third, of course, is looking at the carbon element in the electricity that is supplied in the first place and it is essentially cleaning up the energy supply by taking the carbon element out of the fuel as far as is possible. All three of those are complimentary, and indeed in terms of describing to people what a low carbon economy looks like it is always a big challenge to recognise that energy efficiency, which I would classify as the first two (it is deciding that you do not need to consume energy in the first place or, if you have to consume energy, doing it in the most efficient way possible) is actually complementary in many cases to cleaning up the primary energy supply in the first place. So there are three measures. They are complementary. The only currency which allows you to work across all three. I think, effectively is carbon savings and therefore that is the one that we tend to come back to. So as an organisation we are very keen to ensure not only that we deliver real carbon savings but that those carbon savings are achieved in a very cost-effective way. Quite simply, we believe that the transition to a low carbon economy, for it to be real and for it to be swift, needs to be done at the lowest possible cost and therefore everything that we do needs to come back to a financial metric. Our own targets are all set in terms of carbon abated per pound of hours invested. So we literally measure the energy, the emission reduction per pound of hours invested, and we compare that between different programmes, the different priorities between them. On balance, I would say carbon savings is the cleanest of the measures.

Q72 Lord Lewis of Newnham: So you are only interested in delivered energy?
Mr Delay: We are looking to reduce the carbon emissions of the companies that we work with. So we work with a very large range of organisations and our aim in almost every case quite simply is to reduce their carbon emissions. The fact that we target our intervention in terms of helping them to reduce their carbon emissions is the only way in which we can make common currency with the fact that they face legislation, for instance, that is very often expressed in terms of a trading scheme where there is essentially a pound per tonne of carbon CO₂. So I think it is the only common currency that we can work with.

Q73 Chairman: But that is very much a kind of bottom line, financially driven measure, is it not? It is quite possible that you could have an investment of energy which is not desperately expensive but which still is very inefficient in terms of its delivery.
Mr Delay: Yes, but I think at the end of the day we are very keen to dispel the view amongst many that energy efficiency is a net cost. We believe that it is a net saving in almost every case. Energy efficiency is almost always a way of investing up front and that can be a financial investment or an investment in terms of effort and resource to change behaviours that is rewarded by lower on-going costs in years to come. It is that cost-effectiveness of the investment in energy efficiency that we are always pursuing. I think there is very little question that there is almost unlimited potential for cost-effective energy efficiency from a technical point of view. The real challenge is getting businesses, commerce and Government itself to actually make that commitment up front to get the cost savings and the energy savings associated with the cost saving over a number of years. I do not know if that helps answer the question.

Chairman: Yes, I think it does. Lord Wade wanted to come in.

Q74 Lord Wade of Chorlton: Just following on from what you have said, on the principle that you cannot manage something that you do not measure, how does the ordinary person who needs to get much greater energy efficiency in their property see that in measurement terms, because what you have defined is a whole series of issues that actually come together maybe in the sense of a corporate organisation or a government office but it is much more difficult to understand it in terms of individuals as to whether they should turn off the light or change their fittings? How can they turn all that into a simple measurement and say, “If I do that, I will then be that much better off because I will have saved that many units of something”? Do you think we need to look at the more effectively? It seems to me that what we are trying to do is present quite a complicated argument to people who want to turn it into a simple doctrine. How can they turn all that into a simple measurement and say, “If I do that, I will then be that much better off because I will have saved that many units of something”? Do you think we need to look at the more effectively? It seems to me that what we are trying to do is present quite a complicated argument to people who want to turn it into a simple doctrine.
hydrocarbon element in it that is true. You can go from cost saving to energy saving to carbon emission reduction and each is a reasonable proxy and it is a relatively straightforward way of explaining it. I think that is absolutely true. I think for the very large businesses that we work with actually there is a very different way of looking at this, which is all to do with managing compliance risk to do with new regulations coming in, and those businesses go straight from where they are to saying, “What is our financial exposure to new legislation coming in?” and because they look at it maybe in terms of the European Emissions Trading Scheme they will relate that straight into cost in carbon saving. They will take out, as it were, the energy saving in between. It is neither here nor there; they just go straight from cost to carbon. But I think overall you are absolutely right. The biggest challenge we face in many cases is explaining simply something which is not necessarily intuitive and where there is not a common currency that we can all refer to.

Q75 Lord Wade of Chorlton: I think that is an important thing that has got to be done if we are actually going to get the general public to respond to these initiatives.

Mr Delay: Absolutely, and of course the general public very often have two roles in life; they are a consumer at home but they are also very much somewhere in the workplace as part of a commercial activity and it is in both contexts that we need to effect that behavioural change.

Q76 Lord Wade of Chorlton: We want a new catchphrase which indicates the same benefit.

Mr Delay: Absolutely.

Q77 Chairman: Mr Delay, I noticed that you spoke immediately in your reply solely in terms of electricity. Is that because that is your emphasis, or would you like to say something about other forms of fuel?

Mr Delay: No, not at all. It simply depends where the primary energy source is, be it electricity, gas, or some other form of fuel. Of course, fuel oil is very much less prevalent these days in business and commerce than it was twenty years ago, so it does tend to be electricity or gas. At the end of the day the common currency that we use and that we try to talk about is carbon savings because that is something that you can relate everything back to and it is absolutely tied to our aims as the Carbon Trust. Now, I think we recognise the challenge that Lord Wade has put forward of communicating what we need to achieve, and indeed what we all need to achieve, very clearly.

Q78 Lord Lewis of Newnham: Could I just ask, in a totally different area, we were looking at waste and one of the features there, of course, was waste minimisation and the important thing about waste minimisation was the recognition on the part of industry of what they were actually wasting. Now, in the case of energy I can see that when you talk about efficiency of a particular thing like lighting, or something like that, this is something that you can persuade people to very readily and you can give them the statistics. How do you go about, however, dealing with going in there and telling them, “You don’t need to have that light on”? The first part of your particular analysis, if I understand it correctly, was, “Switch the light off.”

Mr Delay: Yes. It is an amazingly mundane answer to actually quite a difficult question. We simply go out and we tell people and show them what they achieve by walking around their businesses and simply demonstrating that there is wastage virtually everywhere in their operations, both in terms of energy consumed when there is no need for that energy to be consumed in the first place or inefficient use of energy because in many cases plant is old, has not been replaced, is not up to the latest standards, and so on. So it is an element of both. Last year we actually went into just over three and a half thousand businesses and public sector organisations in the UK and in most cases the responses and indeed the opportunities identified were very straightforward. It included things like making better control of heating, lighting, air conditioning, and so on, as well as some more advanced sort of process industry concerns and questions.

Q79 Baroness Sharp of Guildford: I was interested to note that you said in businesses now you go direct from the carbon savings to cost savings, whereas (as Lord Wade indicated) the individual does not make that jump. Do you think this is because business has now got used to the concept of a carbon trading scheme and would, therefore, the notion of giving every individual an individual carbon allowance and giving them at least a virtual idea of what they might be saving be a way forward of getting through on the domestic front?

Mr Delay: I think it is a very interesting concept and it is one I have a lot of sympathy for because I do think at the end of the day what we are trying to do is achieve a carbon saving. Well, articulate everything that you want people to do in terms of that end golden outcome. If I can come back to the first part of your question, not all businesses are familiar with the Trading Scheme and very, very few are comfortable with what it means for them, but I think it is precisely that discomfort that raises the interest amongst businesses and makes it a very productive way for us to engage with them. Ten years ago,
I think in promoting energy efficiency it would have been simply, “Save money, save energy,” and indeed for many businesses, particularly small ones, that is still the best way of getting the message across. But when we are dealing with very large businesses—and we deal with many businesses in the FTSE 100 not only of the energy intensive category but also retailers, banks, property companies and heaven knows what—they are looking at climate change as a business risk. So they are looking at it in terms of a real physical risk in the short-term. So the physical risk to the property assets that they maintain may be articulated through higher insurance premiums but nevertheless it is physical risk that they can quantify. There is a compliance risk in the medium term, which is all around the on-going development of new legislation in this area—and I can think of the Climate Change Levy, the European Emissions Trading Scheme, even the signing of the Kyoto Protocol, which without doubt creates a platform for further action going forward—and then ultimately the risk which they all look towards with real fear is the business risk associated with changing consumer patterns, and they all recognise that consumers can flick very quickly from a situation where they do not care about something to one where they do care about something quite passionately. So I think in terms of assessing their exposure they look at each of those areas. They look at the physical exposure, they look at the compliance risk, they look at the business risk in the future and in each one of those it is maybe easier to articulate it in terms of carbon.

Baroness Sharp of Guildford: Thank you.
Chairman: Perhaps we should move on now.

Q80 Lord Young of Graffham: Could we turn for a moment to the Energy Efficiency Plan for Action or the targets that the Government actually set in that. Were you consulted in the setting of those targets, and if you were could you tell us how you thought that that consultation actually amended the targets and had an effect on the Government?
Mr Rea: Yes, we were consulted in some detail as to our view. I think we will come on to this a bit later on, but our view in terms of what needed to be done was probably a lot more aggressive than I think the view Government had at the time when they were developing the plan. So I think they certainly reached out to understand our point of view and opinions and why we were saying that. In some cases I think we were successful in persuading them to do certain things, but I think we would have liked them to have done a lot more in terms of, as I say, being aggressively addressing energy efficiency.

Q81 Lord Young of Graffham: So where do you think the Government failed, or where should it have been more aggressive?
Mr Rea: I think there are quite a few opportunities. I think a topical one at the moment is the EU Emissions Trading Scheme. Again, we do not have access to the same level of data that the Government has but it appears to me (and we can come back again and look at the calculations that I have done) that the scheme at least in the first phase will not have a large impact in terms of emission reduction. I recognise that there are issues around competitiveness in terms of all the NAPs across the EU being actually fairly weak and therefore it is difficult for the UK to be more aggressive, but at the same time I think there is an opportunity to be more aggressive even with that constraint. Another example would be CCA targets. The Government has gone through a process of re-negotiating the CCA targets and in the first phase of that scheme it demonstrated that there was a lot of potential to go for, and again I think we would advocate going more aggressively for very stretching CCA targets based on the evidence that companies have delivered quite a lot in the first phase.

Q82 Lord Patel: Just to get my facts right, I was under the impression that the Carbon Trust was funded and set up by the Government?
Mr Delay: That is correct.

Q83 Lord Patel: So when we ask whether you were consulted by the Government or not, the plan came before you were set up?
Mr Delay: We are an independent company. We were set up by Government. We are funded in part through Defra core funding and in part from Climate Change Levy receipts that recycle back to the Carbon Trust to deliver business benefit and support in addressing climate change. So we are an independent company in that sense. We are very much the result of the climate change programme, you are absolutely right, but in this latest iteration in terms of developing the Energy Efficiency Plan for Action following on from the Energy White Paper we have been around a couple of years when that discussion was taking place, so I think we are probably seen by Government as absolutely not policy-makers. We provide, hopefully, market insight to policy-makers based on our work with very, very many businesses, so in some degree we are the honest broker between industry and Government and in some cases I think we can provide some insight to both parties as to what is actually going on where they would find that dialogue difficult.

Q84 Lord Patel: That leads me on to my question, which is about Government targets. The Government targets, for instance, offer savings of
over 12 million tonnes of carbon from business and public sector by 2010. Is that realistic?

Mr Rea: Again going back to our input into the Plan for Action, we believe that 12 million tonnes was entirely realistic, and indeed we believe we can achieve a lot more than that through aggressive implementation of energy efficiency measures in a way that will not damage the competitiveness of UK business.

Q85 Lord Patel: Can you enlarge on that? What mechanism would there be for achieving these targets? Is it energy efficiency, is it a change in industry sectors’ working or a change in fuel use? What is it?

Mr Rea: I think we come back to what is the right framework to think about the problem. I think the way we think about it is that you need a combination of very strong top-down measures that really incentivise business to both do the right things in terms of technology investment and to do the right things in terms of changing behaviour both at senior management level and employee level, and you need to complement that by appropriate bottom-up support. If you take that as the overall framework, that leads you to doing things like an aggressive implementation of the EU ETS, extending CCA targets, extending CCAs to cover the sectors, implementing the EU Buildings Directive in a way (going back to Tom’s point) that business might find slightly uncomfortable but which will actually engage them in thinking about climate change and how they can manage the risks and opportunities around climate change. So I do not think the things that need to be done are that difficult. I think from our perspective they seem, to some degree, obvious actually. The difficulty is that politically they are quite hard to do, because we have seen as part of the EU ETS discussion the kind of lobbying on behalf of the CBI and other industry bodies expressing real concern about the EU ETS at a time when energy prices are increasing significantly. Therefore, in that context it is very hard for Government to say, “Let’s be aggressive about the EU ETS,” and I think the difficult thing is that politically these things are difficult to do, not that the things are not well understood.

Mr Delay: Twenty-four days’ worth.

Q87 Lord Patel: Twenty-four days’ worth. So that is the Government’s target and that is twenty-four days in the year?

Mr Rea: That is right across the economy, and then of that let us say about half of it comes from business and the public sector. That is what relates to the 12 million tonnes.

Q88 Lord Lewis of Newnham: Can I just ask, the initial figure, if I understand it correctly, was that the domestic figure would be 5 million and it has been reduced to 4.2. Is that because it is easier to save the energy from industry than it is from domestic or was that a mis-assessment in the first instance of this, or was it just that it was felt that the domestic could not attain 5 million?

Mr Rea: Domestic is not something we look at, so I do not think it would be appropriate really to comment on domestic.

Q89 Lord Lewis of Newnham: Who would look at the domestic then?

Mr Rea: The Energy Saving Trust in terms of our sister organisation. But going back to your point, is it easier to reduce emissions in business, I would argue it is because we can go out and work with very, very large companies and help them make significant reductions. So the total population of organisations we work with is much less than in the domestic environment. For example, we estimate there are about 3,000 organisations with energy bills greater than £1 million in the UK. There are about 30,000 with energy bills between £100,000 and £1 million.

Q90 Lord Lewis of Newnham: But is this not a dangerous road to go along because it suggests to me that if you really wanted to sharpen up the spirit, increase the price of your energy, and if you increase the price of your energy then it is even more of an incentive for them because their incentive is not the CO2 saving, it is a financial saving? In fact one of our problems, as has been suggested to us, has been the cheapness of energy in the past.

Mr Delay: I think you are absolutely right. I think increased energy prices will actually be a stimulus to energy efficiency. I think, nevertheless, increased energy prices also have a damaging effect to economic growth, which per se energy efficiency does not. So I think that is where we need to be very careful that we do not promote one thing and actually achieve the other. I think the big challenge, and indeed it is our challenge in dealing with business on this, is to explain why energy efficiency is actually good for business. At the end of the day it very often implies, as I have mentioned, this up-front investment of resource or of
finance in something that is going to give a benefit over a number of years. It is very easy to look at any group and say, “This is a new target,” and their immediate response will be, “That will cost us so much,” but that cost does not take into account all the ongoing savings. It is actually misrepresenting the overall situation. We are absolutely clear, having worked with very large businesses, that in the vast majority of cases investing in energy efficiency is truly cost-effective as a business. Now, of course, if you then take the aim (completely outwith our debate here) of achieving literally resource productivity for UK plc ten years out, you would actually go in with extremely hard energy efficiency targets because you know that your industry will become extremely efficient and effective over that period, but you would have to put up with an awful lot of noise in the very early years.

Mr Rea: I just want to pick up on a few of the points raised. The public sector is a relatively small part of emissions relative to business. However, the big benefit of the public sector is public sector procurement, which I think we will go on to talk about a little bit later, which we think is an important lever in terms of reducing emissions. But if I could just come back to Tom’s point, what we are seeing at the moment in terms of the existing climate change programme is incentivising the largest businesses to put in place infrastructure to manage their emissions in a sensible way, but for a vast swath of business the measures are not strong enough for them to do that. Therefore, we are not building a platform from which we can increase the rate of emission reduction in this decade and the next. Just going back to your point about rising energy prices and taxes, I think one thing about business is that the investment decisions they make are often very long-term decisions. If you invest in a piece of plant it can have the life of twenty to fifty years or a hundred years in some cases and therefore having very clear signals over the long-term about how prices will evolve I think is very important, and having clarity. For example, there is a lot of confusion right now about the EU ETS and what will happen in the second phase, because most people agree the first phase has been fairly weak in terms of NAPs across the EU and there is a concern amongst business that in the second phase it will be much more aggressive and therefore business is not able to sensibly make investment decisions. Similarly with the Climate Change Levy, there is a question about whether it would be sensible for that to tick up with inflation year on year because again it is a signal to say that over time this is going to become more and more important and you need to factor that into the decision making today.

Lord Patel: Thank you.

Mr Rea: Indeed. Whether we meet them or we do not, it is whether in meeting them or not it gives us a clear steer that we are not on a path to much greater savings in years to come, and I would be worried that if we do not meet the 2010 targets it really says we are not on the right path for the future.

Mr Rea: I have been thinking about your answer to Lord Young of Graffham. I think you are probably right in a way that one of the main issues is that when we are looking at a new or ongoing target, the immediate reaction is that this will cost us money. So if you are setting a target and say, “It’s public sector procurement,” but the other point is that there are already very strong incentives to do this, because if you are a large buyer, you can actually dictate the price that you are willing to pay for a certain product or service, and if you are going to do something that is cost-effective you are willing to pay more for it. So I think it is a balance between the two points that actually makes sense. If you are starting to look at new targets, those are areas where it is going to cost some money. But if you are looking at ongoing targets, the companies are already incentivised to do this, it just costs money to start changing the way you do things. If you already have a framework in place, it already has cost, but if you are looking at new targets it is new cost.

Lord Patel: Thank you.
Mr Rea: The short answer to that is no.

Mr Delay: I think you are absolutely right. I think the reason we come back time and time again to emissions and carbon emissions as opposed to any other measure is that it is the way in which we can objectively recognise that some companies operate CHP plants and therefore they have quite a complex situation in terms of what the emissions are, what the offsetting electricity consumption is and whether that electricity consumption that is offset is coal-fired or gas-fired, and so on. It is a way of getting a common currency around the activities of that business in pursuit of an end goal for us that is very clear. So I think that is really the only reason why we stick to that. In many ways on energy efficiency you are absolutely right, that is where you get the resource productivity. We can be talking to very large FTSE companies about the risks of climate change, we can be talking to the finance directors and the board but at the end of the day when they then say, “I accept all the risk and I accept that we have evaluated the risk to us. Now, what can we do to offset it? What can we do to manage it?” nine times out of ten we come right back to energy efficiency.

Q99 Baroness Sharp of Guildford: I take it from what you have been saying that on the whole your message is getting through to some of the bigger multi-national companies in the UK with whom you are working but you are having some difficulty, given that carbon emissions are still rising, in getting the message through to smaller, medium sized businesses. What do you think the biggest barriers are with them? Is it again a short-term outlook as distinct from the longer term?

Mr Delay: I think there are three barriers and I think the three barriers are probably the same whatever the size of the business, they just factor in in different ways. The first is that energy management is simply not a core issue for very many businesses. It is for a handful and for those businesses where it is absolutely key to profitability then generally speaking energy is managed very, very well already, but it is not generally speaking a core issue. The second is that it is not always obvious what the answer is. We talk about energy efficiency and we talk about opportunity, but it is not always clear to the company what it needs to do to make something happen and that what it needs to do is not something that is going to have a significant cost in terms of the production of whatever they are producing, and so on. The third area is making available the resource (and typically it is finance but it can also be human resource within the company) to actually effect the change and make it happen. For an SME that is very true. It is simply not on the radar screen. It is generally a very small bill. It is not something that the manager usually has time to worry about, so he does not. He has no idea what he can do to actually make the change happen and it is very difficult for us to provide that knowledge to the really, really small companies cost-effectively; for the bigger ones that is no problem. The notion that he is going to take some of his funding and actually put it into energy efficiency as opposed to growing his business is kind of fanciful for many. When you get to very large businesses, the same three barriers apply but obviously far more sophisticated interactions between them apply, and indeed the measures that we, and indeed Government, put in place to try and stimulate those behavioural changes can become much more targeted. So the same basic barriers, but very differently felt by different sizes of businesses.

Baroness Sharp of Guildford: Thank you.

Q100 Lord Lewis of Newnham: I think we have already touched on your interesting Emission Trading Schemes, but could you just tell us how you see it is going to work, the effect you are expecting from it and if you are indeed playing any major role in the implementation of this.

Mr Rea: I will start with your last point. We are not playing a major role in terms of the implementation of the scheme. What we are doing is working with the companies in our pool to help them understand the implications of the scheme and to help us engage other companies in addressing climate change, because things like the EU ETS and the Climate Change Levy give us a platform from which we can go into businesses and say, “This potentially has a material impact upon you,” and we can engage with them and actually work with them. That is why, as I was saying earlier, if the NAPs are weak across Europe then it is more difficult for us to be effective in our day to day activity of working with companies. As I was saying earlier, I think the impact of the scheme in the first phase in terms of emission reduction will be relatively small. How small I cannot say for sure because I do not have access to the appropriate statistics?

Q101 Lord Lewis of Newnham: The impression I have is that of course Government has set the levels initially so that it will give the minimum impact with industry in the hope that it gives them a sort of honeymoon period until 2007 when the thing will actually bite and bite hard at that particular point. You must have contacts with industry. How far is this influencing industry itself? Is it being generally accepted? Is it something that is resented? Is it something that they look forward to with anticipation, that it may give them an opportunity of making money?

Mr Delay: Maybe I can comment on that. Firstly, it depends on the industry sector and it depends upon who you speak to within industry and how forward-looking they really are. We did carry out a study on the impact of competitiveness of the European Emissions Trading Scheme and we looked at a number of key
industries and what becomes very obvious is that there are basically two parameters that any business should be concerned about. The first is its exposure to the Trading Scheme, literally the value at risk for the company. The second is its ability to pass on any additional cost to the consumer, and there are quite credible scenarios whereby companies will be rather successful at passing on the cost to the consumer and may well end up benefiting from the Emissions Trading Scheme, and a whole number of sectors are in that category. One example where we do not see that happening is the aluminium sector where because of competition on a global scale it is very difficult to see how aluminium companies in this country will be able to in any way pass on that cost and therefore offset the very real additional cost that they will be feeling, because interestingly they are outside the Trading Scheme and therefore they do not benefit from these allowances that have been to companies inside it. So it depends which sector you are talking about. Many of the sectors are keeping now notoriously quiet because, quite simply, they are going to do just fine for the first period. I think the vast majority of industry, however, is looking with some trepidation to the future for one of two reasons; either the targets are going to have to get significantly tighter in the next round and they are going to bite and the carbon price is going to go up quite significantly, in which case they are really going to have to start taking some very significant action in that second period, or (and I think this is probably equally a threat to many businesses looking ahead) the Trading Scheme itself will fail for one reason or another—it will turn out to be too complex, the carbon price will not be sufficient and it will end up literally being a white elephant because there is no carbon to be traded. There is a number of reasons why it would fail, and if it did fail then almost certainly a carbon tax would be the next alternative and I think on balance businesses would far prefer to operate within the Trading Scheme than with a carbon tax. So I think the forward-looking companies that we are working with actually want it desperately to work because they fear the alternative.

**Q103 Earl of Lindsay**: So would you see it as being sufficient contribution to the 2010 20 per cent reduction which is set as a target?

**Mr Rea**: My own personal view is that the trading scheme is probably the most cost-effective tool we have to reduce emissions and therefore I think we should be trying to use it to do more in terms of the delivery of the 2010 CO_2_ target.

**Q104 Earl of Lindsay**: Could I also ask whether UK plc will be adversely affected in terms of our GDP growth by the ETS in respect of other EU Member States and internationally?

**Mr Rea**: As Tom was saying, that was something we looked at in some detail and I have brought along a report, which I can give to you afterwards. We analysed that question in some depth because it was something that really concerned us because we did not want to just advocate the Emissions Trading Scheme from an environmental point of view, we wanted to understand really what the competitive impacts are. Our view is that in the first phase of the scheme the vast majority of sectors will see no negative impact in terms of their competitiveness. Now, there are some exceptions to that, aluminium being one. That is our view and we have quite a comprehensive fact base to support that view.

**Mr Delay**: I think there is something else, which is that if the targets right across the EU are relatively modest in this first round and the allocations are fairly generous then overall there will need to be a tightening of those targets in the next phase and that is when we may well feel some competitive distortion if the way in which different countries have allocated allowances to different sectors and different industry sectors varies significantly. So at the moment, because essentially the likelihood is that the price of carbon will be relatively low and the targets will be relatively easy to achieve, competitiveness issues will not be a big issue. They are likely to become more significant in the next round.

**Mr Delay**: Just a quick point on that. I think one of the real concerns of business, which we have as well, is the consistency of NAPs across Europe. If the scheme is designed for each country and has a very high degree of flexibility in terms of how they set the NAP you are likely to end up with the kind of lowest common denominator, which I think is what we have seen in the first phase of the scheme. So one school of thought is

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Mr Tom Delay, Mr Peter Mallaburn, Mr Michael Rea  
and Mr David Vincent
that you have to be aggressive in the next phase of the scheme to be consistent with the EU’s Kyoto target. Another view is that the opposite could happen, in that if the rules about how you set NAPs continue to remain as they are you will end up with again the lowest common denominator solution in phase two of the scheme. So, no impact on competitiveness, but again no impact in terms of emission reduction either.

Q105 Earl of Lindsay: How can business address issues they see as being unacceptable or disproportionate distortions?

Mr Delay: I think the first point is for businesses to actually prove the case that there are distortions of that kind. I think an awful lot of industry sectors have argued that there could be distortions. I think very few, at least that we have seen, have argued conclusively that there are distortions in the Allocation Plans that have been put out. So when the facts are there and when the facts are clear then I think there are various ways in which one can address those issues, but right now the facts are not there to support the argument and therefore the development of a solution. But it is a very serious issue and it is one which at the end of the day is the sting in the tail of what is otherwise a fantastic scheme.

Mr Rea: Yes. I think governments across the EU have erred on the side of caution, so there has been a concern from business right across the EU very strongly expressed, saying that there are potential competitive impacts from the scheme. Therefore, I think governments have said, “Well, let’s in the first phase not be very aggressive and let’s see how it goes,” with the intention in the second phase of ramping things up. But again, I think it is not something that is well understood and that is something I think we need to do between now and the start of negotiations around the next phase, which is to really understand these potential distortions (or not) in more detail.

Q106 Lord Wade of Chorlton: I just want to take up a point which Mr Delay made earlier because I see entirely that when you look down from a fifty or sixty year period from now then the impact of this continual movement towards carbon reduction does have serious economic implications, and I quite agree with you, but I think that is an issue that we do not want to keep pushing away. We might be dead, but somebody will be alive and somebody will need to be thinking that their future is ripe and possible, but competitively there is no doubt that Europe will continue to suffer very seriously against other parts of the world unless longer term action is understood.

Mr Delay: Yes, absolutely.

Q107 Lord Young of Graffham: Could I just clear up something from an earlier answer. You described how you are really working with large companies and really looking at the emissions and not at small businesses (SMEs) because really it becomes too insignificant. I think my question really is, what proportion of energy is being used by large companies and what proportion by SMEs, because surely that is quite a big sector of the market?

Mr Delay: Oh, I think it is huge and it depends on the definition of the SME. An SME is defined as having up to 250 employees. Well, I mean a chemical plant with 250 employees is a serious energy user. So the vast majority of our work covers not just very large energy consumers but right the way down into SMEs. The SMEs that typically we do not address are those whose energy patterns are typically domestic and out of, I think, the four million-odd SMEs almost three and a half million SMEs have five employees or less.

Q108 Lord Young of Graffham: What proportion of the energy market would they account for then?

Mr Rea: Yes. I think governments across the EU have erred on the side of caution, so there has been a concern from business right across the EU very strongly expressed, saying that there are potential competitive impacts from the scheme. Therefore, I think governments have said, “Well, let’s in the first phase not be very aggressive and let’s see how it goes,” with the intention in the second phase of ramping things up. But again, I think it is not something that is well understood and that is something I think we need to do between now and the start of negotiations around the next phase, which is to really understand these potential distortions (or not) in more detail.

Mr Delay: Tiny, really tiny.

Q110 Chairman: Mr Delay, I am afraid we have run out of time. You have given us very full and very useful answers to the questions so far, but there are quite a few important ones that we have not been able to put to you, particularly about the Enhanced Capital Allowance scheme and any other measures you would want to recommend the Government should be taking. I wonder if we could ask if you would be kind enough to write to our Clerk with answers to those questions and perhaps we might be able to be in dialogue with you again?

Mr Delay: Of course.

Chairman: It has been a very interesting three-quarters of an hour and I am only sorry that we have to cut it short now, but can we thank you very much indeed for coming and if there is anything else you want to say to us please do get in touch with the Clerk. Thank you very much.
Supplementary memorandum by the Carbon Trust

1. **How successful has the Enhanced Capital Allowances scheme been? What improvements could be made to it?**

Unlike our other programme areas, which are solely managed by the Carbon Trust, we manage the Enhanced Capital Allowance (ECA) scheme on behalf of government. The Government is responsible for reporting on the overall performance of the scheme. Our responsibility is restricted to the Energy Technology List (ETL) of equipment, products and systems eligible for ECAs and the promotion of the scheme.

There is currently no direct mechanism for assessing the impact and cost effectiveness of the scheme. This is because claimants are not asked to detail the nature and value of their claim on their tax return.

We are currently working with Defra, Inland Revenue and HMT to analyse data from market research into the scheme. This exercise is attempting to measure impact indirectly using best available methodologies.

Based on our experience to date we believe that the scheme is effective in terms of influencing behaviours. Technology suppliers consistently tell us that the Energy Technology List (ETL) encourages equipment manufacturers to improve the carbon emission performance of their product. In addition, public sector organisations, who cannot claim ECAs as they are not subject to corporation tax, have told us that the ETL is very valuable in terms of helping them choose the most energy efficient products.

On the demand side some companies make significant use of the scheme, but overall take-up is mixed. Larger companies, who typically are investing in higher value projects, tell us that the tax break advantage of ECAs materially influences their purchase decisions. For smaller companies the situation is more mixed, primarily because they often do not make a profit and hence cannot benefit from an ECA. Where they are profitable, the value of an ECA is equivalent to about a 6 per cent reduction in the capital cost of the equipment. This is often not sufficient to tip the balance in favour of energy efficiency equipment when other factors are taken into account (e.g. cash constraints often drive purchases towards equipment with the lowest up-front capital cost).

To address this, the Carbon Trust is currently piloting a £10 million interest free loan scheme for SMEs, which offers loans of between £5–50 thousand for energy efficiency investments with a payback of four years or less. Similarly, we are also piloting a £4 million financing scheme for 18 local authorities. If these pilot schemes are successful we will be making the case to government for significant increases in their funding.

Our priorities in the future for the ECA scheme are to encourage innovation by ensuring that new and emerging low carbon technologies become tomorrow’s ETL listed technologies, taking off the list those technologies that are no longer best practice in terms of carbon benefit. We are also looking closely at how we might bring energy efficiency systems into the scheme, i.e. investments in machinery and plant that as a whole are inherently more efficient but where the carbon benefit is more difficult to verify.

We think it would also be beneficial for government to simplify some of the procedures by which technologies qualify for an ECA (e.g. in lighting, the same equipment qualifies for an ECA in some applications and not in others).

Another effective change would be for government to require claimants to provide details of their expenditure on qualifying products and technologies by putting a special box on the tax return. This would enable accurate assessment of the take up of ECAs and better targeting of the scheme.

2. **What other measures do you believe the Government could be taking to reduce carbon emissions by means of energy efficiency?**

The Government’s White Paper targets are very challenging, requiring a step change in energy efficiency take-up. Low carbon markets are highly regulated and will not deliver this change without government intervention. However throwing money at the problem does not work either—heavily subsidised markets often become dependent on the subsidy and stop innovating.

Our analysis suggests that the most cost-effective way of delivering change on the scale required would be for government to take a small number of strong, consistent and balanced policy decisions (outlined below) backed up with targeted market support from the Carbon Trust.

We think the Government has made a good start. For example, Climate Change Agreements under the Climate Change Levy (CCL) package have stimulated investment in energy efficiency improvements in those sectors that are included in the scheme. Our Carbon Management programme is picking up early signs that the EU Emissions Trading Scheme (EU ETS) is starting to encourage companies to view carbon management (i.e. actively managing the risks and opportunities of climate change/ emission reduction) as a strategic business issue.
However, we have some concerns. There is a commitment in the Energy Efficiency Action Plan that government will only procure top quartile buildings as an important signal to the market in the run-up to the implementation of the EU Buildings Directive. The expectation is that property companies who value government as a client will have to improve the performance of their stock to continue to attract business. However, the Government has shown little sign of progress on the development of detailed procurement targets which are due by the end of 2004.

Given the scale of the challenge we strongly believe that the Government can and should go further by taking much more aggressive action in a number of key policy areas. We would consider the following as priorities:

— Ensure more aggressive implementation of the EU ETS in terms of having a much lower emissions cap in the UK and across the EU 25. Experience to date points to the need to move away from business as usual projections as a means of setting emission caps. Using a business as usual approach seems to have encouraged countries to take a very conservative approach to permit allocation to ensure their businesses are not put at a competitive disadvantage. Our views on the EU ETS are summarised in our publication “The EU ETS—Implications for Industrial Competitiveness”.

— Escalate the CCL at inflation plus, year on year, for companies outside the EU ETS as a signal to business that carbon will be increasingly valued. The proceeds should be recycled to business to support investment in emission reduction.

— Consider putting in place innovative mechanisms to involve smaller businesses in carbon trading/emission reduction, for example by introducing a white certificates scheme.

— Set more stretching targets for Climate Change Agreements and broaden coverage to other energy-intensive sectors.

— Take a more aggressive approach to setting building regulations and ensure building standards are properly enforced. In addition, use the planning system to ensure larger public building projects are delivered to a standard beyond building regulations.

— Ensure effective implementation of the EU Energy Performance of Buildings Directive and in particular ensure public display of labels in buildings that the public visit, not just public sector buildings, and ensure a simple cost effective approach is adopted to calculate and display the energy performance of buildings.

— Demonstrate strong government leadership through its procurement leverage and in particular by implementing the Energy Efficiency Action Plan commitment to only procure accommodation from buildings in the top quartile of energy efficiency performance.

— Introduce differentiated Local Authority rates based on building energy performance.

— Driving forward product standards at the EU level.

3. Is funding for energy R&D which focuses on industrial processes sufficient? Should more be expected from the Government or private sector?

Overall approach

Government often sees R&D as a relatively short-term, University-based process. However R&D, including demonstration, is a lengthy process that extends well beyond the University sector. In fact the “development” process can run for 10–15 years until the technology has been demonstrated and the first scale models have been tested. In addition, there are several important funding gaps that prevent technologies reaching the market. It is important that government provides appropriate support for technologies right along the innovation chain with policies and measures designed to work with the grain of the market.

For these reasons we prefer not to view the R&D process in isolation from the rest of the support needed down the “innovation chain”.

We, and others, know that the scale of the challenge to move to a low carbon economy is immense—government funding alone will not suffice. What is required is the biggest shift in private sector investment flows since the industrial revolution. The private sector will need to switch investment towards to low carbon energy systems. To give a sense of scale, 5 major energy companies spent £56 billion on hydrocarbon assets in just one year (2002—Shell, BP, RWE, Eon, Exxon). Government has a central role in designing the policies to trigger this shift and provide the market support to help it happen.

We are the lead organisation in the UK on low carbon innovation. We focus our investment on those technologies that offer a significant carbon saving and/or economic development potential for the UK and where our level of funding can make a material difference in moving the technology forward. We think this
energy efficiency

philosophy should be broadly reapplied in terms of government funding in this area. Funding should be prioritised towards areas of high potential rather than spreading it broadly across a range of technologies. Our approach is outlined in two documents: The Low Carbon Technology Assessment and Building Options for UK Renewable Energy.

Current Government support

In terms of early stage energy R&D, UK funding is significantly lower than other developed countries. However, the quantum of funding is not the only problem. At the basic R&D stage our experience, and others in the research funding community have had similar experiences, is that money is not the limiting factor bearing in mind the comparatively low levels of expenditure typically involved—typically several £10 thousand to several £100 thousands per project. The main barrier we have seen is that quality of proposals is not as good as they need to be. We reject about nine out of 10 applications because they do not meet our quality threshold. To address this we are becoming more active in commissioning R&D in those areas where we think we can be material and make a difference. To inform our thinking, we are currently carrying out a research landscape study to find out what research is going on internationally in a range of low carbon technology areas; what the primary research challenges are; where the UK stands internationally in the research league; and, crucially, where we think we can take a lead—as we have done in the marine energy sector.

Further into the development stage, support is needed for fledgling companies spinning out of universities. This stage is characterised by Venture Capital (VC) companies taking an interest but demanding very high returns on their investment. Our experience is that there is neither a strong deal flow nor developed VC support in this sector in the UK. With this in mind, we provide incubator support to simulate the number of companies coming forward with innovative technologies. We also provide VC funding, co-investing alongside private sector funds to move technologies towards commercialisation and to stimulate the low carbon venture capital market.

Another pressing need is for demonstration of technologies. Buildings are a key sector because they are responsible for nearly 50 per cent of UK CO2 emissions. We are currently scoping out a £5 million demonstration programme to accelerate the introduction of basic energy efficiency refurbishment measures which are well known among green building designers but are not common practice.

4. What are the practical differences between large and small business regarding how willing they are to reduce their carbon emissions? Could more be done to help small and medium sized enterprises (SMEs)?

Large and small businesses have very different drivers and capabilities and therefore need very different types of support. Within the requirements of EU State Aid rules, we have tailored our programmes to be appropriate to the needs of and opportunities presented by large, medium and small organisations in the public and private sectors. Our experience is that large companies tend to be more able and willing to take action and offer the potential to make the most cost effective impact on reducing UK carbon emissions.

In terms of the market we address there are about 50,000 companies we would classify as large and around three million we would classify as SMEs. Large companies tend to respond best to a “Carbon Management” approach managing the risks and opportunities of climate change and emission reduction such as brand value and reputation. On the other hand SMEs continue to respond best to the “save energy/save money” message, which is the rationale behind the loan scheme outlined above. In addition, we provide advice for SMEs through a helpline, tailored publications and our website. We offer site energy surveys for companies where we believe this help can be material and cost effective.

We see a number of areas where further support could be provided that would in particular help SMEs to adopt energy efficiency measures including:

- Providing addition funding to extend Carbon Trust activity with SMEs eg interest free loan scheme if the pilot is successful awareness raising, helpline, site surveys etc.
- Consider introducing white certificates as outlined above.

5. How effective has the public sector been in reducing carbon emissions?

The Government has had some success in reducing its own carbon emissions. However, good examples are relatively few and far between. Our view is that a large department, so far as its energy use and energy management are concerned, is no different to the majority of large businesses. We therefore work with central government and local authorities as part of our carbon management programme to put carbon management and energy efficiency on their corporate agendas.
While public sector emissions are a relatively small proportion of the UK total, where the Government could really make a difference is in leadership and public procurement. We were pleased that the Government’s Energy Efficiency Action Plan committed departments to procure accommodation only from those buildings in the top quartile of energy efficiency performance. Provided this commitment is implemented properly, it could influence the property market significantly because it sends a strong signal to the property sector. Given that government is such a valued client (high volume, low risk) no property company that valued government as a client could afford not to improve the performance of their stock.

6. There are various bodies associated with saving energy, and various initiatives from each of these. Is this a source of confusion? Is there a case for having a “one-stop shop” for energy advice?

We need to recognise that effective energy efficiency advice and solutions will be different for large and small businesses and different again for the domestic sector.

The critical issue is to ensure that customers get what they need from sources that they trust. We are the provider of choice for business and the public sector. The Energy Saving Trust carries the same responsibility for the domestic sector. In addition, the Carbon Trust takes the lead in terms of developing new low carbon technologies/low carbon innovation. This arrangement works well in practice. Our respective markets recognise our respective positions and service offerings and we have no evidence from our customers that they are confused or see the need for a “one-stop shop.”

We do recognise that there are areas of overlap between the EST and the Carbon Trust, for example many small businesses operate in effect as domestic properties and face many of the same barriers to energy efficiency. Here and in other areas of overlap we work closely with the EST to actively manage and co-ordinate our respective activities.

The idea of a one-stop shop is intuitively appealing. There could be some synergies and cost benefits from having one organisation. We suspect, however, that these benefits/cost savings are small and might be outweighed by the loss of focus that would result in having one larger organisation.

Memorandum by the Association for the Conservation of Energy

INTRODUCTION

1. The Association for the Conservation of Energy (ACE) is a lobbying, campaigning and policy research organisation, and has worked in the field of energy efficiency since 1981. Our lobbying and campaigning work represents the interests of our membership: major manufacturers and distributors of energy saving equipment in the United Kingdom. Our policy research is funded independently, and is focused on four key themes: policies and programmes to encourage increased energy efficiency; the environmental benefits of increased energy efficiency; the social impacts of energy use and of investment in energy efficiency measures; and organisational roles in the process of implementing energy efficiency policy.

SUMMARY

2. This evidence draws upon ACE’s 25 years of experience in lobbying and policy research. Whilst we offer our own opinions throughout this document, we also draw attention to previous House of Lords Select Committee evidence also going back two decades or more. The intention here is to highlight the fact that whilst various aspects of the energy conservation debate have evolved over time, we find ourselves still talking about fairly basic and unchanged realities. This is a source of profound disappointment.

THE RELATIONSHIP BETWEEN ENERGY EFFICIENCY AND OVERALL ENERGY USE AND CARBON EMISSIONS.

3. The relationship between energy efficiency and overall energy use and carbon emissions was set out clearly in the Government’s Energy White Paper:

“Energy efficiency is likely to be the cheapest, cleanest and safest way of addressing all four objectives [of the Energy White Paper]” (para 1.19)

and

“The cheapest, cleanest and safest way of addressing our energy policy objectives is to use less energy” (Para 3.2)

4. Despite these statements, and the fact that energy efficiency is the only policy that can deliver on both CO₂ reductions and fuel poverty, the Government’s Energy White Paper stopped short of specifying any target for energy efficiency.
5. We still seek an answer to the following question:
If energy efficiency is ‘the cheapest, cleanest and safest way of addressing all four objectives’, why has the Government set a firm target for CHP (para 4.17), an aspirational target for renewables (para 4.11) but no target at all for energy efficiency?

6. Before the publication of the White Paper, a domestic energy efficiency target of a 20 per cent improvement by 2010, based on 2002 levels had been strongly recommended by the Government’s Performance and Innovation Unit in its Energy Review of February 2002. This target has also been backed by both the Energy Saving Trust and the Sustainable Development Commission.

7. Indeed, that figure was recognised to be achievable in the White Paper (expressed in terms of a possible five million tonnes of carbon savings to come from domestic energy efficiency by 2010, paras 3.5 and 3.6). The Government has stated elsewhere that annual carbon savings of five megatonnes are virtually identical to a 20 per cent energy efficiency improvement.1

8. Over 350 MPs have signed House of Commons Early Day Motions—EDM 96 and EDM 1341—in support of the five million tonnes of carbon/20 per cent figure.

9. Following the publication of the Energy White Paper, ACE sought assurances that the White Paper figures of savings of five million tonnes of carbon per annum by 2010 and a further four to six million tonnes of carbon pa by 2020 were firm Government commitments.

10. Fifteen separate assurances were given by Ministers, the Treasury, the Permanent Secretary at the DTI, a statement in Hansard and even an unprecedented offer by the Government to obtain a change in the bound volumes of Hansard. These are listed in Appendix 1 of our submission.

11. However, on 26 April this year the Government published its Energy Efficiency Implementation Plan, including the domestic energy efficiency aim required under the Sustainable Energy Act 2003. But the figure (a UK saving of 4.2 million tonnes of carbon by 2010 with 3.5 million tonnes of carbon in England from domestic energy efficiency) was 16 per cent less than the five million tonnes of carbon savings envisaged by the Energy White Paper.

12. This comes at a time when emissions of CO₂ are rising, when the Commons Environmental Audit Committee has reported that the Government is likely to undershoot its CO₂ reduction target by 25 per cent and when the latest research suggests that the threat of climate change has been underestimated.

13. We cannot stress highly enough the seriousness of the blow dealt to the energy efficiency industry by this extraordinary reversal of Government policy. The breach of specific assurances given to our industry and specific exhortations to invest on the basis of these assurances has caused a major crisis of confidence.

Previous House of Lords/House of Commons Select Committees Evidence

14. The House of Lords European Union Select Committee has received evidence specifically on energy conservation on several occasions in the past, and we would draw your attention to House of Lords Select Committee on the European Communities Session 1982–83, 8th Report The Rational Use of Energy In Industry [1]; and the House of Lords Select Committee on the European Communities Session 1990–91, 13th Report Energy and the Environment [2].

These sources will be quoted in the following evidence.

15. The most appropriate measure of energy efficiency, and the relationship between improvements in energy efficiency and overall energy use and carbon emissions.

The context must be clearly stated: “energy efficiency” is a broad term and can apply to both the supply side and the demand side. In our evidence, we take it to refer to the demand side, and the Committee should also take pains to define its terms of reference precisely.

1 HC Debate: 10 March 2003: Column 11W:

Sue Doughty: To ask the Secretary of State for Trade and Industry what percentage improvement in energy efficiency would be required to deliver from the household sector the (a) five million tonnes of carbon saving between 2002 and 2010 and (b) the six million tonnes of carbon saving between 2010 and 2020 identified in the Energy White Paper. [100783].

Mr. Meacher: I have been asked to reply. Assuming continuation of past trends for the growth in household demand for energy, an additional annual saving of five million tonnes of carbon by 2010 would correspond to an energy efficiency improvement of approximately 20 per cent relative to the year 2000. This represents broadly a doubling of the average rate of improvement seen in the 1990s. A further four to six million tonnes of carbon of annual savings by 2020 would correspond to an efficiency improvement compared with 2010 of around 18 to 22 per cent.
16. Energy efficiency can be measured and described in a number of ways, and this tends to differ between contexts, be it residential homes, commercial buildings, appliances, generation and so on. The purpose of the description is also important: for example, if the context is climate change mitigation, then £/tonne of carbon saved would be an appropriate measure. If the context were energy security, then £/barrel of oil saved would be appropriate.

17. The House of Lords European Union Committee has addressed the issue of measurement of energy efficiency before, although it did not reach a satisfactory conclusion concerning energy intensity (derived by dividing GNP by energy usage) as a measure of energy efficiency:

18. [2] p 23 [Para 63]: We have strong reservations about the reliability of energy intensity as a measure of energy efficiency. It takes little account of changes in the structure of industry and can be affected by fluctuations in economic conditions including interest rates which have nothing to do with energy efficiency.

19. This conclusion was reached partly as a result of ACE evidence (amongst others):

[2] p 14 [Para 20]: Witnesses cautioned against relying in intensity as an accurate measure of efficiency. The EEO (Department of Energy) said it was “a crude measure... and its use is not to be recommended by observers concerned with serious analysis”. The Association for the Conservation of Energy (ACE) agreed with the International Energy Agency’s view of it as the “least worst way” of measuring. Friends of the Earth (FOE) called it “a very unhelpful, simplistic yardstick”.

20. The relationship between improvement in energy efficiency and overall energy use and carbon emissions has also been addressed before by House of Lords Committees. The focus has evolved over time. [1] cites purely competitive, economic and strategic reasons for pursuing the rational use of energy (RUE) and energy conservation:

21. [1] p. viii [Para 6]: The Committee believe that RUE deserves high priority in United Kingdom and Community energy strategy. While at present all signs point to a buyer’s market for energy, the oil market is notoriously volatile. In the longer term, oil and gas reserves will decline and may approach exhaustion. ( . . . ) [Para 7]: Moreover, efficient energy use is a vital component in cutting industry’s production costs and thereby raising competitiveness. Even for industries where energy costs account for no more than four or five per cent of total production costs, the attainable improvements in energy use can make quite a big difference to profit margins. Unfortunately, much of British management seems unaware of this or reluctant to act upon it. At a time when all EEC industry faces a growing challenge from beyond the Community, the contribution of RUE must not be underrated.

22. This account of the drivers for RUE and energy conservation does not make the link at all with carbon savings. By the time of [2], the linking relationship between energy conservation and carbon reductions had been thoroughly made:

23. [2] p 23 [Para 62]: The Committee believes that there is now an environmental imperative to save energy. The threat to the environment demands a coherent energy strategy.

24. It is interesting to note, therefore, that the discussion concerning the desirability of energy efficiency has been going on for over two decades. The stimulus has shifted somewhat, though perhaps the outcome of the discussion; whilst the apparent continued need for debate and evidence, has not.

25. The relationship between improvements in energy efficiency and overall energy use and carbon emissions is multi-faceted. Perhaps the three main relationships are:

— The relative cheapness of demand side energy efficiency measures in achieving carbon reductions compared to supply side measures;
— The speed with which demand-side energy efficiency measures to start to reduce carbon emissions compared to supply side measures (it being significantly faster); and
— The scope for carbon savings offered by demand side energy efficiency compared to the potential for carbon emissions reductions offered by supply side measures.

26. The behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings.

27. ACE has conducted numerous studies which address behavioural aspects of energy efficiency schemes. Amongst the most recent are:


28. A general conclusion arising from these studies was that information provision remains problematic in many cases. For the most part, the public was not well informed about energy efficiency schemes until they were specifically targeted by information providers (frequently Local Authorities). Moreover, the strategies adopted by information providers were crucial to the success of the task (see paragraph 46). The public can always be better informed, and it is the responsibility of Government (at the appropriate level) to ensure that they are. The great diversity of schemes in existence is, however, a source of potential difficulties in public information provision.

29. The House of Lords European Union Committee was aware of problems in information dissemination and public knowledge over 20 years ago:

[1] p. x [Para 16] Because these activities are carried out by a dozen different governmental departments, they do not form a coherent programme. The total Government effort is only the sum of what these several separate departments do. The Energy Conservation Division of the Department of Energy keeps in touch with other departments but there is no formal machinery anywhere—in or out of Government—for consultation let alone co-ordination. The Committee believes this is unsatisfactory.

30. Precisely this concern is echoed in the Cabinet Office PIU Report (2002): “The existing structure of institutions involved in UK energy policy making and delivery lacks coherence. (...) Government should aspire in the long term to bring together in one department responsibilities for climate change, energy policy and transport policy.” (Cabinet Office, 2002, PIU, The Energy Review p. 144). We are unconvinced that the new Sustainable Energy Policy Network (SEPN) has been demonstrated to satisfactorily answer this long-standing complaint. At the time, it appears that “publicity” for energy conservation measures was as relatively low key as it remains today:

31. [1] p. xi [Para 20] Publicity and information cover ministerial speeches, advice and technical bulletins and educational activities ranging from primary school information packs to courses for energy managers.

32. By the time of [2], the need for public involvement in contributing to the success of any energy efficiency scheme was recognised, but problems evidently persisted:

[2] p. 24 [Para 71] Witnesses to the House of Commons enquiry on Energy Efficiency criticised the Department of Energy’s “heavy supply orientation” as an obstacle to an enthusiastic efficiency policy. The EEO’s budget is now half the level of five years ago. This cut was defended by the Government who said the emphasis of the EEO’s work had shifted from “general advertising and subsidies” to “focussed dissemination of energy efficiency information and advice” They said that “public awareness of energy efficiency had grown greatly so that the advertising and publicity which the Office had done need not be carried on at such considerable rate”. However the Secretary of State for the Environment, in a recent speech, said that while environmental concern amongst householders is widespread and growing, understanding of environmental issues is patchy, and individuals feel that what they do to their own homes is not significant.

33. The scope and incentives for improving energy efficiency, and reducing waste, across the economy, in both private and public sectors.

The Treasury has consulted twice in the last two years on economic incentives to improve domestic energy efficiency.

34. In response to the first consultation, the Association for the Conservation of Energy compiled a list of the 12 economic instruments and other measures—the “Clean Dozen”—that we considered would be most effective in improving household energy efficiency [see Annex 2]. The “Clean Dozen” was supported by over 200 organisations and individuals—including Members of Parliament, Local Authorities, NGOs, energy efficiency practitioners and relevant trade associations.

35. We hoped that the Treasury would act swiftly to implement in Budget 2003 some of the measures listed in the “Clean Dozen”, and we were most disappointed when this did not happen.

36. We responded to a second consultation last year (our response is attached, see Annex 2). We were pleased that two of our suggestions were adopted in the Chancellor’s Budget this year—namely (1) a reduced VAT rate for the domestic installation of ground source heat pumps and, from 2005, for micro CHP and (2) a landlord’s energy saving allowance, which provides individual private landlords with upfront relief on capital expenditure for installations of loft and cavity wall installation in rented accommodation, including first time installations.

37. However, we would still like to see:
—— A reduced rate of VAT to 5 per cent for the supply and installation of energy efficient products or materials in non-grant schemes when householders employ contractors. There is already a limited VAT reduction on certain energy-saving materials (insulation materials, draught stripping, hot water and central heating controls). In Budget 2004 this VAT reduction was extended, as noted above, to cover ground source heat pumps and, from 2005, micro CHP. It should now be further extended to cover A rated windows, A & B rated condensing boilers and low energy lighting and DIY energy efficient materials.

—— Further tax incentives for landlords installing energy saving measures. As noted above, in Budget 2004 the Government introduced a Landlord’s Energy Saving Allowance to provide up-front relief on capital expenditure for installations of loft and cavity wall insulation in rented accommodation. The maximum amount payable to landlords will be £1,500 per property.

—— This is a useful beginning, but there is considerable scope for extending this allowance to cover products other than insulation and for increasing the amount payable per property. The private rented sector is relatively small, but it contains a very high proportion of energy-inefficient properties. In addition, there is currently almost no incentive for either landlord or tenant to improve energy efficiency.

—— A stamp duty rebate for house purchasers who make energy efficiency improvements to their home within, say, six months to a year. We believe that a stamp duty rebate would significantly increase take-up of energy efficient products, particularly insulation materials.

—— A tax allowance for heating and insulation installers if they take on apprentices—designed to address the capacity problems within the industry.

—— A Council Tax reduction for householders installing energy-saving measures. With support from the Energy Saving Trust’s Innovation programme, Fenland District Council is offering council tax rebates for households that install energy efficiency measures. This is an example of good practice that, at the very least, the Government should be encouraging other local authorities to follow.

—— Mortgage Interest Relief on sustainable homes. This would take the form of a restoration of mortgage interest relief at source (MIRAS) for homes that met a range of sustainability criteria.

38. The incentive mechanisms for the promotion of energy efficiency measures appears to have been traditionally fragmented:

[1] p. xix [Para 53] The Committee support the widely held belief that United Kingdom government measures to promote RUE are neither effectively led nor focussed. Stronger co-ordination is needed to correct the impression that undoubtedly prevails in industry of half-heartedness and fragmentation of responsibility. There should therefore be one single central agency with overall responsibility for RUE, including coordinating the tasks at present scattered through many government departments.

39. Broadly speaking, this situation has not significantly changed. Responsibility for energy efficiency policies are currently divided between the DTI, Defra, and the ODPM at the national level, and further dispersed amongst Local Authorities at the local level. This is due in part to the nature of different energy efficiency measures which are linked to other policy priorities (be they the environment, the built landscape, employment, public health etc), but it can still be argued that there is considerable scope to streamline and centralise energy efficiency policy co-ordination as far as is possible in order to increase efficiency and break down inter-departmental and inter-regional barriers.

40. Concerning the scope for energy efficiency improvements, the House of Lords European Union Committee is already well versed in the opportunities:

[2] p. 23 [Para 66] There is undoubtedly significant potential for future saving. But it is important to distinguish between technical potential (what is possible) and economic potential (what is cost-effective). OECD figures indicate technical potential of 30–40 per cent, but economic potential of no more than 15 per cent. [NB: This latter figure is now held by the EU to be closer to 18 per cent]

41. The forthcoming introduction of the EU Energy Performance of Buildings Directive (EPBD) will place a renewed emphasis on Governmental responsibilities concerning demand side energy efficiency. The content of the EPBD pertains to both the residential sector and the commercial sector, and its implementation will be handled by the ODPM. One of the key requirements of the EPBD is the energy performance certification of properties with over 1000m² total useful floor area. For properties “occupied by public authorities and by institutions providing public services to a large number of persons” there is a further requirement to “label” (ie display the energy performance certificate) properties in a prominent area of the building. There is scope for different interpretations of the definition of the term “institutions providing public services”; an ongoing debate centres over how the ODPM will settle on this issue. A limited interpretation, apparently preferred by
the ODPM, would require only State buildings to display EPBD certificates. A more correct interpretation, adopted by most other EU members, would compel a significantly broader group, including concerns such as libraries, public indoor sports centres, and even supermarkets. This is clearly a significant matter, as the difference between the number of buildings affected would be several orders of magnitude. We would strongly advocate this more effective interpretation, in keeping both with the spirit of the EPBD and with the interpretation of “public buildings” under the new Disability Discrimination Act.

42. Perhaps the two overriding requisites of any incentive scheme seeking to encourage the implementation of energy efficiency measures should be:

— To keep individual incentive mechanisms as simple as possible; the same applies to the basket of incentive mechanisms taken collectively; and

— To ensure that the “right” party is targeted by each incentive.

43. The first requisite is simply a hallmark of good policy-making. As there are more than five different measures and programmes relating to residential energy efficiency alone (Energy Efficiency—the Government’s Plan for Action, Defra, 2004: 11), and many more dealing with the business and public sectors, there is a real danger that clarity and accessibility are compromised. Ease of facilitation is crucial for policy packages; if the intended recipients/targets are confused or put off by the complexities inherent in a particular incentive or bundle of incentives, the potential for these incentives to transform lives and achieve policy goals is effectively negated.

44. The second requisite is equally important; all incentive measures have target audiences or recipients, and the design and dissemination route of incentives should accommodate this. In the context of building energy efficiency, the various patterns of property ownership and maintenance responsibility (tenant, landlord, owner-occupier, housing association, social housing authority etc) complicate the picture concerning the issue of who to target. It is clearly easy for both centralised and local authority messages and information to find the “wrong” target or miss the “right” target. In the case of welfare-linked energy efficiency schemes like Warm Front, targeting of potential recipients is hindered by data protection laws (Review of Strategic Energy Efficiency and Health Initiatives (2004). Some local authorities produced innovative ways of circumventing such barriers and had considerable success in joining policy measures with their intended recipients; but others failed to overcome such barriers almost entirely. This anecdotal evidence illustrates the assertion that policies should be designed with a clear target group, and that target group should then be approached systematically. “Shotgun” approaches (ie targeting geographical areas rather than specific client groups) were on the whole less successful in implementing energy efficiency measures.

45. The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented.

We would urge the Committee to adopt the broad definition of the term “technology”, which encompasses processes and systems and not just goods and products. We have a number of suggestions:

46. The Domestic Sector

Many of the policy instruments for the domestic sector are already in place (eg the Energy Efficiency Commitment and Warm Front). The pressing need is for these to be extended for a significant time period, to provide certainty in the market. A firm commitment to meeting a domestic energy efficiency improvement target over a fixed time period would underline this certainty.

47. In addition, more innovative mechanisms are required which can stimulate a genuine market for energy efficiency investments amongst fuel rich consumers. We will address this issue in more detail in our response to the Treasury consultation on economic instruments but, to summarise, the sort of interventions which could be considered include:

— Differential rates of council tax sustained for a number of years which reward energy efficiency investments;

— Stamp duty rebates to encourage energy efficiency investments at the time of house purchase, and

— Personal tax allowances to encourage investment in energy efficiency measures.
48. **Non-domestic Buildings**

In the commercial sector there has been far less policy activity, and therefore a more radical change is required. There are a number of key areas where new policy activity could generate significant change:

49. (a) **The public sector: setting the standard**

Public sector organisations occupy enormous numbers of non-domestic buildings. In addition to being perceived by landlords as desirable tenants, they are also seen to set the minimum standards for requirements in leased office space. Therefore, demands from the public sector for high energy efficiency in non-domestic buildings would be one of the most effective ways to ensure investment beyond minimum standards during the construction and refurbishment of such buildings.

50. (b) **Implementing the EPBD to generate demand**

Proactive developers and investors in the commercial property sector express the opinion that their efforts to increase energy efficiency are constrained by a lack of demand. In this respect, perhaps the most important impact of the EPBD on energy efficiency in buildings will be the implementation of its energy labelling provisions. If the Government wishes to ensure a step change in energy efficiency in this sector, it should work to implement the EPBD as soon as possible and liaise with property professionals to ensure that the labelling system is recognised as robust and meaningful.

51. (c) **Reform of the Climate Change Levy and Enhanced Capital Allowances.**

The existing system seems to be having limited impact on energy use in non-domestic buildings. This is unsurprising since many users of these buildings have been net beneficiaries from the combined introduction of the levy and national insurance adjustments. Also, the present system of Enhanced Capital Allowances specifically excludes investment in buildings-related measures and in energy management systems. Both instruments require reform if they are to achieve an impact outside sectors where negotiated agreements apply.

52. (d) **Local authorities: encouraging best practice**

Suppliers of space in non-domestic buildings can be encouraged to push the market with specific incentives for increased energy efficiency. Local authorities have a key role here, through the planning system and business rates.

- Planning practices could evolve such that highly energy efficient development proposals are fast tracked, reducing lead times and hence costs associated with these projects. Government policy should be designed to encourage this change.

- Buildings with lower running costs are more attractive to buyers/tenants, and local authorities could enhance the impact of lower energy service costs by offering preferential business rates for occupants of energy efficient buildings. Central government would need to ensure that authorities offering such rates were able to maintain total revenue without compromising political acceptability or the local area’s attractiveness to all businesses.

53. (e) **Partnership**

All the above mechanisms will be most effective if developed and implemented in consultation with the relevant stakeholders. Government should support the establishment and running of fora where the necessary discussions can take place. These fora will also provide an opportunity for information exchange between stakeholder groups and for dissemination of best practice.

54. **Innovative schemes to use district heating or combined heat and power in order to reduce overall energy demand.**

The House of Lords European Communities Select Committee has already identified the opportunities presented by combined heat and power (CHP) to achieve significant energy demand reductions:

55. [2] p. 25 [Para 80] **Combined Heat and Power** is both an efficient supply and an efficient use of energy. The Commission will propose a Directive designed to remove barriers to the increased use of CHP throughout the Community. The United Kingdom Government have said that the future of this technology is extremely promising and they anticipate CHP use in this country to double by the year 2000. The witnesses identified difficulties with CHP which have limited it in this country to only 3 per cent of total electricity generating capacity. For example, wide availability of piped natural gas to homes in the United Kingdom is an important factor in restricting the scope for district heating schemes.

56. **We support strongly the development of energy efficiency targets for each sector of the economy, including the CHP target. Not only do these provide clarity in the evaluation of policy effectiveness, they also provide a degree of certainty for the energy efficiency supply industries: if a step change in energy efficiency is to be**
achieved, the industries involved will have to invest to expand, and to do this they need to be sure that increases in policy-led activity in the market will be sustained.

57. The cost-effective potential for additional energy efficiency improvements remains large. The existence of this cost effective potential is in itself evidence that additional policy activity is required to achieve the required step change in the energy efficiency of all sectors of the economy. Progress towards the CHP strategy has, however, stalled since the introduction of the New Electricity Trading Arrangements (NETA). The dramatic fall in electricity prices NETA brought about meant that generators were no longer able to run a majority of their plant at a profit, and in most cases it was CHP assets that were mothballed. The net amount of CHP generation actually declined between 2002–2003.

58. The Decentralised Generation Co-ordination Group (DGCG) is currently examining issues relating to small-scale generation and CHP, especially grid connection charging options, information transparency, as well as technical aspects such as the deployment of bi-directional flow and active grid management. The Embedded Generation Working Group Report of 2001 concluded that there were no insurmountable technical barriers to widespread CHP connection, but political will was lacking and feuding between different sections of the electricity supply industry was counter productive. We broadly agree with these conclusions, and would emphasise the importance of Government involvement in balancing the aspirations of the various players in order to bring about a satisfactory outcome. Previous strict adherence to the mantra that “the market will provide” should be overcome in this case, and measured intervention instituted especially in the case of distribution network operation (which is, in any case, a naturally monopolistic operation).

Annex One

Ministerial Assurances

Assurances given that the White Paper figures of savings of five million tonnes of carbon per annum by 2010 and a further four to six million tonnes of carbon per annum by 2020 were firm Government commitments

2 May 2003: Smith Institute seminar at 11 Downing Street: (then) Energy Minister Brian Wilson MP tells an ACE questioner asking what reassurance he could give to investors, that “the very clear objectives in paras 3.5 and 3.6 of the White Paper (ie the five million tonnes of carbon by 2010 and the further four to six million tonnes of carbon by 2020) are government policy, so your members should take paras 3.5 and 3.6 as read and invest accordingly.”

July 2003: The Chancellor of the Exchequer’s consultation (on economic instruments to improve domestic energy efficiency) stated (on p.5) the government’s “aim” to save five million tonnes of carbon from domestic energy efficiency by 2010.

7 September 2003: Lord Evans of Temple Guiting (who led for the Government in the House of Lords on the second reading of the Sustainable Energy Bill) confirmed these figures in a letter to Baroness Maddock, copied to all other interested Peers.

27 October 2003: Defra Minister Lord Whitty in reply to a PQ from Baroness Maddock confirms the Government’s commitment to the five million tonnes of carbon by 2010 and the further four to six million tonnes of carbon by 2020 (Hansard 27.10.03 col WA19).

29 October 2003: Lord Whitty again confirms these figures in a letter to Baroness Maddock, copied to other interested Peers.

13 November 2003: Defra Minister of State, Elliot Morley MP, speaking at a Fabian Environmental Policy Forum lunch, assures an ACE questioner that “Defra is totally committed to both the 2010 and the 2020 targets” for domestic energy efficiency (that is the five million tonnes of carbon by 2010 and a further four to six million tonnes of carbon by 2020)” and agrees to “remind all Ministers to say that a little more often”.

10 December 2003: Lord Whitty, speaking at the launch of the All Party Intelligent Energy Group, asserts that “we must reach the targets for energy efficiency in the White Paper (five million tonnes of carbon savings by 2010 and a further four to six million tonnes of carbon by 2020). Without this all other objectives will not be achieved”.

20 April 2004: Lord Whitty, in the House of Lords, says that clause 3 of the Energy Bill is not necessary as it will duplicate the “aim” and the reporting required under the Sustainable Energy Act (Hansard cols 185–186).
ASSURANCES FROM SENIOR OFFICIALS

22 August 2003: Permanent Secretary at the DTI, Sir Robin Young, in reply to a letter from Andrew Warren asking “what can I tell my members?”, says that “I can certainly confirm that the Government remains committed” to the White Paper figures for “around five million tonnes of carbon by 2010”.

September 2003: following this letter Sir Robin, agreeing that the Government’s Sustainable Energy Policy Network website is unclear on this, has the website changed now to specifically list the five million tonnes of carbon by 2010 and the further four to six million tonnes of carbon by 2020 as “commitments”.

19 September 2003: Sir Robin again writes to Andrew Warren confirming the above figures. In this letter Sir Robin offers to take the extraordinary step of having Hansard changed in order to clarify this and writes that “the Hansard Editor has offered to include a clarification in the Bound Volume and we will be writing to her to confirm this.”

25 September 2003: Treasury Head of Environmental Taxes in a slide presentation at a seminar run by the Energy Efficiency Partnership for Homes stated that five million tonnes of carbon savings by 2010 was the “ambitious target for household energy efficiency”.

11 December 2003: the minutes of the meeting held between Defra and the British Energy Efficiency Federation—BEEF—(which comprises all the energy efficiency trade associations) record the aim as being the five million tonnes of carbon savings by 2010.

12 January 2004: the DTI Permanent Secretary Sir Robin Young again writes to Andrew Warren repeating his assurances expressed above.

9 March 2004: Defra slide presentation to BEEF says that savings of “around five million tonnes of carbon by 2010 and a similar amount by 2020” are “goals”.

Examination of Witnesses

Witnesses: Mr ANDREW WARREN, Director of the Association for the Conservation of Energy, and Ms JAYNE LAW, United Kingdom and Ireland Sales Manager, Dow Chemicals, Europe, examined.

Q111 Chairman: Could I once again welcome our visitors and the members of the public who are here and thank you both very much indeed for coming along to talk to us this afternoon. Could I ask you for the record just to identify yourselves before we start asking you questions, please.

Ms Law: My name is Jayne Law. I am sales manager for the Dow Chemical company in the UK and the business I look after is the sales of thermal insulation material.

Mr Warren: My name is Andrew Warren. I am the director of the Association for Conservation of Energy, which is a lobbying, campaigning and policy research organisation, which has worked in the field of energy efficiency since 1981 and it represents major manufacturers, distributors and installers of energy saving equipment, including obviously Dow.

Q112 Chairman: Thank you very much. You can see who we are from our labels in front of us and I think you have already had in the information sent to you beforehand a declaration of any interests which the Members of the Sub-Committee have declared. Perhaps we could start by asking, in your view what priority do you think the Government attaches to energy efficiency given its importance in reducing carbon emissions?

Ms Law: The priority is high, triggered initially by Kyoto and the European Performance Building Directive, which all adds to the awareness, and the following Energy White Paper was certainly well received by industry. As this filters down, certainly from my perspective, into building regulations and specifically approved document Part L1 and 2, I think that is certainly well received by industry and a valid contribution. The Government has clearly stated, however, that energy efficiency is the cheapest and the quickest means of addressing the White Paper and it can deliver on many things; it can deliver on the fuel poverty and the CO2 reductions, but there is an element of, I think, further clarity. I think previous to the White Paper the domestic energy target was set at 20 per cent, obviously working towards 2010 based on 2002 levels, I believe. This was translated into a five mega tonne target and then we have a situation, I believe, where the clarity needs to come, the understanding of this and as to why out of the blue, almost, we get a 4.2 million tonne target rather than five, which tends to really confuse industry. So I think there is an element there.

Mr Warren: The figures in question are referring to the residential sector. Effectively, for the residential sector there was a common currency all the way through the last sort of five or six years or so, the feeling that there was a potential for saving around a fifth, around 20 per cent or so of the energy consumed. That translates, as Ms Law suggested, to about a five mega tonne reduction of carbon and that is certainly what was anticipated and that is certainly what the Prime Minister announced in the spring of
last year in the Energy White Paper. What has actually caused some considerable difficulty for those in the buildings energy efficiency area, which is after all half of all energy used, has been this sort of unilateral alteration which suddenly emerged literally out of nowhere, that there was going to be only a 4.2 million tonne target for the residential sector. Having listened to your previous witnesses saying that they felt that Government was being insufficiently ambitious with the commercial and industrial sector, I think that the industries serving the residential sector would say not only was it insufficiently ambitious in the first place, it has actually toned that ambition down in the last year. Which does cause some alarm and which is why we very much welcomed (and I would like to place this on record) the amendment that your Lordships’ House placed upon the Housing Bill only last week, which sought to rectify this change. We noted that in (I think I have to call it) the Other Place, they chose to try that back in again in the Housing Bill. I understand it will come again before your Lordships’ House early next week. I hope you will stick to your guns because, as you will have gathered, it is a very distressing signal that this particular move has made for the market place. Because, as Ms Law was alluding to, our industry has been told that this is supposed to be the cheapest, cleanest, most widespread approved method of delivering in particular the carbon savings required, and they expected to gear up in order to deliver those. When we suddenly get told, “Well, actually, no, we don’t want as much as we originally sought,” that does send a very worrying signal indeed to those who both have to invest in manufacturing and in the training of people to deliver the long-term needs.

Q113 Lord Paul: I find it very difficult to relate between energy efficiency and carbon emissions because on energy efficiency alone, without putting a limit on the total energy you are prepared to use how can carbon emissions go down? I mean, if you save 20 by your efficiency and use another 20 per cent in electricity, you are back to square one. Can you explain this?

Mr Warren: Well, it is one of the reasons why we call ourselves, incidentally, the Association for the Conservation of Energy and have retained that title all the way through. You are quite right that, in principle, saying that one is in favour of energy efficiency per se means that you could see a continual increase in the amount of energy consumed. If I could take you back thirty years or so, which was when we first started to talk about the need for—for let us find a non-emotive phrase—energy saving, after the first big oil price hike. If we looked at the amount of wealth which we as a nation have created since that time, we are basically creating almost twice as much wealth as we were thirty years or so ago, but we are only using six per cent more energy than we were thirty years ago. So effectively we have improved the energy efficiency of our economy. But in that increase of six per cent we have still seen an increase in carbon emissions. So in absolute terms, of course Lord Paul is right. What we have to do is not only improve the efficiency, the energy intensity of our economy, but we also have to look at what we can actually do without. That sounds very hair shirt but it is not intended to be, because I think your previous witnesses were talking about the need to have, for instance, perhaps not quite so much illumination as we currently have in this room. I believe that we could actually probably be functioning with less illumination than we currently are using. But that said, we also need to be concerned (exactly as Tom Delay was saying) with how that illumination is provided, whether we are using the most efficient form of equipment. So it is essentially to some extent a matter of semantics on this, but we do have to recognise that as an economy we can grow without seeing the same level of growth in energy. The question is, if we are particularly dealing with the targets which the Prime Minister has set for us, of the 60 per cent reduction by 2050 in carbon emissions (which I understand both the Opposition Parties have broadly endorsed), then we do actually have to look at genuinely reducing the levels of demand in certain areas.

Q114 Lord Paul: On the Government Plan for Action were you consulted at all, and if so what kind of influence have you had on that?

Ms Law: As an industry, we were not consulted. We have learned through the likes of the Association for the Conservation of Energy. So as far as industry is concerned, and certainly as far as we are concerned, it leaves a little bit of a gap here as to how we plan certainly the future for ourselves.

Mr Warren: We were saying in answer to the first question that there was this sudden arrival at the final figure, which was for the residential sector a great deal lower than industry had reasonably been anticipating, judging from all the statements that had been made prior to the issuing of the Plan for Action. Certainly whilst we were in discussion with the officials from the various departments which were helping to compile this, at no stage did anyone suggest to us that we were suddenly going to get this 16 per cent reduction, even in this short-term five and a half years or so to the end of the decade. Whilst ministers have suggested to us, “Well, it’s only 16 per cent,” it is the fact that it is sending an appalling signal to the marketplace. We do have, even if we are just addressing this in carbon dioxide terms, an enormous sort of step change to make in the way in which we use energy, and by sending a signal so
swiftly after publishing the Energy White Paper that they are downgrading what was being sought from the residential side, I believe that that actually sends a very worrying signal, certainly for the industry but actually to all consumers as well.

Q115 Baroness Sharp of Guildford: You imply that you have no idea as to why the Government did this. Have you hazarded any guesses as to why they have done that?
Mr Warren: We have hazarded some guesses and I suspect it is a dearth of ambition. It is the feeling that they are pretty confident they know that they can arrive at this figure of 4.2 million; and indeed their agency for the residential sector, the Energy Saving Trust, has said, “It is perfectly possible to do it. We can all of us see how it is going to happen.” Effectively, what that is saying is that they are not prepared to state targets if they do not know exactly how they are going to be met. The difficulty with doing that is that that really does show a dearth of ambition. The converse, interestingly, is to be seen in an area which during this afternoon’s session we have not really talked about, which is the commercial buildings sector. You will be hearing about processed plant on this. Now, the commercial building sector is acknowledged to be, apart from aviation, the fastest growing sector of the lot and yet in the Action Plan, whilst there is a lot of potential carbon savings ascribed to it, there are very few policies put forward. I actually do not find that objectionable because what that is saying is, “We recognise that this is a growing area which we need to address. We are not quite certain yet that we are prepared to say precisely how we are going to do that, but we recognise that it needs to be done.” With the domestic sector, they have said, “Golly! We’re not quite sure how we’re going to get there and so we’re not going to declare anything.”
Chairman: Lord Paul, I think we should move on.

Q116 Lord Paul: The Government again has put up the target at 12 MtC from business and public sector. Are these from increased efficiency or changes in the industry sector, or changes in the fuel use?
Mr Warren: Well, their targets, if we are drawing from their published Action Plan from earlier on this year, relate to improved efficiency in the public sector and the business sector. As you heard from their agency, the Carbon Trust, that is certainly possible to be done on a cost-effective basis and indeed more could be delivered. But, as I alluded to in my earlier answer to Lady Sharp, the policies have not been in place yet to deliver those; but that there are policies which could deliver those, let there be no doubt.

Q117 Lord Young of Graffham: Could we just turn to the business and public sector. What are the main barriers to achieving carbon savings both in business and in the public sector and what do you really see the role of the Carbon Trust playing in that?
Ms Law: Certainly, again from my business perspective, gaining interest, gaining awareness in the marketplace, one big issue, I believe, is reducing complexity. We need a simpler approach, a simpler understanding of what we are trying to achieve, and I think advising all. At the moment the incentive that is in place is legislation. From my perspective again, it is building regulations and although that is taken on board extremely well, that is the extent of it. So I come back and I would say the main barriers are probably the complexity. The overriding barrier is probably the complexity that is in place, so simplicity is required.
Mr Warren: If I can address Lord Young’s question relating to the Carbon Trust, we do think that the Carbon Trust is doing an excellent job and certainly we would concur with all of the statements, I think almost without exception, that Tom Delay gave you in terms of their conclusions as to what the barriers are in the marketplace. You did touch upon the fact, and indeed I think one or two of your Lordships actually did express some surprise, that there was also a separate entity dealing with the residential sector, the Energy Saving Trust, and I must admit we echo that surprise. We simply do not see why we need two different agencies dealing with the promotion of energy efficiency. There is no need to have two ways of telling the time. It is completely logical to bring together both the Carbon Trust and the Energy Saving Trust so that we do not have this extraordinary—I was going to use the expression “demarcation line”, which is almost where we are—whereby, as I think you heard, they say there are all these smaller businesses using energy in a very similar way to domestic premises (because they are usually in the commercial sector and they are not running processes, and so forth) which seem to escape their attention. Now, I accept the fact that they are only ten per cent or so of consumption, but they are a particular part of energy consumption which has never been addressed by public policy. With the best will in the world, this is where there has been the concentration of energy efficiency programmes for the last thirty years. So those in the steel industry who do not concentrate upon making sure that their processes are incredibly efficient have gone out of business already. To an extent what we have to do is not the easy ones, those who are big energy consumers—is it to look at the myriad number of businesses which are individually relatively small consumers but which, as I think Lord Young made the point earlier, do add up to an enormous amount. They are the ones who have really never been the subject of serious public policy in this area. The only thing I would say is that there is a scheme which the Carbon Trust has taken up in England and Wales
(which in fact began in Scotland and Northern Ireland) of providing zero interest loans for smaller companies and that has been taken up extremely well, because that addresses one of the very key barriers, which is access to capital or a preparedness, if you like, to make available any part of your capital on an energy saving scheme. I do know that they are running up against cash limits on the demand for that; and that is something very positive which we could in fact be building on if we chose to address the commercial sector.

Chairman: Lord Paul, you wanted to come back.

Q118 Lord Paul: Yes. The previous question, is the balance which the Government has made between 4 metric tonnes carbon saving in domestic and 12 metric tonnes in business, in your view appropriate?

Mr Warren: No.

Q119 Lord Paul: What would you like then?

Mr Warren: Well, I think, as you heard Ms Law say, the residential sector, which is well over a third of total energy use (that is including transport), is being asked actually to deliver a very small proportion of the savings and yet, as we have said, we have known for years there is an enormous potential there. So I would certainly suggest that one of the reasons is that there is under the Sustainable Energy Act a requirement to have, if you like, a firm target for the residential sector. What I think we have got, conversely, because of that is a caution amongst ministers not to try to deliver more than they can absolutely know they are capable of delivering.

Q120 Lord Paul: If you were writing the report, how would you manage that?

Mr Warren: Oh, how long have you got?

Q121 Chairman: Twelve to four. What would you like to see?

Mr Warren: Well, actually I have no problem with the twelve. It is the four which we have the problem with.

Q122 Chairman: So what would you make the four then?

Mr Warren: There is certainly every possibility to take that to five and well beyond. There is no question about that. The reason why one is interested in this five figure is the signal it sends to those providing the training for the people who are going to deliver that, and indeed manufacturers actually investing in new plant.

Chairman: That is a point you have made very clearly. Thank you.

Q123 Lord Wade of Chorlton: May I just follow up on one question. How would you measure carbon savings in some way in which the general public and the millions of small businessmen you referred to could understand it?

Mr Warren: I think if I knew that I would be extremely rich because that is exactly what is going to be required, to be able to find a way in which one can translate into the terms which people actually understand the impact of their behaviour. We have been used to talking about saving energy in terms of saving pounds; and actually one should not forget that for a substantial part of our community, those who are deemed to be the fuel poor, that remains an extremely important part of the overall Energy White Paper’s concern, delivering the abolition of fuel poverty. But if we are approaching energy efficiency (as we seem to be in this discussion) from the other part of the Energy White Paper targets, which is that relating to carbon reduction, what we have to be able to do is to demonstrate to all of us what is the carbon impact, if you like the carbon footprint, which I think is the phrase used, of individual actions that we take. I suspect that most of us do not actually recognise what it is in our everyday lives which has that impact in particular.

Q124 Chairman: On the website of the Energy Saving Trust—I do not know whether you have seen it—they have an excellent summary: turning down your thermostat, replacing an ordinary light bulb, turning off your t.v., turning off your lights in unoccupied rooms, only boiling enough water, and the impact that that has on the overall consumption. That is the kind of message I think they are doing very well.

Mr Warren: Indeed. Yes.

Chairman: But perhaps we should move on.

Q125 Earl of Lindsay: Could I turn to the targets set by the UK’s National Allocation Plan for the EU Emissions Trading Scheme. Do those targets put us on a path to achieving a 20 per cent reduction in CO₂ emissions by 2010?

Mr Warren: The targets as they currently stand obviously only take us part of the way to 2010, so it could be argued that once we have got the Emissions Trading Scheme in place it can be ratcheted up and perhaps we can, as a result of that, see that part of energy consumption which is covered by the National Allocation Plan delivering its sort of *jus retour*, its appropriate proportion. As we currently stand, as you heard a little earlier today, it is not doing that. It is certainly not doing that in terms of the 20 per cent reduction figure. But it is doing it in line with our Kyoto commitments. I do not want to rehearse again what you have already just heard, but the complication is that the UK Government actually
Mr Warren: Earl of Lindsay: Q127

Mr Warren: HAPPENED, THE ONLY THING IS—and I SAY this on behalf of those European Commission officials, if I could reiterate what is being said by the House have cross-examined them at some length—is reading, particularly your paragraph 38 and your proposal that in terms of a 20 per cent overall reduction, the answer is that it will be extraordinarily generous, even well beyond what percentage, are we? I say, one does understand that, but I come back to this amount of Euros per tonne of carbon, you will find that the marketplace will alter. I think the answer to that is: is what is currently being cited is not sufficient to actually achieve much in terms of the overall objective, which is getting investment in carbon reduction activities rather than purely a sort of commodity trading scheme.

Q126 Earl of Lindsay: Are you comfortable with the variability of the playing field that you yourself have just described within Europe, within the single market, with UK businesses and UK jobs, as it were, to the different views that the twenty-five different nationalities are going to take? Equally, in terms of European competitiveness internationally, are you comfortable that once again a proper regard has been had for UK GDP, UK businesses and UK jobs in the setting of targets and, shall we say, the long-term survival of the economy?

Mr Warren: I am going to associate myself again with what Tom Delay said to you rather than repeat it again. I think the answer to that is: broadly, yes. I am a member of the CBI’s Energy Policy Committee. A number of my colleagues have implied that they were less than happy. I have yet to see convincing figures which suggest that there will be major difficulties for any of the participants, but there will inevitably be some teething problems. It is bound to happen and the UK Government will be quite right to try to make sure that British industry is not subject to disproportionate pressure as opposed to their other European colleagues or competitors. But I am not yet convinced, I must admit, that that is what has happened.

Q127 Earl of Lindsay: Could I just ask one more question. At what price do you think carbon should be priced in order that it is an incentive for delivery? Mr Warren: I think I am going to reply to that as I did to Lord Wade. If I knew that I would be extraordinarily rich because I would be involved with carbon trading very fast. But the concern at the moment, if I could reiterate what is being said by the European Commission officials who are dealing with this area—and certainly other committees of this House have cross-examined them at some length—is that the sort of price which is currently being cited is

Q128 Earl of Lindsay: So how far off, as a percentage, are we?

Mr Warren: I am not sure, genuinely—and I am not trying to be difficult on this—that anybody could put an absolute price and say that if you get to this cost, this amount of Euros per tonne of carbon, you will suddenly find that the marketplace will alter. I suspect the answer is that different marketplaces will respond faster than others. And if you do see the Emissions Trading Scheme widened so that it incorporates not just the big energy users but some of the smaller ones too, then again the pricing and the anticipation of what needs to be done may well alter. I realised that there are enormous academic treatises at the moment being written on precisely this topic, and I have read some of them, but I am not sure that I would want to sit here, and I would be surprised if you could find many witnesses who could sit here, put their hands on their hearts and say, “This is the price that carbon needs to be in order for us to turn the corner.”

Chairman: Thank you very much. We are very anxious to get through as many questions as possible and we are down to our last fifteen minutes or so, so perhaps I could ask you to keep your answers as short as possible from now on.

Q129 Lord Wade of Chorlton: Could you tell us how successful you believe the Enhanced Capital Allowance scheme has been and if necessary what improvements could be made to it?

Mr Warren: Very quickly, I do not know how successful it has been. There have been no means of measuring it. We have been asking the trade associations dealing with this area. It is almost impossible to measure because in practice the Inland Revenue does not actually allow that to be assessed. But as a broad principle, in terms of being able to create a list of good products, that is a good thing. The only thing is—and I say this on behalf of those involved with the building sector—they are obviously completely excluded from enhanced capital allowances. So that might be a way of trying to deal with it, to allow it to go further.

Q130 Chairman: Does Ms Law want to add anything to that?

Ms Law: No, thank you very much.

Q131 Baroness Platt of Writtle: I have read your evidence, which is quite long and needs quite a lot of reading, particularly your paragraph 38 and your annex B of annex two, so we come to my question:
what other measures do you believe the Government could be taking, and obviously they are listed there but you may want to emphasise some as more important than others?

**Mr Warren:** Actually, I think I am going to say to you that this is not a sort of pick and mix sweet shop that we are offering there. We believe that in order to achieve the sort of long-term changes in society that we have said we wish to achieve, both in terms of our economic efficiency and in terms of concerns about climate change, it is not a matter of saying, “Well, I might have a bit of that and a bit of this one, but we will leave that one to one side.” This is a total package and I think only as a total package does it work. One of the things that really does alarm us is the belief that you only need to do one thing, that there is a magic idea which alone will deliver; there is not. We think competitors including, I would say, very 
mighthave abitofthatandabitofthisone, but we undoubtedly lessonswe can learn fromour overseas 
climate change, it is not a matter of saying, “Well, Icountry we should base ourselves on, but there are 
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wehavesaidwewishtoachieve,bothintermsofour Services”basedverylargelyupontheUKexperience.

**Q133 Baroness Platt of Writtle:** That is all right, if you mean that they are all equally important. My follow on is, what can we learn from the experience of other countries? I notice particularly that you have picked up the question that you would like the VAT to be used as an incentive, and of course Europe will not allow you to do it, so you presumably want the Government to press on that to allow a reduction in VAT as an incentive?

**Mr Warren:** Well, VAT is allowed to be reduced in certain areas on this if the measures are installed as part of a service, in other words usually by contractors. We actually think that it could be extended to include the purchase of measures which are actually physically installed by the individual but with the service being provided by the DIY outlet actually ensuring that it is delivered to you. I am sorry, this is probably more complex than is appropriate. It is just that we think that the Treasury is being very cautious in the way in which it is interpreting annex H of the sixth VAT Directive. We do not believe necessarily that it needs vast changes to annex H, the negotiations upon which have been going on for years. What it does need is a more imaginative interpretation. I was starting to allude to how imaginative that might be. But in principle there is a lot to be said for getting it right right across Europe as well, and we would wish to see the opportunity for all legitimate energy saving items to be lowest rated VAT right across Europe.

**Q134 Lord Wade of Chorlton:** Is funding for energy R&D which focuses on industrial processes sufficient? Should more be expected from the Government and the private sector in this general approach to R&D in this area?

**Ms Law:** May I take that down to maybe a construction level to answer that. If we look at the changes in construction and the built environment around us, I think we see predominant changes, maybe because of recent skill shortages. I think the next wave of change will be driven because of the increased need for more thermal insulation. So if I look forward to 2006 when the next approved document is put through and in place, we have the need then for thicker thermal insulation. So industry, private industry, I believe has a position here to invest further in R&D, to be innovative as to how thermal insulation should be used. I think if I may give an example of today, the main method of building a wall is cavity wall construction. There is only a certain thickness that you can build a cavity wall. You need a lot more thermal insulation in the future. How do you build a stable cavity wall with a lot of thermal insulation within? Well, the simple answer to that is you really cannot unless you are building up maybe different layers, but ideally industry has got to do something different. We have got to (as we do) invest. Others, like us, have to invest to offer the alternatives in the market. I see it more as probably private, R&D investment in this particular area.

**Q135 Lord Wade of Chorlton:** And from a government point of view?

**Ms Law:** From a government point of view, I think the legislation is probably ample and as long as that legislation continues to be updated then continuous investment will be made. If that legislation stops and that is it, and there is no further progress, then industry will obviously stagnate. We need that pressure on industry to make sure that innovation is continuous.
Q136 Lord Wade of Chorlton: I was thinking particularly of Government R&D. Is Government putting a lot into it?
Mr Warren: Government R&D does not actually tend to impact very much upon this area.

Q137 Lord Wade of Chorlton: Should it?
Mr Warren: I think there is a presumption at the moment that a lot of the products we are talking about are already on the marketplace. It is a matter of actually getting them used. We have already got products on the marketplace which could be delivering the same levels of energy services using about one-third less energy than we currently do. So actually it is the ‘D’ called demonstration that we need to actually get the things out into the marketplace. You have just heard Ms Law say that as far as the new products are concerned, if the marketplace is felt to be there, the industry will provide them and do the R&D themselves. It is not a case of going to Government cap in hand on that. It is a case of saying: we do have to have some consistency of policy, which we were alluding to earlier, to ensure that that investment takes place.

Chairman: I think we have probably dealt with our question on SMEs. You answered that earlier. Lord Young, we may just have time before a vote is called for you to ask your question.

Q138 Lord Young of Graffham: There are quite a large number of bodies associated with saving energy and they have many different initiatives. How does the small business, the larger business get around that? Is there a case for a one-stop-shop?
Mr Warren: Yes, undoubtedly so. As we were saying earlier, our view as the Association is that there is no reason to have, for instance, a Carbon Trust and an Energy Saving Trust; you need to bring those two together. As Ms Law was saying earlier, simplicity is the right thing to be able to offer, to have certain schemes which you know will work and you get out and promote those properly. I alluded to one relating to SMEs earlier, which was the zero interest loan scheme, which undoubtedly works; but at the moment it is cash limited. So here is a scheme which delivers your carbon savings, delivers your energy savings very effectively for a much-neglected area. That would be the splendid way to do it. If I may, there is more to energy efficiency than just the carbon saving; there is also the social welfare issue. Fuel poverty is something which is fundamentally a British Isles issue only and it is because we have such a rotten old housing stock. One of the difficulties with actually introducing into the economy real energy prices which reflect the effect of carbon emissions (as Lord Lindsay was alluding to earlier) is that we have got several million people living on relatively low incomes in very, very poor housing. And the complication is whether or not we have actually got yet in place sufficient finances to deal with that. We have got programmes like the Warm Front programme, but certainly the Government’s Fuel Poverty Advisory Group (it is the formal group) has said for the last two years that they think the Government is under-shooting the budget by at least 50 per cent. And that was before we started to see the changes in fuel prices coming through. The suggestion is that we are likely to see an increase in the number of people in fuel poverty this coming year, which will completely wipe out certainly each year’s extra improvements which Warm Front would deliver. So I am very anxious that it be recognised that obviously energy efficiency has both economic and environmental benefits, but it also has very strong social values to put across.

Q139 Chairman: I think the Committee is very well aware of the importance of retrofit grants, and so on. Could we thank both of you very much indeed for the time which you have spent with us and for your very full answers to our questions. You have taken us ahead very well in our thinking. If there is anything that has arisen during the course of our question and answer which sparks you to want to say something more, do please feel free to write in to the Clerk with any further thoughts, and of course that would by published alongside the transcript of today’s discussions as well. We would be very pleased at any stage to hear from you. Thank you both very much again for coming.
Mr Warren: Thank you very much indeed for inviting us.
WEDNESDAY 17 NOVEMBER 2004

Present Oxburgh, L
Patel, L
Paul, L
Perry of Southwark, B
(Chairman)

Platt of Writtle, B
Sharp of Guildford, B
Wade of Chorlton, L
Young of Graffham, L

Memorandum by Professor Tadj Oreszczyn and Professor Robert Lowe

The UK building stock is directly responsible for approximately 50 per cent of UK’s energy use and carbon emissions. This paper suggests the following:

1. The Government should clearly state that the primary motivation for energy efficiency is reducing carbon emissions. It should therefore clearly brand its various instruments under this single banner and rationalise the bodies charged with delivering a low carbon future.

2. A major secondary motivation for improving efficiency is to reduce UK dependence on fossil fuels, which in the future will increasingly be imported. With appropriate planning, there need be no conflict between these two aims.

3. Improving the energy efficiency of the built stock is only possible in the long term. This goal therefore requires long-term policy instruments backed by significant and sustained research support.

4. Monitoring of the energy performance of the built stock should be based more on real delivered energy and stock data rather than inferred data. Energy efficiency should aim to provide an absolute reduction in carbon emissions and not simply a reduced rate of growth.

5. Trends in energy consumption should be monitored and policy instruments put in place rapidly to control the unnecessary use of energy. This will probably require the development of new instruments.

6. Energy efficiency alone can stimulate energy use and it is essential that a better understanding of social technical links are developed and then implemented in policy.

7. Significant and sustained research support that is in our view required to deliver a low carbon future, requires the brightest brains from the full range of disciplines to be excited by and stimulated to work in this area.

8. The UK should fully embrace the European Building Performance Directive and resist the temptation to discharge its responsibilities under this Directive in a perfunctory way. In this way the UK can lead Europe into a low carbon future. This will require the development of the UK Building Regulations to be properly resourced. The Government should also provide appropriate financial support to demonstrate the practicality of future regulation well in advance of introduction and at a scale that is capable of delivering statistically significant results.

9. Utilities should be mandated to collect reliable energy data (read not estimated), to provide appropriate feedback to customers on their energy performance relative to similar building types and occupancy and, while taking account of the associated ethical and data protection issues, provide access to this data to researchers.

A CLEAR AND LONG-TERM FOCUS

The last 30 years of energy efficiency in buildings in the UK has seen a range of different policy instruments applied to the Built Environment motivated by a desire to improve security of supply, improve health and comfort, save money and energy and most recently, reduce carbon emissions. There has been no really consistent long term policy focus in the UK until the most recent publication of the White Paper Our Energy Future (DTI 2003).

In the past there has also been confusion as to exactly what programmes are trying to achieve: is it energy efficiency (is this system efficiency or appliance efficiency), is it lower costs, use of less primary energy? Hence we have had, Save Energy, Save Monery, Conserve Energy and Energy Efficiency campaigns. In terms of institutions and instruments, we now have the Energy Saving Trust, The Carbon Trust (incorporating Action Energy) and Part L of the Building Regulations (Conservation of Fuel and Power). We have had regular rebranding of schemes with similar goals—Home Energy Efficiency Scheme then Warm Font, Energy Design
Advice Scheme and now Design Advice. In research we currently have the Carbon Visions programme, Tyndal Centre and the UK Energy Research Centre. This is confusing to both professionals and the public and yet all of these bodies are broadly aiming to achieve a low carbon future. The Government is to be congratulated on its long-term commitment to reduce carbon emissions by 60 per cent, by 2050. But it now needs to put into place coherent long-term instruments to achieve this. Long-term stability can have many benefits.

1. Industry can plan for change

It can take industry three or four years to gear up to major changes. Once made, investments associated with preparation for such changes must then be given time to pay back. Industry is an essential partner of government in the battle to drive down CO₂ emissions. Sudden and unplanned changes in instruments such as the Building Regulations can be a major inconvenience for industry and, by compromising the credibility of government, risk making subsequent change more difficult to implement. It is essential that government actions do not compromise the trust of industry.

2. Cost savings can occur

The setting up of new or rebranding of existing schemes is expensive, taking money away from the scheme delivery.

3. The impact and usefulness of research can be improved

The collection of real energy data and the monitoring of trends become feasible and useful when these activities are embedded within a long-term programme. For example, the research community is capable of supporting the development of building regulations through strategic studies to evaluate and demonstrate the effectiveness of regulatory proposals and possible responses. But this approach has rarely been attempted, in part because the long-term perspective has not in place. The establishment of demonstration projects such as Stamford Brook, which has been of considerable value over the last year in the context of the Part L review, appears largely fortuitous. The seeds of this particular project were sown in a report written in 1998. The project itself received confirmation of funding in 2001 and the project is not expected to finish until 2006. This shows the long lead times required to establish such projects, which in our view have been further extended due to the lack of clear direction and understanding of their strategic importance.

4. Stability and clear direction can attract more researchers, and encourage the use of better technology allowing the UK and UK industry to develop a world lead in low carbon technology where previously it has followed other countries.

**Theoretical Versus Actual Energy Use**

Despite 30 years of research in this area we have very little hard knowledge of how people actually use energy in buildings. The main information we currently have is the total delivered energy to the built stock, ie to the domestic and other (Digest of UK Energy Statistics). From this national data, delivered and useful energy demand is inferred from a range of data about the stock (such as the English House Condition Survey and floor space data from the Valuation Office) and computer modelling of energy flows in buildings. The UK has had a world lead in such computer modelling through the development of Building Research Establishment Domestic Energy Model (BREDEM) and subsequently the Standard Assessment Procedure (SAP) in the domestic sector and the development of simulation models in the non-domestic sector. However there is a real dearth of hard data with which to validate these models and take account statistically of variations in occupant behaviour. The reason for this is that it is always cheaper and quicker to model energy performance than measure it. In addition, energy models with large numbers of unknowns can be easily manipulated to provide the answers you want. This difficulty in getting real data has produced an over reliance on theoretical predictions. When this is combined with the fact that many research, consultancy and government programmes have carbon reduction targets to meet and the fact that people are generally only interested in hearing good news, one can very quickly enter a fictitious world of carbon reductions which will never on their

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1 AN Whitehead’s (1911) observation that, “Operations of thought are like cavalry charges in a battle—they are strictly limited in number, they require fresh horses, and must only be made at decisive moments”, is surprisingly appropriate to major initiatives in energy policy. One might add that it helps if successive initiatives in policy, like cavalry charges, generally point in the same direction.

2 The Stamford Brook development involves the construction of some 700 dwellings on the edge of the Manchester conurbation. The project is the subject of a Partners in Innovation research project, funded by DTI and ODPM, and involving Leeds Metropolitan University, the National Trust, Redrow Homes, Taylor Woodrow, Vent Axia, the Concrete Block Association, CITB and NHBC.
own result in real carbon savings. “In theory, theory and practice are the same, but in practice, they’re not” (Santa Fe Institute quoted in von Weizsäcker et al 1997).

Government funding must allow the reporting of things that do not work, as well as those that do, so that lessons can be learnt and communicated. Schemes such as PROBE (Bordass et al 2001) which provide feedback to designers and building owners should be encouraged and, if need be, financially supported. Interestingly, very little data from the key domestic monitoring studies over the last 30 years has been widely distributed outside a small and select group of researchers and government departments. The consequence is that myths about energy efficiency abound, and are propagated from one generation of designers to the next with little or no reference to empirical data. Hopefully the Freedom of Information Act will increase the dissemination of publicly funded research.³

If implemented correctly, the European Building Performance Directive (EBPD) will require building owners to display both theoretical and actual performance. This should very quickly identify discrepancies between the two.

Improvements in monitoring technology mean that it is now far cheaper to collect real data than it was a couple of decades ago—although such data remain more expensive than modelling. Cheaper monitoring, combined with improvements in national data about the buildings stock, provide the opportunity to start to both undertake fundamental and strategically important research and to provide useful feedback to building owners. For this to occur, it is critical that researchers can get access to utility energy data and hence open up research into Carbon Epidemiology. However, obtaining access to utility data has become more complex since deregulation. The Regional Energy Consumption Statistics produced by the DTI are starting to make utility data available. However, for the purpose of research and with appropriate safeguards, it is critical that this data be able to be tracked back to individual premises where it can be linked to fabric, services and occupant data. Clearly such combined data, which is being sought under a Carbon Visions funded project⁴, would not only be a major boost to research, particularly when trying to understand social technical links, but maybe also to occupants. For example, this would enable utility bills to compare a particular occupant in a particular type of dwelling with the average—normalised for floor area and other variables. This would provide a stimulus for occupants to take action and the data to enable them to do so effectively. Such developments may need the support of government departments—in particular DTI, ODPM and Ofgem to ensure that this data is of good quality (in particular that it is not compromised by excessive estimated data). The technology for achieving this is developing. In our view, utilities should be obliged to collect good quality data and to make it available to the research community in an easy to use format. The costs would be relatively small and the potential benefits large. The barriers are largely institutional and departmental.

It is useful in this context to reflect on the parallels between energy research and medicine. The most important step made by medicine in the 19th Century was that it became evidence-based. The foundations of this transition were provided by a combination of experimental work in hospitals and universities, and by epidemiology. The latter was, and is, based on records of births and deaths, medical records and a wealth of circumstantial evidence. While the scientific underpinnings of medicine have advanced beyond the dreams of its founders, medicine remains empirically based. The thought of returning to non-evidence based medicine, or of doing without epidemiology are both absurd.

This is however, very largely the position that energy researchers have occupied for the last thirty years, as a result of being denied access to basic data on energy use.⁵ Clearly there are ethical considerations associated with allowing access to such data particularly if it is linked—as it must be ultimately be—to specific properties and their fabric and services; however these issues could be overcome if procedures analogous to those that apply to medical records were put in place. Indeed, they appear largely to have been overcome in countries such as the United States, where mandatory utility data collection has been carried out.

Longitudinal studies are for the first time being planned in the UK under the Carbon Visions programme. To avoid being crippled by inadequate data and high data collection costs, these studies will need to face, head-on, the issues laid out above.

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³ We are reminded of an adage quoted by Richard Feynman (Robbins 2000). “In God we trust. All others bring data.”

⁴ Carbon Visions, funded by the Carbon Trust and EPSRC, has a new buildings programme “Building Low Carbon Communities” which includes one project called CaRB. This involves longitudinal monitoring of energy use in the buildings stock. One of its major outputs will be a detailed and spatially based model of energy use in the non-domestic stock. Another is an innovative approach to behavioural aspects of domestic energy use based on Bayesian Belief Networks.

⁵ The exception has been a modest number of small studies, where the cost of data collection has been very high.
Increasing Use of Energy

Despite a 30 per cent reduction in domestic heat loss and a 30 per cent improvement in the efficiency of domestic heating systems, energy delivered to UK dwellings has increased by 30 per cent over the last 30 years (Shorrock and Utley 2003). This is because the demand for heat, light and other electricity in dwellings has doubled over the same time period. Whereas the average temperature maintained in dwellings 30 years ago is thought to have been 13°C it is now 18°C and could easily rise to 21°C over the next decade. We increasingly have air conditioning at work and there is already a small market in domestic air conditioning. This could grow significantly with the introduction of electric heat pumps which can provide both heating and cooling.

It is now recognised that the theoretical energy savings predicted very rarely materialise as a result of improved comfort and other changes in occupant behaviour. This is often called the “comfort factor” or “take back effect”. Energy economists refer to the phenomenon, first recognised by Jevons in the late 19th Century, as the Brookes-Khazzoom effect (Saunders 1992). Estimates of the take-back for improvements to thermal insulation and heating systems have been hard to arrive at with so little monitored data, but are thought to be in the region of 50 per cent. However in some cases the proportion taken back may be greater than 100 per cent (see below).

Energy Efficiency Can Stimulate Energy Use

We appear to have an almost innate ability to come up with new and novel ways to use energy even if we know it is bad for the planet. This is similar to our desire to eat more than is healthy for us and become obese. Over the last thirty years the proportion of a family’s expenditure on fuel, light and power has decreased by a factor of more than two—from 6.3 per cent in 1970 to 2.9 per cent in 2001 and we now spend more on alcohol than we do on energy (Griggs 2004). Partly stimulated by this cheapness of energy and facilitated by improvements in energy efficiency technology, we are now using energy in ways not previously considered. One of the simplest examples of this is the domestic conservatory which when it was a single glazed leaky building was just used as a buffer space in autumn and spring. Now, however, 90 per cent of conservatories are heated either directly or indirectly and those that are double-glazed are heated twice as much as single glazed conservatories (Oreszczyn 1993). Improvements in energy efficient technology coupled with increased wealth and falling prices have allowed people to use conservatories as habitable spaces. In addition to heating conservatories some companies also give away free cooling units when you buy a conservatory!

It is not only in domestic conservatories that energy efficiency improvements have resulted in increased energy use. Many atria and glazed walkways that have been designed to be energy efficient buffer spaces are then occupied and fully conditioned. Also, improvements in air conditioning and building design plus the low cost of energy have enabled us to build indoor ski facilities, which maintain artificially made snow at −2°C inside even during the hottest day. Also, energy efficient lighting has meant that we can light the Forth Railway Bridge. One of the biggest challenges facing society will be to decide which of such high carbon emitting activities will be permissible in the future. At the moment it is very much left to governments to take such decisions through instruments such as the Building Regulations. However, such instruments may not be the most appropriate—particularly for rapidly developing technologies such as electrical appliances. Also government is not necessarily best placed to determine which are the priority areas that society needs to use its carbon quota on.

Market-based instruments—the simplest and in our view most effective of which is carbon pricing—need to be investigated as alternatives. It is clear that if energy prices rise at a rate that offsets efficiency improvements, the Brookes-Khazzoom effect is largely neutralised. In the short term the UK can probably get away without addressing the issue of energy price, but in the long term, if it is not addressed, proliferation and intensification of end uses will always outstrip efforts to control and regulate existing end uses.

Skills Shortages

There is a real energy skills shortage at all levels of education in the UK. There are very few academics now left in this area, most researchers involved in current projects are overseas, as are most postgraduate students. Undergraduates are taught relatively little about this subject. Although increased research funding through the UK Energy Research Centre and Carbon Visions etc. will improve the situation slightly, it will not, for example, produce the large number of energy auditors and other professionals that the UK will need to implement and capitalise upon the EBPD. The situation is just as bad in the relevant practical trades that will be required to implement the necessary technology over the coming decades. Therefore a big government education programme is required in order to implement the necessary instruments and technologies.
References

October 2004

Examination of Witnesses

Witnesses: Professor Sandy Halliday, Gaia Research, Ms Lynne Sullivan, Director of Sustainability, Broadway Malyan, and Professor Tadj Oreszczyn, Professor of Energy and Environment, University College London, examined.

Q140 Chairman: May I welcome our witnesses and guests to this meeting of the sub-committee on energy efficiency. Thank you very much for being agreeable to come and talk to us this afternoon. You have had in your information pack a note of all our interests. That does not need to be repeated as we speak. Perhaps you would like to start by just introducing yourselves and saying briefly in what work you are involved in connection with the energy demands of buildings.

Professor Halliday: I am the Principal of Gaia Research and I was recently appointed Visiting Professor at the University of Strathclyde. I have involvement at four levels. One is research, which involves me in matters such as looking at, for example, solar air conditioning the DTI; affordable, low allergy housing, which is a breathing disability issue, for the Office of the Deputy Prime Minister. Another example would be work for the Scottish Executive, which has recently introduced a requirement for building regulations to underpin sustainable development. I have been involved in work with them on the implications of that change on the building regulatory framework. The second level is training. I have delivered a significant training programme for design professionals, local authority personnel and building clients in sustainable construction and with my students, I am looking to develop their sustainability competence. The third level would be consultancy. This is anything from brief writing to policy development, to one or two day critiques on building proposals or hand-holding from inception to delivery and hand-over of a building project. That may be offices, housing or schools and I am currently working on a University campus. The fourth level is working with my colleagues at Gaia Architects and Gaia Planning to implement all of the above into best practice in buildings as far as we are able.

Ms Sullivan: I am Lynne Sullivan. I am a practising architect and I am currently project architect for a large site of new build housing in the Thames Gateway and other smaller projects with a specific low energy brief. I am Sustainability Director in my practice and I am responsible for supporting my colleagues in promoting sustainability in our housekeeping aspects and also our project practice. I sit on the Building Regulations Advisory Committee for the ODPM. I also sit, as part of my duties for BRAC, on the Part L Review Working Party—Part L being energy conservation effectively. I sit on the Sustainable Buildings Task Group, which met at the beginning of the year and made recommendations in May this year. I am also on the Executive of something called nCrisp, which is a DTI-funded construction research and innovation strategy forum.

Professor Oreszczyn: I am Tadj Oreszczyn and I am Professor of Energy and Environment at University College London. My main involvement is in research projects to do with the environment within buildings, several of which deal specifically with energy use in buildings.

Chairman: Thank you for that. You certainly represent a very wide range of expertise.
Q141 Lord Paul: Are the building regulations in the United Kingdom of a high enough standard for the minimum use of energy and will the changes in Part L and the Directives from the EU help or will they prove more troublesome?

Professor Oreszczyn: That is not a very easy question to answer at this particular moment in time because Part L of the regulations is currently under review and the consultation process has stopped. I am not aware of the results of that review. If the question is assuming that the proposals are not watered down in any respect, and I think in the past there has been quite a lot of watering down of draft proposals of the building regulations, but assuming that that does not happen this time round, then personally I think that there is a major step change in implementation that will come with the new Part L of the regulations. That major change really allows for future tightening up of the regulations in a progressive way, which I think is allowed really because, for the first time, we have a long-term view of where we are trying to go and for, the first time, we have a government policy which is trying to reduce carbon emissions by 2050 and we have not had that long-term view in the past. In terms of new buildings, the target that regulations will try to achieve is 25 per cent, which is similar to previous changes. I think that will probably bring us up to a pretty comparable standard to that in several other European countries. It will not bring us to the top but it will bring us up to a level which is certainly similar to similar countries at the same latitude as we are, I think.

Q142 Lord Paul: I think I missed the answer to the first part of the question. What about the present standards? Are they high enough? We had the message from the Government in their evidence that the standards are very good. What do you have to say about that?

Professor Oreszczyn: If they are very good, why are they planning to change them again in 2005? That seems to be the question. I think everybody has realised that in the past Part L of the building regulations has perhaps lagged behind other countries and that we could do better. In particular, the concern for the UK, which has a large housing stock which is going to be around for many years, as the problem is not only, as I said, with new buildings but with existing buildings. One of the big step changes that is planned is to tackle that market more than it has been in the past. I think that will result in a big change.

Q143 Lord Oxburgh: May I come in here with a supplementary? Where is the resistance to improving building standards and making them more rigorous? Where does it come from?

Professor Oreszczyn: Personally, I think it comes from much of the construction industry. I think part of that resistance is due very often to the very short timescales that are given during reviews. We have not had a committed strategy saying, “This is where we are going to go in the future”. Therefore, we have suddenly said, “We have to tighten the regulations again” for some reason or other, and therefore there is a relatively short period of time for industry to gear up and they feel that they cannot gear up instantly to the changes.

Q144 Chairman: Your task group, Ms Sullivan, suggested that one of the problems was that the regulations are simply not being properly enforced. Would you like to comment on that?

Ms Sullivan: Indeed, and some of the evidence we have taken at the Part L Review Committee suggests also that, for instance, homes tested which were supposed to meet the 2002 air-tightness requirements were woefully inadequate when it came actually to being tested on site. This was indeed a point which we reinforced in our recommendations in the task group report, that enforcement of regulations was absolutely key and that, yes, of course, effectively we supported in the task group the recommendations, the proposals, in Part L that would be put forward as part of the Part L Review, both in terms of air-tightness testing and in terms of at least 25 per cent improvement in energy efficiency. In fact, we went one stage further in suggesting that, at the same time as accepting that, what is required is to set a stage beyond the forthcoming Part L improvements to implement the EU Directive and set a best practice first part of the question. What about the present standard though a code of sustainable building, standards? Are they high enough? We had the message from the Government in their evidence that the standards are very good. What do you have to say about that?

Professor Halliday: The simple answer to your question is: no, they are not adequate. What we are hearing from Professor Oreszczyn is that the new regulations, with a good following wind, may just about bring us to a standard which is not quite as good as that in many other countries in Europe. My own instinct, and I suppose there always has to be a spectrum of people in this kind of debate, is that this really is not adequate for us at this time and place. We are facing enormous challenges and enormous potential opportunities and benefits by radically improving our building regulations. I think we should be making every possible effort that we can to do that. Lynne Sullivan is aware of the fact that I am also rather disappointed by the proposed advanced standard which has been proposed by the Sustainable Buildings Task Group because it does not seem to be cognisant of best practice in Europe. I have, quite recently, been in a position where I have been able to
look at a lot of international best practice. What is being proposed by the Sustainable Buildings Task Group neither addresses what is best practice in Europe nor does it seem to acknowledge the current skills that we have in the UK, we could go far beyond it. Both of those represent missed opportunities, which is rather unfortunate\(^1\).

**Q145 Lord Young of Graffham:** Could I come back to the regulations and the reinforcement regulations, which cause a problem? At what stage do you think they should be enforced? Is that to ensure that planning permission is not given until new buildings comply with the regulations or inspection during construction to make sure they comply? I declare an interest. Twenty-five years ago I used to build houses, so I am aware of the day-to-day problems.

**Ms Sullivan:** The problem, with enforcing a standard on the planning system has been that because the planning system, in the way the legislation was framed hitherto, does not prescribe a specific standard of, detailed delivery quality in buildings. Any move by a planning authority to impose a condition retrospectively to deliver a higher standard, for example of energy conservation, has been subject to legal challenge. It has not been a watertight way of ensuring it, which is why we also made the recommendation in the task group that government could define that further. In fact, ODPM has recently published a document which goes some way towards that, ‘The planning response to climate change’ to be able to set a background for sustainable buildings, which can then be followed through in regulation, without any argument. Coming back to your point about enforcement, up till now our way of benchmarking sustainability in buildings, and I am talking about broader issues but including energy efficiency, apart from the baseline standard in building regulations, is by voluntary accreditation, something like the BREEAM or Eco Homes standard. The problem with that standard, in my opinion, has been that it is a design standard and as an architect, you submit your paperwork you are given a rating for the sustainability of your buildings but that is not actually ratified.

**Q146 Lord Young of Graffham:** How do you define sustainability because that, at the moment, is the question?

**Ms Sullivan:** That is the $65,000 question. **Professor Halliday:** I will try. Two points. One is: do not give somebody else a problem. The other is: do not borrow somebody else’s cultural and social resources in order to solve your own problem.

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\(^1\) Note by witness: I have added a separate submission on the outcomes of the Sustainable Task Group Report.

**Q147 Lord Young of Graffham:** I just do not see how this relates to new buildings. I am a very simple chap. I have a greenfield or brownfield site; I want to put up 50 houses; I am coming to apply for planning permission. This is what happens. I personally think energy conservation is something that is very important over a period of time. How do the regulations define this and how do the regulators, or the planners, enforce it?

**Ms Sullivan:** I have explained why I think the planning system cannot deliver that because what you have to put in at the planning stage is not sufficient evidence to ensure a specific standard of sustainability.

**Q148 Lord Young of Graffham:** Does that mean the regulations are irrelevant?

**Ms Sullivan:** No, not at all because at that stage you are talking about a building or a development which is submitted for approval in broad terms. The level of information you provide, as you must know, is not enough for any one person to say at that stage that sustainability or energy efficiency to a certain standard will be delivered. Therefore, you can only, if you like, set the framework for that to be delivered. At the point of applying for permission for building regulations, you have to comply with the baseline standard, which is what the Part L Review is about. What I was alluding previously, if I could just finish that point, is that at the moment to benchmark beyond building regulations and to achieve greater energy efficiency, the current standard is basically a design standard, BREEAM or Eco Homes, which does not insist that the standard is validated through the construction process. In other words, at the end of the construction process, there is no automatic mechanism to validate the rating. You can have wonderful or excellent things but there is no mechanism to validate that, which is why we, both in the Part L Review and in the Sustainable Buildings Task Group, made this very important point, that if you set a high standard, it must be enforced. The best way of making sure that is enforced is to test buildings on completion to make sure that they do not leak air and that sound insulation etc. is up to speed. So many tests have proven that buildings in reality fall far short of the standard they are supposed to achieve.

**Professor Oreszczyn:** The one bit that I think does need to be tightened up is policing of the regulations. The regulations set targets. You can try to design to those targets but then there is a real issue about what actually gets built. There are problems where things are not being built. One option is obviously to test buildings in certain ways, and you can do this at the end when they have been built. The other thing that will play an important role in this is the European
Professor Sandy Halliday, Ms Lynne Sullivan and Professor Tadj Oreszczyn

Buildings Performance Directive, which is coming in, and how we decide actually to implement that. There is talk of having what is called an asset rating, which is a bit like a miles per gallon rating that you get when you buy a car; it tells you how much your house will use. There is also talk of an operational rating, which is how much it really has used in its last year of operation, so that you can compare what theoretically you would expect the building to use with what it is actually consuming. One of the key things that we must make sure about is that we do lead the way in this European Directive and actually go for both these types of ratings, both a theoretical one and also the one in practice.

Q149 Lord Young of Graffham: Could I ask whether a certificate signed at the time of hand-over by both the architect and the person responsible for building that the building that it conforms to particular energy efficiency standards, whatever they might be, would focus the mind? In certain other areas insistence on certification by the people responsible has actually had the marvellous effect of concentrating the mind. Failure to meet those standards would then render those people liable to some sort of action. Has anything like this been considered?

Professor Oreszczyn: I am not an expert in how the regulations work in law. I would anticipate that what you are saying is that if you build to the current regulations, you are securing that you have done that. The problem occurs that in practice the architect really does not know whether all the insulation has gone in, whether all the measures have really been taken, whether somebody else has just missed those out. We have been involved in projects where that clearly has happened. It is only in extreme cases that you pick that up at the moment.

Professor Halliday: We, at Gaia, are constantly trying to push the boundaries of the regulations, and so we will ask in tender documentation and contract agreements for things well in excess of what might be a legal expectation. We still find that with constant vigilance, attention to detail, contractor training, try what you will, at the end of the day, the number of times a building, in the current state of building industry skills, can actually meet the requirements asked for is very small. That then leaves us with the dilemma, which would be equivalent in building regulations, which is that if it does not comply, do you take it down? That is unlikely. I am not aware that it has ever happened. To my mind, this draws attention to the need to not just think about building regulations as something factual at handover, although I agree that your point that signed agreements in law, if they can be enforced and tested, would have some validity. What we are looking at is a parallel need for training on process and when things have to happen. When I first heard about the Sustainable Task Group Code of Practice, I thought that was what we might be looking towards, something that set an aspiration but actually built into that some ideas as to when things needed to be done and what would happen if they were not done.

Q150 Lord Oxburgh: You have mentioned levels of skills but are the levels of skills particularly high beyond actually following instructions?

Ms Sullivan: I think we are all aware that the state of the current skill base in the construction industry is lamentably poor. The recent Sir John Egan Report was on this issue, amongst others. We know from our European counterparts, as Sandy Halliday has said, that it is possible easily to achieve a better standard than we currently are doing. In fact, what is really interesting on building sites at the moment is how much European labour is actually doing stuff on the job. That is presumably because they are the only people who have the skills to do it. Personally, I feel what we are really missing is a higher standard, which is why I am working on the BRAC and the task group to impose a higher standard, and I think validation of that standard is absolutely essential. I know, for example, having worked briefly in Sweden, that one of the ways they have achieved this in Sweden is to set a much higher standard and to be very rigorous about their validation and the monitoring of that standard, so that the whole culture of building high performance buildings has changed and merged, and now they can afford to relax a little bit. We do not know for how long, but they have really changed the culture of building and they have moved towards higher performance buildings, which is inevitably what our industry must do.

Q151 Lord Young of Graffham: Could I ask one simple question? The easiest way to improve the energy efficiency in buildings is to put in double glazing and insulate with cavity walls. Do the regulations say this is compulsory at the moment?

Professor Oreszczyn: Totake the double glazing point asked for is very small. That then leaves us with the dilemma, which would be equivalent in building regulations, which is that if it does not comply, do you take it down? That is unlikely. I am not aware that it has ever happened. To my mind, this draws attention to the need to not just think about building regulations as something factual at handover, although I agree that your point that signed agreements in law, if they can be enforced and tested, would have some validity. What we are looking at is a parallel need for training on process and when things

Q152 Lord Young of Graffham: Does anybody check on that?

Professor Oreszczyn: There is an organisation; called FENSA, whose role it is to certify that. Whether they are actually doing their job, I have no idea. I suspect
they will be. There is a process for doing that. For cavity wall insulation, you need to meet a certain standard of new value for new buildings, which would normally involve some insulation of cavities. For existing buildings, I suppose one of the biggest step changes is where you are implementing an extension of more than £8,000, I think it is, you will be requested to do other things to the building which are cost effective. Cavity wall insulation is one of those.

Q153 Lord Young of Graffham: Somebody checks up on that afterwards?
Professor Oreszczyn: Whether they check up on every one, I really do not know. I think there is a real issue about the policing of these things and the resources that go into policing them. We have been involved in a project which is not to do with the building regulations but it is concerned with something called Warm Front, which is dealing with fuel poverty and trying to eradicate fuel poverty by adding insulation and filling cavities. We have gone back and checked whether the cavities have been filled and they have all been filled; they have not all been filled one hundred per cent. One of the reasons is that it is just very difficult to do that and people do not know whether they have filled the cavity unless they have got the kit we have, which is an infrared camera, which might cost £10,000.

Q154 Baroness Platt of Writtle: You mention leak-proof buildings. I live in an old house and I am quite certain it is not leak-proof. I think it would be impossible to make it leak-proof. Are there any private houses that are leak-proof? I should have thought that was impossible. If they are, surely they are going to lack oxygen and you are going to need air conditioning because you have to have fresh air coming in?
Ms Sullivan: I was using the expression euphemistically. I do not mean absolutely leak-proof: I mean controlled air leakage through building fabric. With the normal standard, and my colleagues will correct me if I am wrong here, you can expect something around one or two air changes per hour in a typical building. What the standard of a high performance, highly sustainable building would aim for is something around one-tenth of that or less. You can imagine, in terms of heating the volume of air in that room, the enormous difference between the two. The important thing is that in the latter case you are basically predicting by proper design and proper quality control on site what that variable leakage factor is.²

² Note: the volume of air leakage is a separate issue from that of permanent ventilation for health.

Q155 Baroness Platt of Writtle: You might do it for a new house but you could not do it for old houses, could you?
Ms Sullivan: I agree that it is very difficult to achieve in old houses but it is not impossible because you can design a renovation that will address the issues of air leakage and you can test those for incidental air leakage by literally pumping air into the building and at times colouring the air with blue so that you get blue smoke coming out of its ears and you can see it.

Q156 Baroness Platt of Writtle: That would be an extremely expensive and energy using activity, I should think.
Ms Sullivan: But it has been done.

Q157 Lord Oxburgh: We have had quite a go at the regulations. Can we summarise and be clear? If we look at the recommendations of the Sustainable Buildings Task Group, which I think you are involved with, Ms Sullivan, this effectively is arguing for higher levels of insulation, larger than, for example, the existing code and Part L. Is that correct?
Ms Sullivan: Yes. The task group recommendation was that the ramping up of energy conservation standards proposed in the Part L Review should go ahead and that beyond that a measurement system for sustainability, which we called the Code for Sustainable Building, should define a further advanced standard, if you like, of energy efficiency and also water waste efficiency.

Q158 Lord Oxburgh: How has the Government responded to this? Have they responded yet?
Ms Sullivan: We have been told that the Government will set up and implement the code. We have been given every understanding, but I believe it has not been formalised, that there will be a recommendation that the code be adopted by all publicly procured buildings and that any buildings with public funding should adhere to such a code, which equates to some 40 per cent of all building construction, I understand. If that were to take place, and I do not believe the code is yet formulated—I believe work has started but certainly is not completed—then that would make a huge difference.

Q159 Lord Oxburgh: Could I ask all three of you whether the concept of sustainable building has any significance at all in the use of the choice of materials? As you are well aware, cement, which is an important element of most buildings, is an incredibly carbon-producing, energy-eating material in its production, and the same is true, though to a lesser extent, of bricks. To what extent does material come into the concept of sustainability?
Professor Halliday: Massively and in the UK the subject has been largely avoided.

Q160 Lord Oxburgh: But it is going to be specified?
Professor Halliday: Not as far as I am aware. Even within the current Sustainable Task Group Code there is very little on materials. An area of concern is that it lags considerably behind regulation in our neighbouring countries in considering the effect of materials on indoor air quality. I take your point about the energy consumption in making and transporting materials, but a principal concern is the issue of increasing the air tightness of buildings whilst simultaneously adding increasing amounts of toxins to the indoor environment from building materials. 90 per cent of materials used in buildings are chemically as well as mechanically transformed. They leak gas into the indoor environment to very unhealthy degrees. The Swedes tackled this back in the 1970s and have introduced requirements for low toxicity materials used in the indoor environment, as have the Germans and the Norwegians more recently. It is an area we have hardly begun to look at, although I am currently working for the ODPM.

Professor Oreszczyn: We have to move beyond just the CO₂ emissions of buildings due to the fossil fuels burnt in the building and to go to what is often called embodied energy, energy in manufacture. That is something we must look at. Until we had tightened up the regulations on the primary materials used in buildings, this was a secondary component, but now we are reaching the stage where we have tightened up and have reduced this, and these then become very significant issues that need to be looked at.

Q161 Lord Oxburgh: Has any other country done this?
Professor Halliday: Yes.

Q162 Lord Oxburgh: Could you give us an example?
Professor Halliday: Norway and Holland. A number of other countries are currently considering embodied energy.

Q163 Lord Young of Graffham: These are colder countries than ours in the winter.
Professor Halliday: Not Germany, with respect.

Q164 Lord Young of Graffham: If you were given the power to bring in one or two changes now really to improve energy efficiency in new build, what would you do?

Q165 Lord Young of Graffham: How do you define passive design?
Professor Halliday: Passive design is when you use the building physics such that you do not need to use mechanical services to provide a service (such as ventilation or heating) or the mechanical equipment for a building can be much smaller.

Q166 Lord Young of Graffham: So you would have gas-fired or oil-fired central heating systems?
Professor Halliday: We should not need them but other items such as ventilating systems are a significant aspect of the energy consumption of buildings too. Moving air around buildings is very energy expensive. You can design your buildings to work as passively as possible by passive moisture management and natural stack ventilation, for example. There is huge number of things you can do...

Q167 Lord Young of Graffham: Are there any passive houses in existence?
Professor Halliday: Yes, and in fact there are two passive standards in Germany called the Passive House and the Advanced Passive House.

Ms Sullivan: I would support that and add that I think a cultural change and a public awareness campaign also need to be carried out because in a normal household something like 60 per cent of the energy consumed is on what I call the hairdryer factor, which is lighting, appliances and so on. I believe that people’s understanding of the consequences of their actions in terms of climate change and CO₂ emissions is at best variable. A public awareness campaign is absolutely vital to back all this up.

Q168 Baroness Platt of Writtle: Have you seen the Institute of Electrical Engineers advice? I thought that was extremely good, very practical and down to earth and it needs a lot better circulation.

Professor Halliday: Is this the advice called One Watt on Standby?

Q169 Chairman: It does refer to standby but it has this rather nice list of 12 things you could do.

Professor Halliday: One of the serious impacts of equipment being left on in buildings when not serving a function—the television on, the fax machine running—is that all those things use something like 5 to 15 per cent of our electrical energy consumption in...
the UK. It is a serious area that we have the technology to address.

Baroness Platt of Writtle: It is full of advice about using a half-filled washing machine or dishwasher, all sorts of things.

Lord Young of Graffham: It is difficult to enforce that.

Baroness Platt of Writtle: You cannot enforce it but if people realise it is saving them money, perhaps they might do it.

Q170 Lord Paul: Which counties have the best regulation and implementation?
Professor Halliday: In my report to the Scottish Executive I said very clearly these are Germany, Norway, Denmark and Holland.

Q171 Baroness Sharp of Guildford: We have the carbon emissions trading system at a commercial level, but as individuals would it help if we were at least notionally allotting a carbon allowance and had some idea as to how much different appliances use?
Professor Halliday: I think that may be something we can use but a culture shift is what we are fundamentally lacking, in the UK. We have had 30 years within the UK when it has not been seen to be important to address these issues. In fact, it has been brown bread and sandals, and it has not been given any respect or any value. In Norway and Germany, to respect the environment and to respect the money that you waste is part of the culture. Imposing something like a carbon limit on a family would be quite an entertaining way to move things forward, shall we say!

Q172 Chairman: Would you like to say a little more about the skills that you mentioned earlier, the shortage of adequate skills within the construction industry and perhaps amongst architects as well, to address the issues of energy efficiency?
Ms Sullivan: It seems to me to be a great pity that my children, who are now going into higher education, and they are both good mathematicians and they are both very practical, just would not consider the construction industry as a potential career. I think the agenda for high performance buildings and the delivery of the number of homes, for instance, that we are targeting ourselves to deliver is a fantastically exciting agenda. It is such an awful pity that the two are not married up together because there is a job to be done; it requires skill and imagination but somehow we are not in a position to respond to that.

Note by witness: This would be a significant contribution to meeting our targets.

Professor Halliday: I am involved quite closely with two professional bodies. One is the Architects Registration Board, which is responsible for the validation of architects. Within the last four or five years, it has made it a requirement at professional accreditation that undergraduates have to be trained in sustainability. I am also involved with the Royal Academy of Engineering, which has quite recently made it a requirement that all undergraduate engineers will be trained in sustainability. The fundamental difference between them is that the Royal Academy of Engineering has resourced that requirement; they have funded professorships, such as this one, in order to make it happen and not just to assume that the schools can somehow draw on new resources to deliver that requirement. They have actually funded it. I think that is to be respected. The fact that the ARB has not been able to resource that requirement is somewhat lamentable because architects need the understanding and culture change.

Q173 Chairman: What about the lower levels, the people who actually build the houses physically? If the building regulations are not being carried out, it can happen at that level, can it not? Are the courses which train the carpenters, plumbers and brickies and so on also doing this?
Professor Halliday: What carpenters and what plumbers, I would have to say?

Q174 Lord Oxburgh: There are apprenticeships.
Professor Halliday: We are very clear that we are 70,000 plumbers short of the requirement in the UK. We do not have anything like the number of carpenters we need, particularly if we are looking to promote the use of UK timber. We do not have any skills to add value in our own country to a natural resource that we have. The skills are not there.

Professor Oreszczyn: All I would add to that is that the issue of skills and that of policing have to go together. People on site will not take something seriously unless they feel they are going to be pulled up on it. Unless there is the method to pull them up on it, why should they improve? How many architects have been taken to court for designing an energy inefficient building? I only know of one possible case which almost went to court and I do not think it finally did. Architects and all professionals must take on board a whole host of issues, such as structural safety. Obviously, the priority goes to those issues where they know there will be inspection and somebody is going to look at it seriously. If that is done, the industry will change and there will be changes.

Lord Paul: Then every architect will end up in the courts!
Q175 Lord Patel: My question relates to existing building stock and what can be done that is economic, cost effective and practical in terms of energy saving.

Ms Sullivan: I think the Energy Saving Trust has issued some extremely good advice on the practical ways of upgrading the energy efficiency of building stock.

Q176 Lord Patel: What do you mean by that? What is your view?

Ms Sullivan: The question is: at what point do you make people do it? Of our building development, only 1 percent is new buildings. If we are really to tackle carbon emissions, we need to tackle the existing stock, you are absolutely right, but at the moment there are no mechanisms to insist on energy upgrading. It is all just voluntary and people will fill cavity walls because they think they will recoup the money through lower heating bills. To take the Kyoto target seriously, I believe that the Government must expect someone who is spending say £30,000 on a building extension to make some cost-effective improvements to reduce carbon emissions in terms of the thermal performance of their entire building. That is what we have recommended in the Part L Review (with a threshold of £8,000).

Professor Halliday: The German housing and building structures are different but, as far as housing is concerned, any property which has more than two apartments in it has to be upgraded in terms of its boilers, its ventilation systems and its water economy, as of now. Anything which is smaller than that, as in one apartment, will be required to be upgraded at point of sale. There is a requirement for annual MOTs. I believe for all Danish buildings there is a requirement for an annual water and energy audit. Throughout Europe there are much higher standards of exposure to information and also quite clear requirements in terms of access, regulation and operation of both domestic and commercial buildings.

Q177 Lord Patel: Is the main barrier lack of regulation?

Professor Halliday: Yes.

Ms Sullivan: It is at present.

Q178 Lord Wade of Chorlton: When making these comparisons, do you happen to know the history of the housing stock in Germany and Denmark as against in the UK? Do we have a higher proportion of older buildings than the countries you mentioned in Europe?

Professor Halliday: I do not know the answer to that. I would like to know the answer.

Q179 Lord Wade of Chorlton: Why do you not know the answer to that?

Professor Halliday: That is a good question. It is because I was simply tasked with looking at current regulations and that was the job that I undertook. It would be interesting to look at a spectrum but I was not resourced to do that.

Q180 Lord Wade of Chorlton: You would need to know that to make comparisons, I would have thought.

Professor Halliday: The comparison that I was trying to make is with what is possible because a lot of the reluctance to regulate in these areas seems to be concerned with what is possible and what people will accept. It is very much to do with political will. Therefore, I think the information I do have is valid in the sense that it sets the precedent for what is at least possible within Europe. I take your criticism that more information is always better than less. I think that in itself makes it reasonably valid.

Professor Oreszczyn: I agree that there is a lot you can carry on doing to the existing stock. I feel it is perhaps important to think about the reason why we are having to default to the regulations as the mechanism for doing that, because this is about the barriers to implementing measures that occur if you do not do it through the regulations. There I think the biggest barrier is cheap energy. At the moment, we spend less on energy than on alcohol. You could heat probably 200 homes for one minute for the cost of running a mobile phone for one minute. Energy is cheap. It would be very difficult to motivate people just on the cost basis. The hassle factor of doing anything in your house and the difficulty about getting good people to come in and do repairs, modifications or refurbishment makes it very difficult to try to motivate people to do things to their own buildings, without resorting to the regulations. When people are personally motivated to improve the energy efficiency of the stock, they do the things mostly that give them comfort: improvements or some other benefit than just energy saving. The most cost-effective measure to do with your house is to put in double glazing. That is the one thing that lots of people have done. They have not really done that so much for energy as for comfort, security and acoustic reasons. They take a lot of the benefits not as energy savings but as improvements in comfort. The regulations tackle the problem in a slightly different way.

Q181 Baroness Sharp of Guildford: I wonder whether you would like to make any comment about the differences between domestic, public and commercial buildings in their approaches to energy use. Perhaps you can give us some examples of how techniques are transferred between sectors? May I
come in quickly on the skills issue because it does seem to me that there is an issue about training people in Britain. I am fully aware of this as I have been working quite closely with the heating and ventilating engineering people and I know all about the skills shortages there. One of the issues is about inspectors. We have to upgrade the skills of the inspectors and a lot of training needs to be done at that level as well, I would have thought. To return to the question I put to you, it is about differences between domestic, public and commercial buildings.

Professor Oreszczyn: I think there is a dramatic difference between those. Similar techniques are used across the various sectors. For instance, water heating might be 60 per cent of a dwelling’s fuel costs, whereas it may be 10 to 30 per cent of an office. What gives you the best results in various buildings compared to dwellings will be radically different. In addition to that, obviously there are leasing arrangements that exist in buildings. In many non-domestic buildings the tenant does not necessarily directly control the energy supply coming into the building and is not necessarily directly influenced by that in a way that domestic owners are. Our understanding of the domestic stock is relatively good. I am not sure to what extent in Germany they really know the distribution of their stock. Even in the UK our housing stock knowledge is very good but for non-domestic stock it is probably 20 years behind that. For instance, we must make reasonably good guesses just to know the number of cavities in the non-domestic sector and the impact that would have on energy consumption. One of the projects we are currently running, which is funded by the Carbon Trust and EPSRC, is to try and collect more information, to get a better understanding of the non-domestic stock. Another point I would like to make on that is that we do not at the moment have a UK energy, non-domestic rating system. We have had the SAP in housing and that has had quite a good impact in enabling people to understand what sort of energy performance they are buying when they get a building and to specify higher standards. We have not had a non-domestic system. I think it is a bit ironic that we might be looking at software from abroad to implement a system in the UK. Again, that shows the problems you end up with if you do not try to keep up-at the forefront of this technology. In the past, we have been lagging behind. There are real advantages to being at the forefront of this. We can lead Europe in many of these respects, and there will be advantages to the industry in being at the forefront of it.

Q182 Lord Wade of Chorlton: We are informed that climate change will result in a warmer climate for the United Kingdom. Clearly, we may then reach a situation where we are more concerned about cooling our houses than we are about warming them. How can this potential demand for a different kind of energy be reduced? Given the long lifetimes we expect property to last, as it has to do to cover its cost, what should we be doing now not just to look at the present problem but also at the problem in 30, 40 or 50 years’ time?

Ms Sullivan: I was going to make a similar response to the last question. What is really interesting to me as a designer is that the lessons you learn in designing are well a low energy commercial building are to make the actual fabric and the passive aspects of the building very sound. For instance, you shade to stop the summer sun coming in. You try to have exposed thermal mass basically to act as a heat store when you get a lot of radiation and heat that could build up in the day. You ensure that you have correct ventilation levels for health and you make sure that you can expel hot air when you get a build-up. Curiously, those issues have not really been thought directly control the energy supply coming into the building and is not necessarily directly influenced by that in a way that domestic owners are. Our understanding of the domestic stock is relatively good. I am not sure to what extent in Germany they really know the distribution of their stock. Even in the UK our housing stock knowledge is very good but for non-domestic stock it is probably 20 years behind that. For instance, we must make reasonably good guesses just to know the number of cavities in the non-domestic sector and the impact that would have on energy consumption. One of the projects we are currently running, which is funded by the Carbon Trust and EPSRC, is to try and collect more information, to get a better understanding of the non-domestic stock. Another point I would like to make on that is that we do not at the moment have a UK energy, non-domestic rating system. We have had the SAP in housing and that has had quite a good impact in enabling people to understand what sort of energy performance they are buying when they get a building and to specify higher standards. We have not had a non-domestic system. I think it is a bit ironic that we might be looking at software from abroad to implement a system in the UK. Again, that shows the problems you end up with if you do not try to keep up-at the forefront of this technology. In the past, we have been lagging behind. There are real advantages to being at the forefront of this. We can lead Europe in many of these respects, and there will be advantages to the industry in being at the forefront of it.

Professor Oreszczyn: I think we should plan for both have on energy consumption. One of the projects we are currently running, which is funded by the Carbon Trust and EPSRC, is to try and collect more information, to get a better understanding of the non-domestic stock. Another point I would like to make on that is that we do not at the moment have a UK energy, non-domestic rating system. We have had the SAP in housing and that has had quite a good impact in enabling people to understand what sort of energy performance they are buying when they get a building and to specify higher standards. We have not had a non-domestic system. I think it is a bit ironic that we might be looking at software from abroad to implement a system in the UK. Again, that shows the problems you end up with if you do not try to keep up-at the forefront of this technology. In the past, we have been lagging behind. There are real advantages to being at the forefront of this. We can lead Europe in many of these respects, and there will be advantages to the industry in being at the forefront of it.

Q183 Lord Wade of Chorlton: That would result from the passive approach to creating the right building materials to create houses which are immune to changes in temperature, either way, as it were?

Professor Oreszczyn: That is right.

Ms Sullivan: Thermal stability is possible.

Q184 Baroness Platt of Writtle: How can the public and businesses be better informed about the full lifecycle energy cost of buildings they buy, and encouraged to use this information when considering a purchase? I should think at the moment that does not enter into it.

Professor Halliday: I do not think it works like that. I cannot see a situation, without a very radical increase in energy costs, where people will start to make those decisions. We have seen examples in the past. I think the classic example is the increase in the cost of petrol in the States. It went up by a factor of four and
consumption went down by about 10 per cent or something. People do not make decisions on that basis. As Professor Oreszczyn has said, we spend much more on drink, on our mobile phones and on other things. I think the responsibility is two-fold: one, to generate if possible a culture shift so that people respect why we will do this, why it is important to individuals, to communities to UK plc in the long term that we take these issues seriously; and, secondly, to place perhaps some requirements on this very complex energy supply industry to do much more in terms of delivering energy efficiency. I do not think we have been very imaginative about that yet. We are funding renewable obligations but we are not looking very seriously at opportunities for what I would call “negawatts”.

Q185 Baroness Platt of Writtle: How do you suggest we could alter the culture so people are thinking in terms of “negawatts”?

Professor Halliday: That is a very difficult question. Could I have notice of it? I think we have to do it. I will not answer that on the hoof. I will send you a short note on it.

Q186 Lord Oxburgh: I do not think your petrol analogy is realistic because there is total inelasticity in that market. You have no choice; if you want to drive your car, you buy petrol. A better comparison is in domestic appliances where you do have ratings and people can compare. Although they may not be able to make a direct financial translation, they will say that an A is better than a B. If you had some such rating for houses, I think you might find it began to have an effect. Do you not agree with me?

Professor Halliday: I would stick to my initial point. I think we can have small effects by ratings. I still feel that people do not fundamentally make decisions on energy on the basis of the cost, unless it is radically more expensive. They may make minor changes possibly, but I do not see there being fundamental changes, except possibly in the higher echelons of the commercial building market where people are making decisions on the basis of energy. Even there, that is directly related to productivity, and the energy costs will be irrelevant compared to the increase in productivity. If they can make them marry up, they will, but, if they are in conflict, they will not: they will use the energy.

Q187 Chairman: On that rather gloomy note, I am afraid we have run out of time. It is a point that has been made to us quite forcibly and I think we are very seized of it. We have left out some questions that you have been given prior notice of. If you would like to give us any thoughts on those in writing we would be very grateful indeed and it will be published along with the oral answers you have given us today and, indeed, if anything else occurs to you over the next few weeks that you wish you had said but did not do, we would be delighted to receive that. I saw you looking puzzled, the supplementary question we were going to ask was about PFI schemes, had they been a beneficial contribution or otherwise?

Professor Halliday: We would like that one.

Q188 Lord Young of Graffham: Energy efficiency.

Professor Halliday: I appreciate that.

Q189 Chairman: Can we thank all three of you very much and thank you for the way you have harmonised so beautifully without having practised working together previously, presumably. It has been extremely useful to have the three of you with your slightly different points of views answering our questions.

Professor Halliday: Thank you for the invitation. I hope that it was helpful.

Supplementary memorandum by Professor Sandy Halliday

Is there enough effort in the UK devoted to investigating innovative ways of reducing energy demand of buildings?

No. There has been a significant increase in effort directed to reducing energy demand of buildings in recent years following decades of near neglect. However, the effort is still not sufficient to develop innovative ways to reap the economic, security and quality of life benefits that would be available from radical improvements.

A notable feature of the lack of innovation is the startling reluctance to engage with specialists, especially designers, and to use their experience of the last 3 decades and the considerable expertise that has developed. A wealth of expertise exists in the UK—often referred to as equivalent to the English carthorse, which evolved largely due to the inefficiency of the English cart—and we could respect it and use it as other countries do. Another part of the equation is the tendency to succumb to lobbying by small sectors of vested interests on behalf of the status quo, which has often successfully been able to resist beneficial innovation. It is about time the megaphone was passed on, some people have had it for too long.
Increasing amounts of effort have gone into marketing at the expense of developing and using specialist knowledge. This presents us with a significant danger that we will revisit old mistakes and continue to miss opportunities. One glaring problem is the tendency to see “sustainability and energy efficiency” as adding technology and cost to buildings. In reality it is more likely to involve doing the simple things well with minimum or no extra cost and considerable cost and energy savings in use. There is ample experience and information on this but we don’t use it.

**Incentives**

We do need thorough information on the means to incentivise different sectors of the industry. Clients, developers and designers will have different priorities and these need to be better understood if we are to create the necessary innovative culture.

**Planning**—Some sectors of the construction industry have become very powerful. Planning legislation must address the rights of people to a good quality, healthy and affordable built environment and provide the incentive or the regulatory framework to provide it. It may be that planning laws need to be fundamentally changed to prevent excessive slipping of standards. Where planning permission is only granted for a limited time period it is easier to maintain standards at contemporary levels. Where the only motivation to raise standards is legislation then legislation must be strict and enforced. A notable concern is that affordable housing is essentially poorer quality housing with lesser standards in most regards than non-affordable housing. There are serious ethical and environmental problems with this. In many other countries the housing quality is maintained and the families are subsidised. We need to consider these options.

**Resource conservation**—The Renewables Obligation has encouraged new investment from diverse sources into the field of energy supply. Many years ago Scandinavian utilities recognised that the increasing costs and liabilities associated with building new generating plant meant there was potentially more profit available from energy conservation or Negawatts. They distributed free energy efficient bulbs and thereby freed up the available generating capacity to do more. Negawatts are attractive and often cheaper than watts. There is currently a requirement on energy suppliers to promote conservation and it is unclear how the new scheme (2005–08) will operate. It would be interesting to investigate whether strong incentives (negarocs?) could encourage new investment in conservation.

Resource conservation has suffered from poor image and public relations. The hair shirt. It is widely interpreted as meaning that we should expect less eg in the way of quality/heating/cooling or space. Communicating the benefits as well as the importance of doing more with less by focusing on using resources more effectively and reducing waste is vitally important. This is fundamental to the required culture shift.

One suggestion was carbon rationing—an option may be to incentivise—initially in the commercial and public sector—by charging significantly higher amounts for energy/CO₂ emissions over a certain “good practice”, limit. If introduced on a regulatory basis or accompanied by design advice it could be a powerful incentive. Once established in principal then the limit can be reduced over time.

*Can you point to good practice elsewhere which could be applied to the UK?*

A number of initiatives from outside the UK have the potential to contribute to much needed innovation. They address a range of issues.

**Flagship Projects**

In a number of countries major development, that has the support at highest level of Local Authorities and Government, is improving public awareness of the practical, pragmatic and widespread benefits of energy and sustainability considerations. Too often these considerations are still seen in the UK as luxury issues.

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7 Replacing a 100W bulb with a 20W bulb providing the same light output (lux) means that the required power has been reduced by 80W. This has become known as the production of Negawatts. Similarly water conservation measures result in Negalitres.
8 See the Dutch Energy Performance Coefficient for the ratchet comparison.
Design

A number of projects have addressed the issue of the value added by design. This is a slowly increasing feature of discussion on health and well-being, productivity and learning and teaching effectiveness.

Costs

There is increasing amount of information available on the costs of sustainable building that undermines traditional arguments about what can and cannot be afforded.

Flagship Projects

Germany, Sweden, Holland and Finland have all been developing mainstream housing/mixed use projects of a significant scale—to standards in excess of mandatory requirements. The planning, commercial and research importance of these projects mean that they all have commitment at the highest level. In general these go beyond simply energy considerations to look at holistic solutions to cost, transport, community engagement, resource conservation, biodiversity enhancement, pollution abatement and health. Often they are looking at using efficiencies primarily alongside economies of scale and closed loops such that outputs from one process—such as waste—are used as inputs to another—such as heating. The potential is significant. They have had varying degrees of success but the better examples could usefully inform our own plans. We have no such foresighted plans in the UK and the recommendations of the Sustainable Task Force on Sustainable Construction are woefully unambitious in this regard. I would gladly organise a tour of such schemes.

Design

There is still little attention given to the contribution of designers to energy conservation and indeed to health and productivity.

A German initiative to promote solar energy opted to support interdisciplinary design rather then solar technology. The consequence was buildings that cost 69 per cent to 76 per cent of the typical reference buildings and had an energy demand of 47 per cent to 57 per cent of the standard. Given that on average 0.1 per cent of the cost of a building is spent on design, the added value implications are enormous.

We have the potential to deliver considerable energy efficiency by addressing this and a range of issues at the design stage including, importantly, power demand which is rarely discussed. Power demand and delivery itself will become increasingly important as part of an overall strategy to reduce energy use. The actual amount of power delivered to buildings can have a significant effect on energy losses in terms of standby and transmission losses. Sweden is attempting to reduce the amount of power used in its buildings and Danish regulations also have requirements that aim to limit power. In the future, it will be more important to measure the total amount of power a building demands and the energy a building consumes rather than simply the amount of energy consumed per square metre. This will put the onus on the efficient use of space and infrastructure as well as the efficient use of energy.

Another example of the added value of good design is the notable feature of some recent exemplar buildings is the shift to passive design and consequent transfer of costs from mechanical services (often 30 per cent or more of a building cost) to form and fabric. Examples include Glencoe 9 per cent, Arup Campus 5 per cent and McLaren Community Leisure Centre 16 per cent (extremely good for a swimming pool). There will be others for which I don’t have data.

Cost

Little is really known about the cost of sustainable building. Many beneficial features have little or no additional capital cost but deliver cost benefits in use. Estimates based on American projects assessed through the BREEAM equivalent, LEED, initially indicated an increase of 0–3 per cent in capital cost for the lower ratings and up to 6.5 per cent for the highest ratings. More recently a review of 138 buildings with varying commitment to the environment found them to be indistinguishable. Significantly more research on UK buildings is needed to provide relevant information to clients and builders. Evidently there is the need for a skills base that can assist in the delivery German and American research indicates that increasing design time

to integrate sustainability at the outset tends to save on capital and running costs whilst late considerations tend to increase costs significantly.

A significant aspect of the growing interest in sustainable building design can be attributed to the recognition on the part of clients, that there are direct economic benefits from sustainable building. The initial output from PPP/PFI projects suggests that despite much evidence in favour of using whole life costs, many contractors still seek short term gains as well, regardless of longer term expense.

In the German regulations requirements for improvements are tied to an economic efficiency criterion, ie the value of the energy savings must recoup the cost of the measure during its normal life expectancy. This avoids the tendency to apply prohibitively short payback times or to apply luxury measures over cheaper ones.\(^\text{11}\) We have not done this in the UK and find very expensive technology such as PV with relatively short life and high maintenance take priority over educating the industry in delivering the simple things well that once adopted into the culture—like air tightness—have a genuine building lifetime benefit.

In the Netherlands there is a philosophy of shifting the tax burden from labour and capital based income towards the use of the environment. This is reflected in a range of national and regional subsidies mainly for energy saving including the current energy tax rate of 20–30 per cent (depending on fuel). These subsidies change quite often. This is part of a rise in enlightened attitudes to development economics which is likely to see more inclusion of externalities—such as pollution costs—and could create a level playing field for benign products. There is now a move towards forms of social and environmental costing to provide a framework for sustainable development and there is real activity to develop indicators that relate economic change to quality of life. The EU 5th Environmental Action Programme committed members to developing pilot systems of “environmental adjusted national accounts” by 1995, with a view to adopting them by 2000.

**Expanded Comment on Task Group**

With respect to the Sustainable Task Group Report which was supposed to look to future possibilities, the ideas they put forward are not innovative and there is no discussion of why these have not been implemented that might inform the debate. Also they:

(i) give no consideration to regulation and guidance outside the UK [including that for existing buildings] despite the fact that we lag significantly behind other countries;

(ii) give no consideration to best practice in the UK;

(iii) fail to adequately acknowledge leading edge organisations in a number of important areas;

(iv) fail to make the necessary links between planning and building regulations which go beyond them being only “complimentary”;

(v) fail to address issues of pollution and health which are fully debated and increasingly legislated in Scandinavia and beyond;

(vi) give little consideration to the opportunity to design out inefficiencies instead looking to outdated “end-of-pipe” solutions;

(vii) fail to properly address the issue of cost which dominates the debate in many respects and on which significant advances could be made;

(viii) promote a centralist strategy on materials, timber and policy—potentially in this context—of the ill-informed. In respect of policy it may be a result of context but our work for the Scottish Executive recommended the opposite. We consider it most productive if different departments procure research in common as it is more inclined to encourage joined up thinking and effective considered action. However there is evidently a need to ensure that there is agreement on resourcing the outcome recommendations if positive actions are to result. There are problems in this regard.

The conclusion of the report is targets set too low, weak role of regulation, inability to engage the true power of design, the economy or planning regulation, and it opens up the potential for unintended, undesirable consequences.

Supplementary memorandum by Lynne Sullivan

**Is there Enough Effort Devoted to Investigating Innovative Ways of Reducing Energy Demand of Buildings?**

In my opinion, the top priority is to understand how buildings actually work in practice. This is the key to reducing energy demand of buildings. At present, there are many “innovative” solutions—but what we really need to know is whether they actually work. Monitoring and testing actual performance, and understanding whether people are comfortable in buildings, is vital to progressing energy efficiency. We have a number of low-energy possibilities, for example, for cooling commercial buildings—groundwater cooling, seasonal heat storage, etc in conjunction with good quality passive building with sun shading and thermal mass. However, if these buildings are “leaky”, or managed incorrectly, they will use more energy and until we understand precisely how they are working we will not be in a position to evaluate the “best buy” for energy efficiency.

**Has PFI Made a Beneficial Contribution to Understanding Full Lifecycle Energy Cost?**

Regrettably, my experience of PFI projects is that if the cost comparator is based on a low-capital, high running-cost model, (which it usually is) then the additional capital that a more sustainable solution would bring cannot be justified during the highly competitive bidding process. However, if the commissioning authority were to ask for a low or zero CO₂ building or give a specific CO₂ performance benchmark this would change—which a Code for Sustainable Building would bring about by defining such a benchmark.

12 December 2004

Examination of Witnesses

Witnesses: Mr Steve Irving, Director of Building Research, Faber Maunsell, Mr Ian Hornby, House Builders Federation, and Ms Janet Young, Assistant Director—Asset Management, Peabody Trust, examined.

**Q190 Chairman:** Can we welcome you formally. I know you have been sitting and listening to the earlier evidence which I hope was useful to you. We welcome you very much indeed. Thank you for coming to give evidence to us. Perhaps you would like to start by introducing yourselves for the record.

**Mr Hornby:** I am Ian Hornby. I am the National Technical Advisor for the House Builders Federation. I have been with the House Builders Federation since June of this year and, prior to that, I worked for 18 years for a major house builder and also a manufacturer of a modern method of construction.

**Ms Young:** I am Janet Young. I am here as a representative of the Peabody Trust, which is a large charitable housing association based in London. We are a developer of new housing. We produce approximately 300 properties a year. Recently we have completed the Beddington Zero Energy Development in the London Borough of Sutton. Also, we own housing stock, about 19,000 properties across London, almost 6,000 of which were built before 1900, so also we are very committed to upgrading the energy efficiency of our existing stock as well as building new energy efficient homes.

**Mr Irving:** I am Steve Irving, Director of Research at Faber Maunsell. My main activity at the moment is I am working for the ODPM in co-ordinating the current review of Part L of the building regulations and the implementation of the European Directive on Energy Performance.

**Q191 Chairman:** Thank you very much indeed. You can see who we are from our labels. I think you have had a note about any declared interests that we have as part of your information pack. I would like to start by asking you that we have heard from the Government that the United Kingdom is really well up the list in terms of its buildings regulations, that we are doing rather well, but what is your comment on that? Perhaps you could include in your answers whether you have replied to the consultation on the proposed changes to Part L of the building regulations. Do you think that these will lead to a major step change in energy use?

**Mr Hornby:** Yes. Yes, I have responded to the consultation and I believe that there is the potential for a major step change. Unfortunately, the calculation methodology is not available to us to truly assess the implications of the changes, which is disappointing, but the indications are that some house builders may want to go down the route of renewable energy and if they do go down that route then it will be a major step change. They may want to go for a wider wall construction than is perceived to be normal or what will be normal and, again, that would be a major step change and has quite significant implications on the structural design.

**Ms Young:** Peabody has not specifically responded to the consultation on Part L, although obviously we are following that with great interest. As I mentioned in my introduction, recently we have completed a zero energy development in London so we have got
Q193 Lord Young of Grahame: How enforceable are the existing regulations or the new proposals? Does it make much difference in the real world what the regulations say to what actually goes on on building sites?

Mr Hornby: Yes, there is a major change for the building control bodies from the proposed changes. There is an element of it which would suggest improved construction techniques. If it falls within Government actively encouraging research?

Mr Hornby: I do not have accurate information that there will be a site of a gap that needs to be filled in some way.

Chairman: Do the Peabody Trust get involved in research?

Ms Young: I was just going to explain what research we have done at the Peabody Trust, if this is an appropriate time to do that. In terms of our existing stock, we have focused on the energy efficiency improvements that we would need to do to bring that up to an affordable warm standard. We commissioned research from Peter Rickaby Associates and what came out of that was the need to focus particularly on heating systems. We have done some follow-up research in what we have called a Strategic Heating Review and over the long-term of 10 or 20 years what we need to do to our existing housing stock to enable us to improve the efficiency of heating systems. Linked to this we have also done some action research on how we can integrate renewable energy into our existing stock, which in itself will reduce demand for fossil fuel. We have built two schemes on our existing properties with funding.
from the European Commission and from the DTI. In terms of new build, our main area of research has been on the BedZED development in Sutton where we have tried and tested a whole raft of energy efficiency measures and we are now evaluating and monitoring the effect of those.

**Mr Irving:** There are just a couple of points I would like to make. I think one of the interesting points that arises from one of the projects that Ian mentioned, is the scheme being done in the North West. This is trying to design and construct houses to what was, at the time the project started, the notional 2008 Part L standards; so quite a bit beyond current normal practice. An interesting aspect of that is that the first block of that development went on sale and sold out on the first morning. It does suggest that maybe there is a market for very energy efficient houses, but it is a beautiful development as well, the Natural Trust is involved so it is a very nice scheme. I think one of the other problems that is perhaps worth mentioning in terms of construction research is that project was one of the last to go through the Partners in Innovation Scheme that was funded by the DTI where there were ring-fenced sums to encourage construction research. Now construction research is just lumped into a great big pot of money that the DTI dishes out, so a very diffuse and fragmented construction industry is competing with aerospace and biotechnology and everything else for funds. What is going to happen is that the construction research is going to wither on the vine until the Government decides that this model is not a very clever one and it will go back again, I think. That is a real issue at a time when we are trying to drive up standards dramatically and it does seem a shame.

**Q200 Baroness Platt of Writtle:** I wanted to ask a question particularly of the Peabody Trust because you were mentioning your older buildings and what you are trying to do. I would have thought that your success in those fields would be of very great value to other people. I wonder whether you publish it in any way. Earlier in our original interviews we talked about the change in the culture and I would have thought that what you have done successfully might be of great help to other people.

**Ms Young:** We have made the findings of our research available to interested parties although we have not published it formally. I think probably we ought to if it is of general interest. If I may use this opportunity to just follow up on something that Steve said which relates to whether people are prepared to pay a premium for highly energy efficient buildings. It is our experience on the scheme that we completed two years ago that people were prepared to pay a premium in that particular case. We commissioned some research from FPDSavills on the premium that people were prepared to pay and, because our scheme included properties for outright sale and shared ownership, this was based on real facts and what that told us was depending on the property type people were prepared to pay a premium of between 8.5 per cent and 18 per cent. Clearly that was one particular scheme in the London Borough of Sutton, and how replicable that is would be difficult to say.

**Q201 Lord Oxburgh:** Can I come back to this question of research. I sympathise to an extent that you are competing with all sorts of other apparently more attractive areas, but we are not talking about rocket science here and we are not talking about problems which other people have not solved in other places. From an architectural point of view, the Romans were making phenomenally good use of cooling and passive heating systems through natural air circulation and the principles of insulation are pretty well-known. There are building codes and building practices in countries round about. I am not sure what research is needed other than jolly well going and seeing what other people are doing, and doing effectively, and copying it. Am I wrong here? **Mr Irving:** There is an element of that, but a lot of what has been done through the research programmes in construction is not so much about blue sky research in new techniques and new methods, it is about how we can encourage, train and educate people to do the basic things well. It is more about dissemination and training activities than it is about whole new research fields. There is another important element which comes on from something Janet mentioned, which is the analysis that we have done suggests that levels of insulation that we have proposed in this current review of Part L are beginning to get to the limits of cost-effectiveness.
with our UK climate. There is not a lot of point in putting more and more insulation into the walls if you are getting into the law of diminishing returns. We are into problems with heating systems. The legislation has gone through that now all boilers will be condensing boilers. They are now reaching their thermodynamic limit, you cannot go much higher in terms of heating system efficiency without going to new systems, so that is going to start us needing to look at new ways of heating buildings, to look at the way in which we can make better use of renewable energy systems, in order to make the next quantum leap. If you just go for more insulation, the next review will achieve a five per cent improvement, if that. If we want another 25 per cent we are going to have to look at renewables, we will have to look at heat pumps, all sorts of new technologies which will deliver the returns that we are looking for.

Ms Young: There is an area that still does require some research. One of the projects that we have done with the Association for the Conservation of Energy is to evaluate how people living in energy efficiency homes get the level of performance that the designers and the builders expected. What happens is that not in all cases does the building perform in that way. Sometimes that is because of the information that people are given about how to operate the heating systems or thermostats or ventilation systems in their home and that is not always communicated very well. There is some work that the industry still has to do, particularly around training for sales people, marketing people, letting agents, people managing properties to make sure that whoever is moving into that new home does get the performance from it that the design and construction team originally envisaged.

Mr Hornby: From the membership of the House Builders Federation, the anecdotal evidence does not suggest that people are willing to pay extra for increased insulation, therefore research is needed to achieve a commercially viable solution which meets the building regulations but also the expectations of potential customers at the price that they can afford to pay.

Q202 Lord Oxburgh: Frankly, if the regulations require it people have no choice.

Mr Hornby: Yes, we do that but we do it as economically as possible.

Q203 Lord Wade of Chorlton: You have started talking a little bit about relative prices and I would like to go deeper into that. Suppose I come along to you and want a three or four bedroom house which will cost, let us say, £100,000 if you do it to normal standards and I say, “I want it to the best possible standard. I want it to be the Rolls Royce of eco-housing. I have not got the slightest idea what sustainability means in this context but I want it so that even that lady over there might describe it as sustainable”, what would it cost me then?

Mr Hornby: I do not know.

Q204 Lord Wade of Chorlton: Why do you not know? The point is how can somebody come to the industry and start talking about he wants certain standards if there is not a way of defining in cost terms the relative costs of different standards of development, different standards of offering a house? I would have thought that was an important thing for everybody to know.

Mr Hornby: I do not know because I am not active in that industry at the moment but certainly I could get those costs.

Lord Wade of Chorlton: Could you get those figures for us because I think it would be very interesting to understand the practical implications of how somebody gets what they want. As has been suggested, if we have different standards of housing with grades of A, B, C or D in terms of insulation and these standards that we have been talking about, what would be the relative costs to bring them up to those standards? I think we would all appreciate that.

Q205 Lord Young of Graffham: Could you just add to that, if I pay a premium to have a grade A house, or whatever that may be, what the payback period would be in terms of saving money costs. That is very important for the market.

Mr Irving: There are some very important caveats that need to be put on those numbers. There is a very big difference between achieving a premium grade product when you are constructing a new house and the problem of converting the existing house to achieve premium standards.

Lord Young of Graffham: I am talking about new.

Q206 Lord Wade of Chorlton: You have to work to a fairly simple basis.

Mr Irving: In the Part L review, as you will appreciate we had to do a Regulatory Impact Assessment and the costs we reckoned, to make a 25 per cent improvement in energy efficiency, varied from about £500 for a small terraced house up to £1,500 for a large, four bedroom detached house.

Q207 Lord Young of Graffham: That £1,500 would take how long to get back at current energy prices?

Mr Irving: The way that we arrived at the standards was that the extra costs should be recouped over the life of the house, over the 60 year life of the house.

Q208 Lord Wade of Chorlton: I would think the life of the owner would be more important.

Mr Irving: The costs are assessed on a national basis, not on a personal basis.
Q209 Lord Wade of Chorlton: Over half the price of a house is in the land and you do not have to insulate the land, so you are only talking about 50 per cent at least of what the person is expecting to pay for the house will be affected by the insulation.

Mr Irving: In fact, there is an argument, which is one of those hot potatoes that is disputed greatly by different sectors, that if the cost of building a new house goes up, then all that happens is the price you have to pay for the land goes down because the land is less attractive as a development option, so the total cost is unchanged. Others will strongly dispute that, and I imagine Ian may well be one of them.

Q210 Baroness Sharp of Guildford: We have been talking a lot about whether there is a demand for energy efficient housing and construction. Are there other barriers to constructing buildings which you feel are important here? We talked about skills earlier and how far you feel that the skills issue is a very important issue here.

Mr Hornby: There are several barriers. One is our planning system at the moment where we do not have a confidence of certainty in getting land with planning permission and, therefore, that does not encourage developers to work with or develop construction techniques, modern methods of construction, that will go towards the energy efficiency that we are looking for. The second one is the cost of energy is relatively low and there is no great incentive that we have found to our potential customers, which is a major issue. As Steven mentioned, it is dislocation generally and then value for money and specifications.

Q211 Lord Paul: What kind of price would you think it has to go up to to start thinking seriously about energy efficiency? Twice? Thrice? Half?

Mr Hornby: I really could not say.

Q212 Chairman: Enough for people to be hurt in their pockets if they become inefficient in their use of energy.

Mr Hornby: It is like water, that is conceived as very cheap.

Ms Young: We have talked about the additional cost of building in energy efficiency in new homes and whether private purchasers are prepared to pay that. In terms of social housing tenants, clearly they are not buying their home, the landlord, is paying the capital cost of those works but most of the benefits are going to accrue to the resident through reduced fuel bills and so forth. Most of those properties are eligible for social housing grant from the Government and there is a sustainability indicator applied which helps to fund those additional costs. To come back to my earlier point about existing buildings, of course most of the housing stock in this country is quite old. There are funding packages available to carry out energy efficiency improvements but what our research has shown us is that there is not enough funding to achieve good levels of energy efficiency in our existing houses. Generally speaking, where houses need energy efficiency improvements they probably need other types of improvements as well, maybe to make them more accessible or improve security and so forth. The way that the funding is structured is in packages, so there is energy funding or security funding and so forth. We may be going into an existing property responding to funding opportunities, which is a good thing, but not really doing everything that we ought to do all at the same time and potentially that resident may be disturbed again in five years’ time when we come to do some other works. I think we would like to see the available funding brought more together into combined packages so that we can target properties and do more work at once.

Mr Irving: There are a couple of points that I would like to make. One is at the skills level, which is where I think the question first came from. I think one point that perhaps has not been raised thus far feeds back into the training and enforcement issue we were discussing earlier, that as we improve the insulation standards of houses so the relative importance of what are apparently small defects in the construction becomes much greater, things like thermal bridges and air tightness become crucially important. They probably account for up to half the heat loss from the building from thermal bridges at junctions, air leakage through the building. I think the workforce does not realise how significant these apparently small defects are in the overall scheme of things. I would make the analogy that it is a bit like someone saying, “My bath is perfectly watertight except you have forgotten to provide me with a plug”. It is a bit difficult to have a bath without a plug. That is really what we are doing at the moment, providing a wonderful bath where the walls have got lots of insulation but it is all leaking out through these apparent defects. There is a big training issue to make people realise that these apparently inconsequential factors are, in fact, very important. The other one comes back to funding and the need to get our thinking all joined-up in terms of some of these grant schemes. The Energy Efficiency Commitment, for example, is a scheme that has been working very well to help finance the improvements of cavity walls, loft insulation and so on. As was mentioned in the earlier session, one of the things that we put into the Part L review this time was this idea of consequential improvements, that when people build an extension they should fill unfilled cavity walls. We have only just realised the problem with that is that Energy Efficiency Commitment grants are not allowed to be spent in the fulfilment of meeting Building
Regulation Requirements, so you can no longer get the grants to do the consequential improvements that we want to happen. It is this sort of thing that needs to be taken a bit more into view, to make sure that all these mechanisms that we have got to encourage energy efficiency are linked up a bit more effectively perhaps than they might be at the moment.

**Chairman:** That is very helpful, thank you very much. You have raised the training scheme. Lady Platt?

**Q213 Baroness Platt of Writtle:** Really you have just answered my question to a certain extent. Coming from the last interview, the question of inspectors being trained is important too so that they overcome bureaucracy and do things that are practical. I was very interested that Peabody is training locally, which sounds a very good idea.

**Mr Hornby:** Could I say something on the training which conflicts with what you heard earlier. There have been over 60,000 applications for apprenticeships in the construction industry, far more than the industry can actually cope with. The HBF are working with the CITB construction skills to actually develop this to enable new people to enter the industry with the appropriate skills.

**Chairman:** Excellent.

**Q214 Baroness Sharp of Guildford:** Am I right in thinking that a great many of these apprenticeships are only for what is termed the ordinary modern apprenticeships as distinct from the advanced modern apprenticeships and that there is quite a high drop-out rate? The ordinary modern apprenticeship only goes to foundation level, which is equivalent to NVQ 1 of GCSEs A-C, and quite a lot of those 60,000 drop out at that level and relatively few take it on to the second level, the advanced modern apprenticeship, which gives you the A level equivalent of NVQ 3.

**Mr Hornby:** I do not know the actual figures that are drop-outs but it certainly goes further than NVQ 1.

**Q215 Baroness Sharp of Guildford:** NVQ 2 is the modern apprenticeship.

**Mr Hornby:** The drop-out rate is an issue and we are tackling this problem as well.

**Q216 Baroness Sharp of Guildford:** There is an enormous demand, as I understand it, for apprenticeships but a lot drop-out at a relatively low level. The other problem that arises here is the fact that quite a lot of people start a course and then they get a job offer or something like that and they do not complete the course, so it is the same thing. We desperately need them to go on through to the foundation degree level.

**Mr Hornby:** It is an issue that we are tackling.

**Q217 Chairman:** Any comment on the training of inspectors? Do any of you know much about how they are trained?

**Mr Hornby:** No, I do not.

**Q218 Chairman:** Where do they come from?

**Mr Irving:** Obviously the main inspections come through the building control bodies, the local authorities and the approved inspectors. I think the problem that was intimated at the previous session is that the focus of building control bodies tends to be on structure, fire and drains because those are the things that really affect human health and safety. With the limited resources they have, the attention paid to Part L is not what we would like it to be in an ideal world. We have got to recognise that the building control function does a tremendously good job with very limited resources. Also they have a problem with the way that competition was introduced into the building control function, so that they are competing for work and then have to take their client to court if they fail to meet the regulations, which seems quite an interesting exercise in client relationships. There are some issues around that that need to be thought through. One of the things that ODPM has recognised in this current review is the high importance of training the building control function and there is a formal part of the consultation proposal about how we might go forward and improve that and that is an ongoing activity as we speak.

**Q219 Lord Wade of Chorlton:** I take it that building control people are now employed at local authority level?

**Mr Irving:** There is the building control in local authorities and there are private approved inspectors who can offer the same service.

**Q220 Lord Wade of Chorlton:** They would be paid by the client?

**Mr Irving:** Yes.

**Q221 Lord Wade of Chorlton:** Is there a need or is there a role, do you think, for a national body that takes it out of their hands so it is centrally funded? I have no views on the subject myself but I wonder if it is a matter that has been discussed.

**Mr Irving:** I know this is an issue that BRAC—the Building Regulations Advisory Committee—are discussing to see how enforcement can be improved. I think that is one of the options they have been looking at.
Q222 Lord Wade of Chorlton: A national body?
Mr Irving: Yes.
Lord Oxburgh: I was going to ask about public awareness of life cycle energy costs of running houses, but I think you have really covered that. The impression, if I may sum it up, is that none of you feel that people buying houses have the energy costs of running those houses or properties very high on their list of desirable qualities.

Q223 Chairman: I wanted to ask a supplementary on this, as to whether any of you in your different roles have had any dialogue with the funders of houses, with building societies, mortgage lenders and so on? Is there any way of educating them as to the importance of energy efficiency in the homes that they finance?
Mr Hornby: We have an exercise that is ongoing at the moment which is to deal with one of the recommendations of Kate Barker’s report on modern methods of construction. We have a cross-industry group of probably 60 people, the Council of Mortgage Lenders, warranty providers, building control, all involved with this. There is an awful lot of dialogue going on about this. It is focused primarily on modern methods of construction but the dialogue does spread to general things that are important at the time.
Mr Irving: There are some mortgage lenders who will lend a higher amount on an energy efficient home because the homeowner has got less money going out in fuel bills and, therefore, has more money to finance his loan repayments.

Q224 Chairman: That is worth publicising, is it not? That is a motivation.
Mr Irving: How much difference it makes I am not too sure but certainly it has been talked of in the past.

Q225 Chairman: Very enlightening.
Mr Irving: On the question of energy awareness, this is one of the key mechanisms that are being introduced through the Energy Performance of Buildings Directive with the energy certificate both for dwellings and for non-domestic buildings. At least people should be more aware. Whether they will take more action on that awareness is something we will have to wait and see, but hopefully they will no longer have an excuse that they do not know about the energy performance of their building.

Q226 Chairman: Ms Young, is there anything you want to add?
Ms Young: Just to echo what Ian said mainly. Our main discussion with funders has been around modern methods of construction and fundamentally they want to protect the finance that they are lending on. We have not had specific discussions with them about highly energy efficient developments.

Q227 Lord Wade of Chorlton: Do you think that district heating schemes could be used more widely? What barriers are there to prevent them from being used as widely as they could be?
Ms Young: I think I mentioned earlier that we carried out a Strategic Heating Review of our housing stock to see what we should be doing with it in the future. One of the recommendations that have come out of that is for a number of reasons—energy efficiency is one of them—we ought to be considering district heating schemes. Incidentally, one of the other reasons is because with a high number of individual gas central heating systems in our properties we do have some very onerous statutory obligations to service them on an annual basis, which is very expensive and disruptive to the residents. So there are energy efficiency reasons for district heating schemes but there are also management reasons. In terms of how we do it, what our research has shown is that because of the enormous capital cost of setting up communal or district heating systems we ought to be looking for collaboration with other housing providers or local authorities in the area. We need to work closely with partners rather than trying to do this on our own.

Q228 Lord Wade of Chorlton: Mr Irving?
Mr Irving: Very similar in a way. The issue with district heating is it is very much a question of scale. The economics are such that to really get the benefit it has to be of a significant size and, therefore, it is more about area planning issues. You cannot decide at the level of a single building or even a small estate, it has probably got to be much further up the community planning side of things in order to get the sensible investment for the infrastructure. One of the other issues comes back to the improvement of the existing stock. District heating is one way of improving the energy efficiency of the stock because you can improve the efficiency with which heat is generated and utilised. This may be a more effective way of spending money than spending lots and lots and lots on condensing boilers in individual houses, but it is spending a lot more money to get a big return.

Q229 Lord Wade of Chorlton: It surprised me that if there was a building development, a series of houses being built on one close site, it would make much more sense to have a large combined heat and power unit put in that would provide hot, cold and
energy efficiency

blocks of flats, is going to become much more prevalent, particularly in the context if the proposals of Part L get through, it is going to be more difficult to heat flats with electric resistance heating, which is not a very clever way either cost wise or environmentally wise.

Mr Hornby: Just one quick comment. My colleague has reminded me that with the scale of new housing developments we would find it difficult to justify the cost of a heating scheme of this type.

Chairman: I think we have probably gone past the end of our time, so we will have to leave our last question, which was about cooling. You have heard us ask this question before. If you would like to write to us about the issue that increased global warming may cause us to need more air conditioning in our homes and how do we build that in at this stage, we would be very grateful indeed and what you say will be published as your oral evidence today will be published as well. Equally, if you have any thoughts in the next few weeks that you wish you had said and you did not, we would be delighted to hear from you. Again, anything you write in to us will not only be extremely useful but also will be published. You have given us some very interesting answers this afternoon. Both sets of witnesses have given us a great deal to think about and a great deal which I am sure will be reflected in our report. Thank you very much for your time.
Introduction

1. Domestic Tradable Quotas (DTQs) are a ‘cap and trade’ scheme designed to reduced greenhouse gas emissions from energy use. The novel feature of the DTQs scheme is its allocation of emissions rights directly to all energy end-users—firms, other organizations and adult individuals. Individuals receive their emissions rights free and all individuals receive the same amount. In short, DTQs is based on the principle of equal per capita emissions and would create a nation of potential carbon traders.

2. DTQs were formulated by Dr David Fleming, an independent environmental policy analyst and writer, who first published the idea in 1996. In July 2003 Richard Starkey and Kevin Anderson started work on a project to research DTQs funded by the Tyndall Centre for Climate Change Research.

3. Is the DTQs scheme fair? Is it administratively and technologically feasible? And might it be preferable to other emissions reduction instruments? These are some of the questions the Tyndall project seeks to explore.

4. This evidence briefly describes the DTQs scheme as originally formulated by Dr Fleming, the findings of the Tyndall project to date and planned future work.

Original DTQs proposal

5. There are four elements to Fleming’s original DTQs proposal: 1) setting the carbon budget 2) allocating carbon units 3) surrendering carbon units 4) trading carbon units. These are described below

Setting the carbon budget

6. As noted above, DTQs were formulated as an instrument for reducing emissions from energy use (around 85 per cent of all UK greenhouse gas emissions). The carbon budget is defined as the maximum annual quantity of greenhouse gas emissions from energy use that can be emitted by a nation implementing the DTQs scheme. This carbon budget is reduced year-on-year so as to meet national or internationally-agreed energy emissions reduction targets.

7. In any given year of the scheme, carbon budgets are set 20 years into the future so as to give the market a long-term emissions reduction signal. Fleming (1997) divides the 20-year budget into three periods. Period 1 is a 5-year binding Commitment, which cannot be revised: this is a requirement for an orderly market. Period 2, the 5-year Intention, is inflexible; the presumption is ‘no change’, but it can be revised for stated reasons at an annual review. Period 3 is a 10-year Forecast, which is indicative only.
Allocating carbon units

8. Each carbon budget is divided into carbon units—1 carbon unit representing 1 kg of carbon dioxide equivalent—and divided between individuals and organizations. The proportion of carbon units allocated to individuals is equal to the proportion of energy emissions resulting from individuals’ purchase of fuel and electricity over a given period prior to the introduction of the scheme.\(^1\) Emissions are allocated to individuals free and on an equal per capita basis. The remaining carbon units are allocated to firms and other organizations through a government-regulated auction, with the revenue raised going to government.

Surrendering carbon units

9. All fuels and electricity are assigned a carbon rating based on the quantity of greenhouse gases (measured in carbon units) emitted by the combustion of a unit of each fuel and by the generation of a unit of electricity.\(^2\) When citizens and other final users purchase fuel or electricity, they surrender to the retailer the number of carbon units corresponding to their purchase. For accounting purposes, these units are passed up the supply chain and on reaching the primary energy producer are surrendered back to government.

Trading carbon units

10. There is a national market in carbon units in which individuals and organizations with surplus units may offer them for sale to those wishing to purchase additional units.\(^3\)

The DTQs scheme depends on information technology

11. Central to Fleming’s scheme is a computer database in which the carbon unit account for all citizens and organizations is held, and in which all carbon unit transactions—issuing, surrendering, buying, selling or transferring, are recorded. All transactions are conducted electronically. For example, a customer purchasing petrol would simply have their ‘carbon card’ swiped by the petrol station attendant, thereby transferring the carbon units corresponding to their purchase from their carbon unit account to that of the company owning the petrol station. For those purchasers of fuel and electricity without carbon units to surrender at the point of sale, for example, foreign visitors and individuals who have used all their units, the relevant number of carbon units are simply purchased electronically on the national market by the fuel or electricity seller on behalf of the purchaser. The purchaser then pays the seller for these units and surrenders them in the usual manner.

Assessment criteria and typology of instruments

12. Prior to the Tyndall project, no detailed academic assessment of Fleming’s proposal had been conducted. The project therefore aimed to assess DTQs and other emissions reduction instruments in terms of the 3Es: equity, effectiveness and efficiency. These are criteria well established as appropriate for assessing environmental policy instruments.

13. The project has adopted the OECD typology of greenhouse gas emissions reduction instruments—see Table 1 (OECD 2001, 2002). The IPCC adopts a similar typology.

14. Taxes and tradable permits are often described in the literature as “price instruments” with other measures collectively described as “non-price instruments”. Almost all analysts advocate a mixture of both price and non-price instruments. Assuming that the same non-price instruments can be used in combination with any price instrument, then an assessment needs to be made as to which price instrument(s) is/are the most appropriate. Given that upstream trading schemes are, from the perspective of the final purchaser of

\(^1\) In the UK, this is currently about 40 per cent.

\(^2\) The carbon rating for electricity will vary with generation mix and efficiency.

\(^3\) A Quota is the total number of carbon units held by an individual or organization. These carbon units are tradable, hence the name Domestic Tradable Quotas.
fuel, equivalent to a carbon tax, to date much of our analysis has been a comparison of DTQs and a carbon tax (see paragraph 17 below):

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<th>Policy Type</th>
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<td>Fiscal</td>
<td>Taxes (tax, tax exemption, tax reduction, tax credit)</td>
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<td>Fees/charges, refund systems</td>
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<td>Subsidies (transfers, grants, preferential loans)</td>
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<td>Tradable permits</td>
<td>Emissions trading</td>
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<td>Green certificates</td>
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<td>Project-based programmes (including CDM and JI)</td>
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<td>Regulatory instruments</td>
<td>Mandates/standards</td>
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<td>Regulatory reform</td>
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<td>Voluntary agreements</td>
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<td>Research, development and demonstration (RD&amp;D)</td>
<td>Research programmes</td>
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<td>Technology development</td>
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<td>Demonstration projects</td>
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<td>Technology information dissemination</td>
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<td>Policy process and outreach</td>
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<td>Outreach/information dissemination</td>
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<td>Strategic planning</td>
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<td>Institutional development</td>
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Table 1 OECD typology

Equity

15. Is the allocation of carbon units amongst individuals on an equal per capita basis equitable? Certainly this approach (particularly in the form of the “contraction and convergence” proposal) has gained increasing support over the last decade. However, little effort has been made by supporters of this allocation to offer a justification for this allocation.

16. Academically, such a justification is to be sought with the branch of political philosophy known as distributive justice. The literature on distributive justice specifically addresses the question of what constitutes a fair share of resources, rights, opportunities amongst individuals.

17. It would be very convenient if all major approaches to distributive justice endorsed this emissions allocation. A defence of such an allocation would not then require a defence of any particular approach to distributive justice. However, our work thus far indicates that whilst the “left-libertarian” and the “egalitarian liberal” approach both support an equal per capita allocation, the right-libertarianism approach does not.

Consequences of an equal per capita allocation

18. Under a DTQs scheme all individuals receive an average number of carbon units. Therefore below average emitters are better off under DTQs than prior to such a scheme being introduced as they can sell their surplus units into the national carbon unit market. Under a pure carbon tax, by contrast, below-average emitters are worse off as, faced with higher fuel prices, they can afford to buy less fuel. If some sort of rebate scheme is introduced which allows at least below-average emitters on the lowest incomes to continue to buy the same amount of fuel as prior to the tax, then at best they are no worse off than prior to the tax. Hence below-average emitters are better off under a DTQs scheme than under a carbon tax and better off than if neither scheme were introduced.

Effectiveness

19. The effectiveness of a greenhouse gas emissions reduction instrument is the extent to which it achieves an agreed emissions reduction target. For DTQs to be an effective instrument it must be both 1) technologically feasible 2) administratively feasible and 3) command a sufficient degree of public acceptance.
Administrative feasibility

20. Under a DTQs scheme, a government would allocate carbon units to all “eligible individuals”. In the case of the UK, such individuals would consist of citizens resident in the UK and foreign nationals with rights of residence in the UK who are over a threshold age (this could be anywhere between 16 and 18). In order to make this allocation, the government would, ideally, need a complete list of all eligible individuals.

21. In addition the government needs to identify all “potentially eligible individuals” i.e. British citizens resident in the UK and foreign nationals with long term rights of residence in the UK who are under the threshold age.

22. Hence, in order to run a DTQs scheme, the government would, ideally, need a register that contained a complete list of all eligible and potentially eligible individuals. The register would be needed to accurately be able to record when:

- individuals become eligible (potentially eligible individuals reaching the threshold age or foreign nationals being granted residence)
- eligible individuals ceased to be so (through death or emigration)
- potentially eligible individuals ceased to be so (through death or emigration)

23. In other words, what the government would need is a population register (and also a register of all organizations). In November 2003, the Home Secretary, David Blunkett, announced that the Government planned to introduce an identity (ID) card scheme. According to the Government’s consultation document on the introduction of an ID card scheme (Home Office, 2002, p 16), such a scheme would comprise:

- a central database (“the central register”) capable of covering all of the resident population of the UK. The central register would hold core personal information which is commonly used by all service providers such as name and address;
- secure procedures for establishing entries on the central register and for keeping the information up to date so that people would not have to provide the same information time after time to different service providers;
- the issuing of plastic cards to everyone on the central register. The cards may incorporate some information and features on a microchip embedded into the card. These are commonly known as “smartcards”.

24. Hence, if an ID card scheme was implemented, the cost of the central register would not be borne by the DTQs scheme. However, communications with the Home Office indicate that it is unlikely that the ID card could “double up” as a carbon card.

25. Given the ambitious nature of the ID card scheme and the Government’s record on procurement of large IT systems the success of the scheme is, arguably, less than certain. In addition there is also the possibility that the scheme may be derailed through political opposition as happened in Australia and New Zealand. Hence the precautionary principle demands that the administrative feasibility of DTQs is examined in the presumed absence of an ID card scheme. This work is ongoing and we are in discussion with the team at the General Registrars Office working on the Citizen’s Information Project.

Technological feasibility

26. As noted in paragraph 11, a database will be required that holds a carbon account for each eligible individual and organization. Is such a database technologically feasible? The project team was able to interview an expert on the design and implementation of large databases at Oracle, one of the world’s leading providers of very large databases. We were pleasantly surprised to learn that the size of database required would not by present-day standard be anything like approaching leading-edge and current day technology could facilitate real-time transfer of carbon units between accounts and allow access to accounts through channels including landline phones, the internet and mobile phones.

27. We are currently in discussion with technology experts as to which type of card (smart card, 2D barcode) would be most suitable as a “carbon card” (see paragraph 11 above).
Public acceptability

28. The fuel protests of 2000 illustrated the public antipathy that can arise in response to even small rises in carbon taxation; such antipathy could escalate if substantially higher levels of taxation were introduced to bring about significant emissions reductions. DTQs may provide an opportunity to mitigate such antipathy through the explicit inclusion of citizens in the task of emissions reduction. Rather than confronting citizens with higher prices, DTQs actively enlists them as environmental stakeholders through the direct allocation of emissions rights. Moreover, as a result of the particular allocation under DTQs, citizens are made equal stakeholders. If the public perceive this equal allocation to be broadly fair, this will contribute to the public acceptability of DTQs.

29. The Tyndall project plans to hold a number of citizens’ panels to assess public attitudes to DTQs. In addition research on the expected price fluctuations in carbon unit prices is planned as there is a possible link between price volatility, ease with which public can use the scheme and public acceptability.

Efficiency

30. Using Government cost estimates for the ID card scheme and estimates supplied by a consultant at Oracle, we have very approximately estimated the average annual cost of the DTQs scheme over the first 13 years of its life as £50–100 million. This cost assumes the implementation of an ID card scheme but that the ID card is not used as a carbon card and so separate carbon cards are issued. We are seeking to compile a more robust cost estimates for the DTQs scheme both with and without the implementation of an ID card scheme.

31. As the IPCC notes (IPCC, 2001, p513)

“An important part of climate policy debates is underpinned by a lasting controversy between believers and non-believers in the existence of a large untapped efficiency potential in the economy . . . Several major studies concretize this view in Europe as well as in North America (USA and Canada). For Europe, the monumental IPSEP reports (summarized in Krause et al. (1999)) conclude that emissions could be reduced by up to 50 per cent below the 1990 level by 2030, at a negative overall cost. We take the view that such “large untapped efficiency potential” does indeed exist. If this is the case, then the set up and running costs referred to in paragraph 30 will be offset by tapping into this potential.5

Ten-minute rule bill on DTQs

32. Colin Challen, Labour MP for Morley and Rothwell heard one of the Tyndall project team interviewed on Radio 4’s Today programme about DTQs in January 2004. Since then he has been working closely with the project team and presented a ten-minute rule bill on DTQs in July 2004.

References

Burke, T (2000) Is this the End for the Green Agenda?, New Statesman, 25 September, pp 12–14
IPCC (2001) Climate Change 2001: Mitigation

4 These protests caused one former government advisor to remark that they had “driven a stake through the heart of any new proposals for British, or indeed European, carbon or energy taxes” (Burke, 2000).
5 Two important publications supporting this view that we would commend to the Committee are Krause et al (2002) and DeCanio (2003).
Examination of Witnesses

Witnesses: Professor Jim Skea, Research Director, Professor Paul Ekins, Co-Director of energy systems and modelling, UK Energy Research Centre, Professor Geoff Hammond, Department of Mechanical Engineering, University of Bath, and Mr Richard Starkey, Tyndall Centre for Climate Change Research, examined.

Q231 Chairman: Could we welcome our visitors very warmly and thank you very much for coming to talk to us today. I think you have been told that we are being broadcast on the Internet for. I am sure, the waiting millions who are listening! Perhaps just for the record it would be helpful if you would just introduce yourselves.

Professor Skea: Okay. I am Professor Jim Skea. I am research director for the UK Energy Research Centre.

Professor Ekins: I am Professor Paul Ekins. I am head of the Environment Group at the Policies Studies Institute and co-director of the UK Energy Research Centre in charge of its energy systems and modelling theme.

Professor Hammond: I am Professor Geoff Hammond from the University of Bath. I am a mechanical engineer, but I also run the International Centre for the Environment at Bath. Obviously I am here supporting the UK Energy Research Centre.

Mr Starkey: My name is Richard Starkey. I am from the University of Manchester. I work for the Tyndall Centre for Climate Change Research and for the last fifteen months I have been working on a project assessing domestic tradable quotas.

Q232 Chairman: Thank you very much indeed. I thought, just to outline the direction in which we will move this afternoon, we might for the first nearly half hour or so concentrate on research questions, what research is being done and the progress of the Energy Research Centre, and then perhaps halfway through switch to the economic instruments, the financial attention to.

Professor Skea: And the review will be by whom? Professor Hammond: It will be carried out by the Research Councils. We have a supervisory board which the research councils are collectively appointing.

Q233 Chairman: And the review will be by whom? Professor Skea: Yes. When I ran through the count of the number of individuals who were actually named in the proposal I think I got to around 40 or 45 people altogether, not all of whom would be acting full-time. For example, we have divided the research and coordination programme into six different themes and each of these themes is led by a senior academic, such as Paul Ekins who is sitting beside me, and they may be contributing perhaps 30 to 40 per cent of their time, whereas the more junior staff will have a larger commitment.

Q234 Lord Lewis of Newnham: Could you just tell us how many numbers are involved in this, students and staff and things of this nature?

Professor Skea: Well, I do hope that progress has begun to accelerate during this current year. The situation is that I was appointed as Research Director designate in April of this year and the task I was given was to prepare a proposal for an initial work programme for the research centre, which I did by about the end of May and which was approved by the Research Councils at the end of June. What has happened since then is over the summer we got down to the nitty-gritty of putting the contractual agreements in place and we do now have a contract for the work programme of the centre which runs from 1 October this year through to the end of March 2009. So we have a contract in place. It is, as they say, a distributed centre. There are a number of Universities and Institutions involved. We have also been able to put in place the various sub-contracts which are associated with these other groups. Needless to say, it does take time to get things off the ground. By starting on 1 October we rather missed the deadline for that particular academic year, for example, in putting studentships in place. Nevertheless, a number of our participants operate in such a way that they have research groups where they can flexibly move people around from one project to another and some of our groups have actually been able to make a relatively prompt start in getting things going. But the big tasks at the moment are actually getting the staff in place to deliver the programme of work that we promised and we will be moving up to, I would say, a substantive programme of activity by about March or April of next year. I should just say perhaps two other things. There will be a significant review of our progress in about two years’ time and there is the possibility of changes in direction at that point. Obviously the milestone of March 2009, when we end our full first phase, is one which I think we are already paying some attention to.
Q235 Lord Wade of Chorlton: Could I just ask, what is your view on the effectiveness of what is in fact a virtual centre? In other words, as you described it, distributed around rather than actually establishing one single centre with a director and a group of staff in place? How much more effective do you think such a research centre would be?

Professor Skea: In principle, I think having a research centre which had a sort of bricks and mortar concept behind it would be advantageous in the sense that people can meet each other around the corridor and can meet more informally over coffee. However, I think it has to be said that given the history of energy research in the UK over the last 10 to 15 years or so, the competences that we have are rather distributed geographically in terms of the different aspects of the energy centre. So the places where you would find expertise in industrial energy efficiency may not be the places where you would find expertise in nuclear engineering, for example, and I think certainly at this stage it makes sense to try and overcome the obvious obstacles associated with this distributed centre. I have to say the term does not slide easily over my lips because it is almost an oxymoron, but I think it is our duty to try and make that kind of operation work at this particular stage.

Q236 Lord Wade of Chorlton: In other words, it is better than nothing but it is not as good as it might be?

Professor Skea: I think that would be a fair way of putting it, yes.

Lord Wade of Chorlton: That is my view, too.

Q237 Baroness Sharp of Guildford: I perhaps should know this, but what is the funding associated with the centre?

Professor Skea: The funding associated with the centre itself is £13 million over the five year period and the centre itself sits inside the wider towards a sustainable energy economy programme, which is worth £28 million over the same five year period. It is worthwhile saying that that total sum of money is associated with the period up to the Spending Review 2002. There are still potentially some funds to be distributed under the 2004 Spending Review.

Q238 Baroness Sharp of Guildford: Are most of the groups involved in that involved also in this towards the sustainable energy programme as well?

Professor Skea: The towards a sustainable energy economy programme will engage a much wider range of groups around the UK. It is difficult to say at the moment because the four themes under which it is being commissioned were still sub judice in terms of it going through peer review and things being decided, but having seen the applications and having sat as an observer on the committees doing the selection I can say it will be a much wider range of people engaged.

Q239 Baroness Sharp of Guildford: And are you looking to raising any further co-funding from, for example, European programmes or anything like that?

Professor Skea: Yes. Well, obviously an issue for the centre itself is that it does not have a legal personality and hence cannot apply for European funds, but what we can do, I think, is act as facilitators to try and get the partners who are engaged in the centre engaged in the European programmes and begin to act as a kind of marriage broker, as it were, to take things forward. So that certainly would be the case. The other thing in terms of co-funding is we would certainly be looking for other sources of funding in the UK, whether it was from the corporate sector or other sources.

Q240 Chairman: One of our witnesses in our earlier inquiry into renewables described your centre as a “research hotel”. Is that a description which you accept and is it appropriate, do you think?

Professor Skea: Yes and no. We are not a research hotel but we have worked up a research hotel concept within the centre, which will be part of the overall centre’s operations. The purpose of that is to act as the networking hub for the centre, the place where we can engage with the international energy research community, draw in the senior academics from overseas, run joint projects and act as the place where we will be actually running workshops and seminars. In fact that research hotel, which has been described as the meeting place, is based at Oxford University. So Imperial College will be the administrative headquarters of the centre and Oxford will be running the networking hub with the research hotel.

Chairman: That is interesting.

Q241 Lord Wade of Chorlton: Could I just ask a quick addition. When you looked at this issue, and you have come back to the point that I was making about the virtual as against a proper centre, was there an analysis made of the different costs and was it costed out to have one proper research centre and was it the extra cost that stopped it happening? What would be that extra cost if that was an issue?

Professor Skea: I have to say that I was only part of this process since April this year and I was given a certain charge at this point, which was to try and put together the different elements of the UK community on the basis of peer review comments that had been made and passed through the scientific advisory committee which was advising the Research Councils, and listening to the guidance I had from that committee the steer was very much to try and
pull together this distributed centre rather than to base it all in one place and have a kind of winner takes all result coming out of it. So from where I was sitting these were the kinds of instructions or parameters that I was operating within.

Q242 Lord Wade of Chorlton: So you were not aware of any initial analysis on cost that had been made on alternative ways of doing it?

Professor Skea: No.

Lord Wade of Chorlton: I raise the issue, if I can just make the point, because we had exactly the same situation when we ran the investigation into the future of computers and computer technology when this Committee proposed the setting up of a centre and Government watered it down to a virtual centre made up of four different centres throughout the country. In practice, it has been a very difficult thing to pull together and it is still long behind what it should have been had the advice of this Committee been taken and it worries me that it is a Government approach to try and reduce the cost that turned out to be a lot less effective. When we look at the financial implications of what is going to happen on the energy field generally, it would seem to me the difference between 10 or 20 million is peanuts within the general scheme of things and is a mistake. I would like to put that on the record, which I obviously have.

Q243 Lord Lewis of Newnham: Could I just ask, is this an interim measure or is this the intention that this will be the operational procedure it will go through, as it were, for all time? I can understand that your way of dealing with it at the moment allows you to start very quickly, whereas building up a centre, going through a recruitment phase, could well have been your four years. But if indeed this is still an alternative that you could envisage taking place in three or four years’ time, it seems to me you could then marry these two together quite successfully.

Professor Skea: Yes. It is worthwhile saying that we do have these two milestones within the next five years where we can look at the arrangements, the first being the two year review, which I do not anticipate making any radical changes in terms of moving from a virtual centre to a bricks and mortar one. The Executive Director and I have been invited eighteen months before the end of the current contract to give careful consideration to how you might want to move this forward after 2009 and to draw forward appropriate proposals at that point.

Q244 Chairman: On the financing, did your budget not come out of the Research Council? Did three or four of the Research Councils throw something into the pot, or was it an additional sum on top of the Research Councils’ already existing fund?

Professor Skea: As I understand it, it was part of the Research Councils’ bid for the 2002 Spending Review. They were allocated £28 million for the towards the sustainable energy economy programme and took the decision to allocate £12 to 13 million of that for the centre itself.

Q245 Chairman: And all of the Research Councils were involved in that?

Professor Skea: Three of the Research Councils. It is led by the Natural Environment Research Council with support from the Engineering and Physical Sciences Research Council and the Economic and Social side.

Chairman: Thank you.

Q246 Baroness Sharp of Guildford: There was a specific allocation in the CSR last July. Is there any further allocation as far as you know?

Professor Skea: There is further allocation for energy research, as I understand it, but there is a process going on at the moment to decide where that will go.

Q247 Lord Paul: One of the criticisms that one hears a lot is that there is a lot of research going on all over the country but it is just not being coordinated and people are afraid to communicate with each other in spite of the advance in the communications system, etc. They just want to run it themselves. How effective do you think now in energy that coordination is and what kind of effect your research centre would be able to bring to it?

Professor Skea: Clearly the starting point for this was Sir David King’s Energy Research Review Group report back at the end of 2001 and it clearly said that energy research was not sufficiently coordinated in the UK. My subjective impression from having tried to put the programme of the research centre together and also communicating with the people making their bids under the wider programme is that that would certainly still be the case, though perhaps not as true as it might have been two to three years ago because I think the very fact that the Research Councils have been increasing their funding again has given incentives to people to find out what is going on and this awareness has been rising. What I would say about the Energy Research Centre is that if we do not make a difference to that level of coordination we will actually have failed in our task because it is one of the main charges that have been given to us. If I could just mention two specific initiatives that we will be taking forward within the centre to address that. First of all, we will be establishing a research portal which will map out the landscape of research activities and competences in the UK to try and make it clear and transparent to the wider community and there will essentially be a
gateway from the main website which will take you to that type of information. The second thing is that there is quite a high expectation from the Office of Science and Technology, the Research Councils and the DTI that the research centre should attempt to in some ways “conduit” (my inverted commas) the sort of direction of future energy research within the UK and we have built a specific function called research road mapping into the centre’s activities which will be integrated with the work of the wider network to try and identify future research priorities and the sequence of research problems which need to be solved if you are going to get to certain points in the future in the energy system.

Q248 Lord Paul: One of the problems which I hear about is that it is a cultural problem, everybody wants to keep their research to themselves. How are you going to make changes in their cultural inhibitions?

Professor Skea: Yes, everybody wants to keep their research to themselves but a lot of the more recent funding initiatives have actually made it a requirement that people begin to work together in order to actually get access to funding. I have to say at the smallest sniff of research funding it is amazing the incentives that are given to the academic community. They are incredibly responsive to these kinds of signals. So if you look at the kinds of initiatives which are being put together under the towards a sustainable energy economy programme really quite extensive consortia have come together with different pieces of inter-disciplinary expertise with people beginning to work together. Interestingly, to relate it back to this problem about virtual versus bricks and mortar, it appears that it is almost easier for people to collaborate with people at a university one hundred miles away than it appears to be for them to collaborate with their own colleagues and this pattern of collaboration between and across universities is actually quite a striking feature.

Q249 Chairman: Perhaps we could ask Professor Hammond, who is at the sharp end of this.

Professor Hammond: Well, I certainly agree with Professor Skea. I have been involved in the Carbon Vision programme (Carbon Trust/EPSRC) and I am hoping to be involved in Supergen III, which is an EPSRC programme. Both programmes involve large consortia. In the case of Supergen, 12 universities plus two industrial companies, and the prospect of getting “a pot of gold” to do the particular research that you want to pursue encourages researchers no end.

Chairman: I am sure, yes.

Q250 Lord Lewis of Newnham: Are there any areas which you have found completely lacking from the point of view of energy research which you think really are critical and ought to be being looked at and are not being looked at in this country?

Professor Skea: Maybe I can go first on that. I think given the very ambitious political objectives engaged with energy policy, the 60 per cent target, it is very difficult to leave out parts of the energy sector when you are actually trying to take the research agenda forward, which is why the work programme that we have put together is really rather comprehensive in trying to cover all of the angles. Personally, I think perhaps the biggest challenge is making the link between more basic research and the exploitation of technology, which is more the development and demonstration end that would fall within the remit of the DTI perhaps rather than the Research Councils. I go to see the DTI regularly about that, but this is one of the agendas that I would like to see taken forward certainly.

Q251 Chairman: Perhaps we might just ask, because we have them here, whether PSI and the Tyndall Centre have any collaboration in their programmes?

Professor Ekins: Yes, I can say categorically we have. I have been working on two projects with the Tyndall Centre. One was to do with economic modelling of carbon reductions, which has now come to an end. That was a collaboration with the universities of Cambridge, Imperial College, and colleagues at the University of Manchester. So that was already one of these networking activities which will be feeding very much into the UK Energy Research Centre work that we are doing. We are doing another project, again with the University of Manchester, on the integrated scenarios side of things, which again is going to be related to the modelling work that I will be doing with the centre, and PSI is going to be a collaborating partner of phase 2 of the Tyndall Centre, assuming that phase 2 of the Tyndall Centre is approved. It is part of that proposal. So I personally have been very keen, and I know Professor Skea has too at Research Director level, for the UK Energy Research Centre and the Tyndall Centre to do things together where that makes sense and clearly I am running the energy modelling theme for the UK Energy Research Centre. That is a very important part of the climate change agenda as well, the whole issue of integrated assessment models, and I am pleased to say that institutionally it looks as if we are going to be able to work very closely together indeed.

Mr Starkey: All I would add to that is that Professor Ekins and I met only yesterday at Tyndall north.

Chairman: Well, we are hot off the press then.
Q252 Baroness Sharp of Guildford: We have been talking about the structures. Could we talk a little bit now about the research agenda and what are the main priorities of the research agenda of the Energy Research Centre and how energy efficiency, which is the main focus of our study at the moment, is positioned within this agenda.

Professor Skea: Yes. Maybe if I can take that first and then pass it on to Geoff Hammond to look specifically at the energy efficiency side. The sad answer is that the priority is almost everything, which I think is probably the wrong answer when you put the question in that way. We have divided the Centre’s work into three vertical themes which basically divide the energy sector up into a fairly logical way—the demand side, the supply side and the infrastructure (ie the wires and pipes that join things together)—and there is a Co-Director responsible for each of these vertical themes. We also have three cross-cutting themes, which largely address the interests of the individual research councils. So the systems and modelling work being pioneered by Paul represents the interests of the Economic and Social Research Council. We have an environmental sustainability theme and we also have a theme on materials for advanced energy, which was one of the key blockers identified by the Chief Scientific Advisor a couple of years ago. But just to emphasise that demand reduction is the title of the very first theme that we identify, so clearly energy efficiency is something that we identify as a priority. Perhaps I could invite Professor Hammond to amplify on that theme.

Professor Hammond: Thank you. The energy demand reduction theme which Jim mentioned is being coordinated through Oxford University under Dr Brenda Boardman, whom I believe you met at an earlier session. Roughly speaking the split of activities in demand reduction is something like 46 per cent of energy is assumed to be part of the building fabric or structure, excluding processes in buildings, 15 per cent transport (which I know is outside your particular remit), something like 20 per cent in the food chain, the growing, packaging and transporting of food of one sort or another, and 15 per cent in industrial processes. Now, there are other ways in which you could ‘cut that cake’, and many people would combine the food processing with the industrial infrastructure. So that is the basic format in which the energy demand reduction theme is going forward, and different groups will take a role in various sub-themes. Generally speaking, under the buildings sector the Carbon Vision programme, which is a joint Carbon Trust/EPSRC programme, is thought to deal adequately with the building structure, transport is being done by the Robert Gordon University up in Scotland, I think the food chain is being undertaken by Oxford, and we are looking at industrial processes at the moment.

Q253 Baroness Sharp of Guildford: Is Oxford also doing the building fabric? Are they leading on that?

Professor Hammond: Under Carbon Vision there is a very large consortium, of which Oxford and Brenda Boardman coordinate one part, which is entitled “building market transformation”.

Q254 Lord Lewis of Newnham: So what timescale are you running to on this? When do you anticipate that the work you are doing will build a result? I am just looking at an energy report here, which says that emissions have increased in three of the past four years and still stand at broadly the same level as in 1997. So there is a large hill to climb there and I am just wondering what sort of timescale you are anticipating your work will lead to.

Professor Hammond: Carbon Vision is looking at 2030 as the timescale for something like a 50 per cent reduction in the buildings sector. I think Jim will probably be able to tell you what the UK Energy Research Centre is looking at elsewhere.

Professor Skea: Yes. To turn it into a more managerial response to the question, because we will be reviewed in two years’ time we have some specific targets for what we intend to deliver at that particular point and three years further down the line at the end of the first phase we would expect to have other achievements under our belt. But I think it is worthwhile emphasising that given research will have an impact in the energy system in the long-term and given the long-term nature of the UK’s energy policy objectives, I think it is appropriate for the centre to have these slightly longer term timescales in mind rather than thinking of what happens in the next six months to two years in terms of the development of the energy system.

Q255 Baroness Platt of Writtle: Are you intending to focus demand-side research on any specific sectors and in what sectors do you see the greatest scope for reducing demand?

Professor Hammond: As far as the bodies that are coordinating the activity, the energy demand reduction is being focused at Oxford in the Environmental Change Institute and is led by Dr Brenda Boardman. The largest of the sectors is clearly seen as being buildings but as there already is this very large Carbon Vision programme it is seen as being handled mainly by them. It is being coordinated and linked through the UK Energy Research Centre. After buildings we are looking at the food chain, transport and industrial processes, roughly equal size in terms of potential for energy demand reduction.
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Q256 Baroness Platt of Writtle: Could I just follow this up, because it seems to me that the most important thing is public education. I got my gas bill last week and was very pleased to see that British Gas has included all sorts of ways of saving energy in the home. All this research is lovely, but the average member of the public is not going to take much interest in that. The most important thing is the average member of the public thinking, “This is something I need to do if I want to avoid climate change and also what I want to do because I then save money.”

Professor Hammond: Perhaps I will just answer that from a personal point of view and then I am sure Jim will want to come in. A few years ago I was involved at the University of Bath with a couple of colleagues, a psychologist and an architect, in looking at how we could introduce smart metering into Georgian houses in Bath to encourage the occupants to save energy. Certainly the evidence from that study indicated that, if you give people more information about their impact and also the potential cost savings, they do take steps to reduce their energy consumption.

Professor Ekins: Perhaps I could just comment in a slightly broader sense. I am just coming to the end of a period of being Director of the ESRC’s programme on environment and human behaviour, which seeks to address very much the sorts of points you are making, what causes people to change behaviour, and obviously information is an important possible cause of change of behaviour, but I emphasise the “possible” because we are bombarded with information of all kinds in all sorts of ways. Most if it we ignore. It is therefore very important that there is research to try to elucidate how this information should best be presented to householders, and indeed there are ongoing practical programmes of work through Ofgem and elsewhere. I am also a member of the Ofgem Environmental Advisory Board, which has advised on how the bills from the suppliers should be formatted so that people will read and act on the information that is there and whether there also need to be other policy measures such as, perhaps, economic instruments which will reinforce the mere information, because the unfortunate thing is that there have been many attempts by government to inform people about energy use, climate change and about all sorts of things which, when people have done surveys afterwards have turned out not to be terribly successful. I think, therefore, there is an enormous role of research in helping to identify and ascertain precisely what kind of information is going to be effective.

Q257 Baroness Platt of Writtle: I notice that we have had some information internationally that in France they are putting a lot into radio and television and whereas people may not read things, perhaps they watch it or listen to it more readily.

Professor Ekins: Indeed, yes.

Chairman: Perhaps we should move on. Lord Lewis of Newnham.

Q258 Lord Lewis of Newnham: Could I just ask a supplementary here. I am a little bit confused as to the aim here. Is it to save energy or to reduce CO₂ or both, because if it is to reduce CO₂ then there are alternative areas in which I would expect you to be doing certain types of research?

Professor Hammond: I think the answer is, both. Obviously energy efficiency results in energy savings that will lead to carbon savings, providing we still have roughly the mix of supply side technologies that we have at the moment (because they are dominated by fossil fuels). As we move into the future, if and when the sources either become more scarce or we achieve some of the targets for renewables, and we possibly introduce nuclear, then those are carbon-free sources.

Q259 Lord Lewis of Newnham: I am afraid you have used a forbidden word as far as we are concerned. Nuclear is a word the Government does not seem to like under any sets of circumstances, but that is another issue. Could I just ask, what interactions will the centre have with government departments? I know you have been telling us that you have got a well-developed structure there. Will energy bodies such as the Energy Saving Trust be involved in developing the research programmes and how will the centre feed evidence into the policy-making process?

Professor Shea: I am quite happy to respond on that. It is not just a question of plans. Already there are regular meetings between myself, the DTI, Defra, the Energy Saving Trust and Carbon Trust about how we take forward the research agenda and some of these have actually been quite practical in the sense that the Carbon Trust under its carbon vision programme actually still has some decisions left to make. We have some decisions left to make about the disposal of our resources and we are actually talking together to make sure that we make the best common use of the resources that we have got, that we do not duplicate and we complement. So we are well engaged with them. In terms of getting the information and the results over to the policy community, there are several generic measures but we have also built a very specific function into the centre to try and achieve that aim. So the general approach would be publications, short summaries of research, workshops (because the personal contact is very important in getting the communication) and direct interaction with policy-makers on the one to
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one level. We would also rather systematically look at opportunities for responding to consultations and inquiries. I apologise for not responding to this inquiry as we started on 1 October and you closed on 9 October. We thought it was a little premature, perhaps, to make the offer. The very specific function that we have built in is something called technology and policy assessment, which is a function that has been operated for us by the Imperial College Centre for Energy Policy and Technology. The idea there is that perhaps if you are trying to influence policy it is not so much new research as the careful integration and synthesis of existing research which could make the difference. So with this function we are going to create a steering committee which will be drawn from people like DTI and the Trusts to develop a programme of short projects which tries to draw together the relevant types of information. There will be a steering group. We have a very clear set of questions and protocol to guide the projects and the results will be subject to peer and also policy review at the end of the process. We would anticipate carrying out about two of these initiatives each year and we are actually planning a workshop on 10 December with various people from the policy community to scope out how that programme of work will actually operate.

Chairman: That is very clear. Thank you.

Q260 Lord Wade of Chorlton: Could I just sort of dig a little bit further into that before I ask you my question because as I have been listening to you what I do not quite understand is that, as has emerged from our inquiry so far, there is no lack of knowledge about how you can save energy, there is an awful lot of knowledge about how every building in Britain could save energy and how individuals could save energy but they are not doing it, so is the purpose of your research to find some method that nobody has ever thought of yet that is going to be so much easier and everybody is going to say, “That’s a wonderful idea and from now on I’m going to change my life, and I press a button and it all happens,” or is the purpose of your research to find out how we can put into effect what we already know, and if we do that is that not a different approach from one which needs the sort of research bodies that you were just describing? I am a little bit confused about what you expect to happen out of everything that you are doing.

Professor Skea: It is an interdisciplinary centre which draws together engineers, social scientists and economists. The engineers are clearly concerned with developing new products, new technologies, new techniques which will help you in the longer term to reduce energy and it can range from very ordinary kinds of things to the people in the materials theme looking at super-insulating films which, for example, could really reduce energy use in existing housing. But as you say, I think in terms of demand reduction a lot of the challenges are to do with deploying existing technologies or changing existing patterns of behaviour and it is there that perhaps the policy people, the social scientists and the economists have a bigger role to play and here we quite acknowledge the fact that there is a very heavy stone to be rolled up a very large hill in terms of taking that forward. So I do not think we expect to develop magic bullets in that sense of developing new strategies and policies. What we are really hoping to do is to contribute to the policy-making process and move forward rather incrementally in improving the overall portfolio of measures that we might put in place.

Q261 Lord Lewis of Newnham: But I think we have discovered, paradoxically, that in fact if you increase the energy efficiency in a home it does not reduce the amount of energy they use, in fact it could increase it because we were given examples, for instance, of double glazing for conservatories. So double glazing now means that the conservatory is used for the whole year, whereas under the old system it was only used during the summer period. So it has adapted itself to a completely different type of sociology in this system. This seems to me to be another feature which is very important and very worrying from our point of view.

Professor Skea: Yes.

Professor Ekins: I am quite happy to comment on that because that brings together really the two themes with which I am mainly concerned in this area. One is the need for investment. A lot of realising energy efficiency opportunities requires investment and very often that investment does not take place. It either does not take place, to be frank, because it does not yield a great enough return and people can get more money back from investing in other things, or it does not take place because the people who need to make the investment have not got the money and the financial markets do not work well enough to lend them the money and they do not have the expertise to take that route in any case. So that is one important set of issues to be looking at, as to ways in which those financial barriers to investment can be addressed. The other issue is to do with this very complicated business of behaviour. Clearly people could change their behaviour and save energy in all sorts of ways which would not require any investment at all, but behaviour is a very complicated business and we all behave in the way that we do for quite good reasons as far as we individually are concerned. One gets then into, I think, academically a very rich area of social science because one is talking there about incentives, about the interplay
between incentives and regulations, and about actually knowing how people will behave when certain actions are taken. Your discovery about greenhouses was a quite unexpected and unintended consequence of this particular development. In the economics literature it is actually well known that increased efficiency in the use of a resource leads over time to greater use of that resource and not less use of it, because it becomes more widely available for more purposes and the business of a growing economy sucks more of that resource into it becoming more fundamental, which is why I as an economist tended to think that the price mechanism is important and that unless you get increased efficiency allied to rising prices you will get increased use overall rather than decreased use overall. If we look at where energy prices have been until very recently over the last fifteen or twenty years we should not be surprised that there has been a tendency for energy use to increase rather than the reverse.

**Baroness Sharp of Guildford:** We have also been looking, if I might say so, at the issue of savings made through energy efficiency which are then used to finance holidays or cheap flights.

**Q262 Lord Paul:** But more than the holiday, I mean, there are better designs, more energy efficiency but then you build far bigger glasshouses, etc., which expend more energy. So what is the theme? Are we trying to make it energy efficient irrespective of how much energy use increases or are we trying to make energy consumption less?

**Professor Hammond:** This phenomenon that you have identified is sometimes called the rebound effect. I think there are likely to be limits to the rebound effect. For example, many people argue that energy efficiency in the home means that you buy into greater thermal comfort, but there is a limit to the amount of thermal comfort that you are going to have. After you have got a temperature in the home of 20 or 22 degrees, or something like that, you are not going to put the thermostat up even further. So I have a feeling that there will be saturation effects to this so-called rebound effect. Certainly if you have new-build, then you can build new houses to a very high standard in terms of thermal insulation and the efficiency of the building. One of the major problems we have is refurbishing the old stock, given the long life of existing houses.

**Q263 Chairman:** Yes, but is there not another spectre on the horizon here, and that is air conditioning? As people become more affluent and the summers get warmer they are going to want more air conditioning. The more people who buy it, the cheaper it will become, therefore more people will be able to afford it and that is going to be a massive addition to the energy demand.

**Professor Hammond:** Yes, I quite agree. I had to give a presentation in relation to the Carbon Vision Steering Group and I was actually thrown by that question, but I fully accept that is a possibility. I think we must try and discourage that as far as we can.

**Q264 Lord Lewis of Newnham:** I think there is a cultural factor here as well. I mean, after all the child is father unto the man. At home when I feel cold I put on a jumper; my grandchildren put up the temperature on the thermostat.

**Professor Ekins:** If I may comment, and this is very much a comment from an economist’s point of view, I have absolutely no doubt at all that human ingenuity in terms of inventing new ways of using energy will mean that for as long as energy is relatively cheap we will find ways of using it, and however efficient we may make certain uses (and I think it is very important that we should make those uses efficient), we will find other ways of using it if the price of energy and carbon relative to other goods and services remains at its current level, which is frankly very, very low if one looks at its share of expenditure, whether of businesses or individuals. That seems to me to be an economic fact of life which is extremely unpalatable politically and very difficult to cope with, but nevertheless it is an economic truth which we will need to cope with if we are to make progress.

**Q265 Lord Paul:** We have an example in this room. I mean, we have more lights than I certainly feel comfortable to work with and air conditioning, which I am sure is an increase in the use of energy. We may be more efficient.

**Professor Shea:** I am sure we could go on about this all afternoon, but just to perhaps make one over-arching point, this is actually, I think, a very complicated picture and it is actually Paul Ekins’s job in the systems and modelling to pull it together because the evidence you heard from, I think, UCL was quite clear about the conservatories issue and how the rebound effect had probably been more than 100 per cent. On the other hand, it identified in programmes which were addressing fuel poverty the rebound effect was typically 50 per cent and I have to say on the back of an envelope if I see myself saving domestic gas I cannot find any way of spending it on foreign holidays that will make me increase carbon dioxide emissions!

**Lord Lewis of Newnham:** I refer to the point that you have got a problem here. I do not think the young think this way. I am not trying to insult you in any way, but I do believe that my generation takes a
energy efficiency:

december 2004

Professor Jim Skea, Professor Paul Ekins, Professor Geoff Hammond
and Mr Richard Starkey

Baroness Platt of Writtle: And shower every day.

Q266 Lord Wade of Chorlton: On this Committee we have a number of issues which have been laid before us where we have been very concerned about the expertise, both scientific and in other forums, to be able to deliver the policies and clearly this is an area where you are going to need sufficient expertise to research into energy efficiency and into energy policy more generally. As we have just been discussing, there is a wide range of issues. So what are your comments on that? Do you believe you do have that necessary expertise or is there a shortage there?
Professor Skea: Well, we are not in a position at the moment to comment on the availability of gas fitters and things like that, but in terms of the academic—

Q267 Chairman: This is research expertise?
Professor Skea: Yes, on the research expertise. It is interesting that in putting the Energy Research Centre together and also the consortia which are forming under the Research Council’s programmes there is a fair mix between what you might call the usual suspects, people who have been around in the energy area for some time, but also a number of new people are beginning to come into the area who were not there previously, perhaps more at the mid-career level. I do not think we have the capacity to double or triple our research funding in this area overnight and for there to be sufficient people there to carry it, but if there is a gradual increase in funding I think there are ways of actually dealing with that to improve the effectiveness of our research. I flag up in particular the idea of attracting people from parallel fields, people who have been slightly adjacent to energy research, say on the materials side, who could be brought in. I would emphasise the importance of training people, getting people moving at the post-graduate level, beginning to develop the courses again and beginning to create the qualified people. One final point, which my colleagues may want to pick up on because Paul and I were just going through applications for jobs at the Policy Studies Institute this afternoon, which is the question of what we do about attracting skills from overseas and whether we are actually bringing skilled people into the country who could contribute to the energy research effort or whether we end up training people and sending them back to their home countries. So I think there are some interesting issues there which my colleagues might want to follow up on.
Professor Ekins: Well, certainly from the energy modelling side of things, which I have been involved in this country now for a number of years, it is very disparate and frankly it is rather small at the moment, but the injection of resources that is represented by the Energy Research Centre in this area is very significant and we will be recruiting highly skilled modelling people in order to take forward the UK effort in this field and we have had some terrific applications from the United States and from mainland European countries. My belief and certainly ambition is that at the end of two or three years the UK will be well-established in this field. It is a very policy-relevant field. You will know that in the Inter-governmental Panel on Climate Change discussions economic models are referred to all the time. One of the things I hope we will do is get much more transparency into how these models are constructed and how they deliver the results that they do deliver. But certainly in this field I have been aware of a very significant buzz going on internationally and an awareness that there is a new initiative and that we are placed quite fairly to make a decent contribution. So I think we are acting as a skills magnet in that sense.

Chairman: That is excellent news.
Baroness Platt of Writtle: What about the skills though? You said you do not know about gas fitters, but if you are going to get buildings to be more efficient you are going to need a tremendous army, not only of gas fitters but all sorts of people, and my feeling is that those skills are not present.

Q268 Chairman: We are hoping to devote one day of evidence to the issue of training for the trades and professions involved in building. I think perhaps now we should turn to the second part of our agenda. We touched lightly on financial and fiscal incentives earlier in the discussion and we are very well aware of the range of views on this issue. The recent PSI study which you co-authored, Professor Ekins, looked at carbon taxes and Mr Starkey’s evidence from the Tyndall Centre, for which many thanks, which put the case for domestic tradable quotas. We have had other evidence recommending stamp duty and council tax rebates, and so on. Perhaps we could start off the discussion on this topic by asking how much research is being done in this field. Can the range of views we have heard be the sum total of possibilities or are there further possibilities emerging, and is there some coordination of all these different views?
 Professor Ekins: Well, perhaps I can answer first. I would hope that at an Institute like the Policy Studies Institute we take very much an overview, a kind of holistic view of policy both in terms of regulatory instruments, economic instruments and information instruments, in terms of voluntary agreements and the whole range of policy because broadly it is a horses for courses situation, as I am sure you are aware. Very often to address a complex set of issues
one needs a range of policies and one needs them to be combined in the right way so that you do not get unintended consequences and you do get the right incentives to the right places that are of an adequate size to achieve the results you are wanting to achieve. Having said that, when one does individual pieces of work in order to keep them manageable very often one has to concentrate on one policy measure as opposed to others in order to really hunt that one down and see what its implications are. In this particular piece of work that you refer to one part of it was indeed looking at the way in which a carbon tax might increase energy efficiency but its principal purpose was to look at its distributional effects, especially its effects on people in low income households, and to discuss and recommend ways in which those effects could be mitigated; in other words how you could implement a carbon tax on households without having disproportionate effects on low income households, which is the stated reason at least why this Government does not implement carbon taxes on households. So it seemed to us important to illuminate the fact that there were to be a will to implement carbon taxes on households (and our household taxation rate on energy in this country is much below that in many other countries both in terms of VAT and in terms of not adding anything on top of VAT) then it would be possible to do so in a way in which the great majority of low income houses were not made disproportionately worse off. That was kind of the headline message of that particular piece of research.

Q269 Chairman: That is very important indeed. What about the coordination of all these various different proposals? Is there any part of your centre which is bringing together the people who are working on fiscal incentives?
Professor Ekins: Well, I do a lot of work on fiscal incentives. I have done a major study through the Tyndall Centre of the Climate Change Levy, which of course is related to industry, and the climate change agreements, which are part of the voluntary agreements system, and obviously I am very much engaged in discussions on the building regulations, for example, which is a way in which through regulatory means one is trying to do these things. Part of our study too looked at the issue of Domestic Tradable Quotas in the transport sector so we were trying to bring that into our discussion as well, but obviously Richard Starkey is involved in a project which is looking just at that and is going into that issue in much more detail than we were able to do.
Mr Starkey: Yes. I agree with everything that Professor Ekins says. It is important to have the right mix of policy instruments and it is very much horses for courses. My reading of the literature is that the message comes out time and time again that what you need is a combination of price instruments, either taxes or some sort of rationing, and what are referred to as the non-price instruments, energy efficiency standards, voluntary agreements, and so on and so forth, which Professor Ekins talked about. You get a lot further if you mix the two rather than just using one or the other. So Professor Ekins has been looking at taxes as a price instrument and I have been looking at Domestic Tradable Quotas, and I can say a little bit about Domestic Tradable Quotas if you would like me to.

Q270 Chairman: Well, I think we will move on now, so perhaps we can deal with it as we come to it. Mr Starkey: There is one further point I would make on the policy mix issue. On the way down here I was revisiting a study of how the US could meet their Kyoto commitments for 2010, and this study found that if you tried to do it just through taxes alone it would require a tax of $230 per tonne of carbon and the economy would lose $110 billion in 2010. If you did it with a mixture of price and non-price instruments the price of the carbon was much lower, I think $130 per tonne, and the economy ended up gaining up to $50 billion in 2010. Of course, you can question the assumptions in all these modelling exercises but nevertheless it is a very interesting contrast, I thought.
Chairman: Thank you.

Q271 Lord Paul: I think, as the Chairman said, we are aware of the PSI study on the energy efficiency. Can you summarise for us the main conclusions and how do you think you will be able to get it transmitted to the Government?
Professor Ekins: Well, the main conclusion was that although if you simply levied the carbon tax in an undifferentiated way across households and made no attempt to compensate low income households you would make low income households disproportionately worse off and you would increase fuel poverty, and given Government policy commitments in that area that therefore is a very unlikely policy and as such it is indeed not Government policy. What we hypothesised was that there were ways through the benefits system and in other ways in which one could compensate low income households with the revenues which were received from the carbon tax in order to ensure that this effect did not happen and for 80 per cent of the lowest income households we were indeed able to do that, so that 80 per cent of these households ended up better off than they were before the measure started.

This was a revenue-neutral measure so there was no extra Government expenditure going into that. That of course meant that 20 per cent of households were made worse off. Because there is enormous variation in energy use between households at the low income end (in fact it varies by a factor of more than six within the lowest income decile, which is a very high factor of variation within these very poor households) it means that some households, even with those compensatory measures, those very high energy using households, would have been made very much worse off and so fuel poverty would still have been deepened. So we recommended that actually until one can sort out that problem—and that problem is largely a function of the extreme energy inefficiency of a lot of the UK housing stock—then probably a carbon tax was going to be relatively unpopular government measure. But if we were able to increase the energy efficiency of the housing stock it very possibly could contribute to a curbing of this ever increasing household use of energy which we are currently seeing.

Q272 Lord Lewis of Newnham: This is a point to which you have actually referred previously, but in addition to your statement the point has been made to us on more than one occasion that the energy prices are too low to stimulate significant investment in energy efficiency. What is the consensus amongst researchers that further fiscal incentives are necessary if the Government is to get targets which are going to in any way represent the targets they have got placed at the moment? If one simply relied on, shall we say, the market force situation what sort of energy price increases would be required in order to make a significant impact on the domestic energy use?

Professor Ekins: Well, those are two complicated questions and I will be as simple as I can in responding to them. I am not sure that researchers have a consensus about very much in this area. I would venture to claim that probably among economists there is a perception, to put it no more strongly than this, that unless the price mechanism is used in order to encourage energy efficiency in the context of economic growth we will not manage to curb the secular trend of increasing energy demand, and that while one might try to do that through regulation one is unlikely to be successful, and if one were to be successful one would only achieve it at greater cost than one would if one was using economic instruments. I have to say that among economic instruments I do include trading schemes, permit schemes. It is a question of whether one tries to ration by price or ration by quantity, but of course very soon if you ration by quantity it feeds through into the price. We are all familiar with black markets when things are rationed by quantity and people try to get around those quantity rationings. In respect of the first question I suppose I am quite a conventional economist; in respect of the second on how much energy prices would have to rise, I am bit heretical because economists tend to look at the way in which prices have affected energy use in the past and postulate that there is something called a price elasticity, which will tell you how prices will affect demand in the future. I actually think that that elasticity is a very variable quantity, and that the context within which prices are increased and in which people are asked to change their behaviour, and whether they understand why they are being asked to change their behaviour, whether they buy into the reason (say climate change or whatever it may be) could make an enormous difference to the responsiveness of people’s demand to these price effects. I think one has seen across a range of issues that where people perceive there are substitutes, into increases would be required in order to make a significant impact on the domestic energy use?

Q273 Chairman: Mr Starkey, is this an appropriate time for you to say something about your domestic trading scheme? Would you like to tell us something about how you see that contributing to a fiscal incentive?

Mr Starkey: Well, we have been talking about the need to combine price and non-price instruments. Tax is one way of giving a price signal. Another way of doing it is through personal carbon allowances and this is the scheme which I have been working on. In principle what Domestic Tradable Quotas does is it sets a very clear framework for carbon emissions reduction. It sets a carbon budget every year. The budget is set twenty years in advance and there is a long-term emissions reduction signal for the market. It also couches the solution in terms of the problem. The problem is carbon emissions and the solution is couched in those terms. Everybody gets a personal carbon allowance. This carbon allowance is on an equal per capita basis, so domestic tradable quotas arguably approaches emissions reduction in an
equitable way. It is based on the principle endorsed by the Royal Commission of Environmental Pollution that all human beings are entitled to emit into the atmosphere the same quantity of greenhouse gases. Finally, I would say that it makes citizens stakeholders in the environment because it gives them an equal share in fact of a limited atmospheric sink. So I think in principle that is what the scheme does. In practice there are some definite implementation issues that I have been looking at in terms of the enrolment of fifty million people in the scheme, in terms of the information technology that you would need, in terms of Government procurement (we have heard rather a lot about that recently), in terms of card fraud and in terms of rating electricity. So I think domestic tradable quotas have a lot to offer in principle and so what I am looking to do is see how feasible it is in practice.

Chairman: Lord Lewis of Newnham, did you want to ask a question?

Q274 Lord Lewis of Newnham: The question I think could wait, but may I pose it and then you may decide that you would rather wait. It is just simply that it does seem to me that all the schemes that we are talking about are possibly applicable if one is talking about a 20 per cent reduction. But if we do take, as you rightly pointed out, the Royal Commission's suggestion of a 60 per cent reduction this seems to me to put in a totally different system altogether when you start talking about controlling it by any form of taxation or by quantities of this nature. I mean, 60 per cent is a tremendous reduction in the potential energy scale for the country.

Professor Ekins: Well, I will certainly respond to that. I think we have to be clear first of all that we are talking about 60 per cent carbon, not 60 per cent energy, so that alongside demand reduction one is talking about the promotion of non-carbon sources of supply, which will mean that the actual demand reduction in energy needs to be rather a lot less than 60 per cent, and one is also talking about a very long time. 2050 is a long way away. I was rather a small boy in the 1950s so I do not remember that much about it, but I have read a fair bit about it and I know that the transformations that our society has gone through in the last fifty years have been truly astonishing, technologically, behaviourally and in every other kind of way. I can imagine that under systematic influences (incentives as an economist would say) we could find that technologically and behaviourally our society gradually transformed itself in such a way that actually by the time we got to 2050 we could be finding that we had a very, very low carbon system indeed and we would not even experience it as a loss or a sacrifice, it would just be the way the world was, and because we would be aware of the benefit of a stable climate we would be rather glad that we had done what needed to be done in order to ensure that that was there. One knows that we currently have a tax on road fuels which is about 70 per cent of the price at the pumps, or a little more than that. If one had thought of moving from a zero taxation regime to 70 per cent overnight that would clearly have been perceived to be completely impossible, intolerable and politically unacceptable. We know that it is still a political problem but it is more or less sustainable to keep it at that level and people more or less accept it and I have absolutely no doubt at all that it is one of the things which have meant that we can still move anywhere on our roads at all, which has to be said to be an advantage. So if one is talking about systematic change over long periods one finds that one can arrive at quite dramatic results almost without people noticing it and being very comfortable when they actually get there.

Q275 Lord Lewis of Newnham: You have a great belief in fusion!

Professor Ekins: The fusion of what particularly?

Professor Hammond: Nuclear fusion.

Professor Ekins: Oh, nuclear fusion. Well, unfortunately that seems to me to be proceeding at rather a slower rate than even I have been talking about.

Chairman: Well, we were told 20 years.

Q276 Lord Lewis of Newnham: We had Sir David King in front of us, who told us he views this as 2030.

Professor Hammond: I used to know the late John Collier, who was chairman of Nuclear Electric, very well. He used to give some lectures for me in a previous era. Obviously he was a supporter of nuclear fission, but I always remember him getting up and saying, “You know, nuclear fusion is going to be 40 years away but it doesn’t matter where you start, it’s always 40 years away!”

Chairman: Well, you see, that is why the new head of the facility in Culham is saying 20 years!

Q277 Lord Wade of Chorlton: I would just like to come back to what Mr Starkey was talking about, because having read your paper on that what you have got to do is move wealth from the economically active to the non-economically active, from the wealth creators to the non-wealth creators, and I was just wondering if you have done an investigation to properly understand the implication of that. What effect does that have upon those who are the wealth creators and who create the wealth for everybody if in fact they are heavily taxed to the benefit of those who are not going to be economically active no matter whether they have got any money or not? I
just wondered what you looked at, because clearly without an understanding of the impact of that then you have not really understood what the implications might be.

Mr Starkey: I think I would phrase it slightly differently. I think there would definitely be a movement from those on high income to those on low income.

Q278 Lord Wade of Chorlton: It is exactly the same words that I have said, from the economically active or the wealth creators to those who are the non-wealth creators. So the guy who sits in front of the television all day gets money paid to him by somebody who is running a business in China and America and everywhere else and making a hell of a lot of money for the country. Now, how do you balance that out? If you do not understand the impact of that you have not looked at the implications of what it is all about.

Mr Starkey: Well, we use slightly different terminology but we agree in principle that it would be a movement from those on, let us say, a higher income to those on a lower income. The question is –

Lord Wade of Chorlton: No, I am sorry, I disagree with that way of putting it. It is not a question of moving it from the wealthy to the poor, it is a question of moving it from those who are the wealth creators to those who are not the wealth creators and once you start disadvantaging the wealth creators you produce wealth for everybody. That is the key, and if you do not see it in those terms you will miss the impact of what you are proposing.

Chairman: Perhaps we should just agree to let you go away and think about that one.

Q279 Baroness Sharp of Guildford: I think we have talked quite a lot about reduction in fuel poverty and the impact on low income households. There is, however, one question which picks this up, which I would quite like to put to the panel, and that is if we were to use Domestic Tradable Quotas it creates a system which gets slightly complicated. Now, if you look at the way in which people have reacted to, let us say, the introduction of competition in the energy market and the degree to which the average man in the street is still totally perplexed by this situation, they are confronted by a whole load of energy suppliers and they are confronted by different prices, and the prices of course change constantly so that from one six month period to another it is a different supplier who might be the right one to supply you and you have got the rather odd situation whereby it is the person who you think should be supplying gas who should supply you with electricity and vice versa if you want to get the best market, but it is also changing. How does somebody who is not, if you like, on top of this all the time going to cope with tradable quotas?

Mr Starkey: Yes, that is a good question. The scheme certainly will not come out of the blue in order to enrol everybody into the scheme. There would be a very long lead-in period and so there would be a definite chance to get familiar with how the scheme works and it would require (quoting from the Government’s document on energy efficiency) “leadership, awareness raising and education”. I think that is a mantra, “leadership, awareness raising and education”. So certainly there would be time for people to become familiar with the scheme and there would also be an incentive to become familiar with the scheme because if you can conserve energy you can become a low user and you will have surplus carbon units that you can sell on the market. So it will be an incentive to take up the information that Paul was talking about earlier. Information is necessary but not sufficient. There needs to be a motivation to actually –

Q280 Baroness Sharp of Guildford: When I look at all these pensioners who do not even know that they can claim their pension credit, how on earth are they going to be able to know that they have got some surplus on their tradable quotas?

Mr Starkey: Absolutely. I mean, even with leadership, awareness raising and education there will definitely be people who either are not interested in the scheme or do not grasp the scheme, but there is a way in which they can convert the scheme into essentially a carbon tax because they just sell all their carbon units immediately on receipt, they do not need to think about it, and then whenever they go to the petrol station or they pay the utility bill the vendor goes into the market, buys carbon units for them and it is just added on to the bill. So you can convert from a rationing scheme, if you like, into a tax scheme.

Q281 Baroness Sharp of Guildford: I do think there would be an enormous advantage for us to have units of conversion. If people knew roughly speaking how much carbon per day, per year they should be using and converting it—I mean, what does a gallon of petrol take in terms of carbon? How much does it mean? Just in the same way as if we are looking at food, what is the calorie content of this and that, you look at it and people think in those terms to some extent.

Mr Starkey: Just as Weight Watchers has points, DTQs have carbon units.

Lord Lewis of Newnham: You have also got a major problem in primary allocation, have you not? If you consider an old person, I imagine that they would automatically merit more in the way of carbon tax
than a younger person because in fact we give them at the moment an extra amount of money to buy their fuel in the winter. Equally, if you have got somebody living in the country as opposed to somebody living in the centre of a city where all facilities are available and within walking distance, whereas in the country they have got to go miles in order to get these sorts of facilities. So there would have to be a very complicated mechanism of allocation to various people in this particular type of arrangement. If you were ill presumably you would then become eligible for a further type of—I mean, I understand your point but—

Q282 Chairman: I think you are suggesting an absolutely even allocation where everyone gets the same?
Mr Starkey: Absolutely.
Chairman: When I read that I remembered the Poll Tax, which also was claimed as a principle of equity but which somehow did not quite sell itself to the British public.

Q283 Lord Paul: What about the extra work for everybody it will create, to physically handle that much extra work?

Professor Skea: Could I perhaps make one rather general point about this and what I would see the role of something like the UK Energy Research Centre, and indeed Tyndall, with respect to these kinds of innovative proposals, because I would not see the role of UK ERC being to act as an advocate for particular technologies or policies. What I think we need to do is carry out a careful evaluation of the advantages and disadvantages of different measures and present that coherently to the policy-makers. What I think we have heard wonderfully around the table now are issues about administrative simplicity, links with wealth creation, redistribution, etc, and I think some very helpful tips have come through as to how we carry out these evaluations.

Q284 Baroness Sharp of Guildford: And sheer bureaucracy if you are not careful.
Professor Skea: Yes.
Mr Starkey: Absolutely.
Chairman: And do remember the Poll Tax! Sadly, I think we must bring this to a close. Can we thank you very much for an extremely stimulating session. I think it has been apparent from our response to your answers how much we have enjoyed talking to you and how much we have learned as well. I repeat again, do feel free to write in with any extra thoughts which occur to you that we did not mention. Thank you very much.

Supplementary memorandum by Richard Starkey and Dr Kevin Anderson

1. This evidence addresses issues regarding Domestic Tradable Quotas (DTQs) raised in the oral evidence session of 1 December 2004 which it was not possible to fully explore within the session.

DTQs: LIKE A POLL TAX?

2. In Q282, it was remarked that DTQs brings to mind the Poll Tax, a tax “which also claimed the principle of equity, but somehow did not quite sell itself to the British public”. Again, in Q284, it was suggested that, when conducting our research, we “remember the Poll Tax”.

3. No-one has previously drawn a parallel between DTQs and a poll tax and we can only imagine that such a parallel was drawn because both measures involve a flat rate. However, we would strongly emphasize that they involve a flat rate in completely opposite ways. Under a poll tax, everyone is obliged to give a fixed quantity (of money) to the state. This makes a poll tax (deeply) regressive. In marked contrast, under DTQs, individuals actually receive, free of charge, a fixed quantity (or carbon units) from the state. This makes DTQs broadly progressive.

DTQs: HOW PROGRESSIVE?

4. Just how progressive are DTQs? A pure carbon tax (ie without any sort of compensation) leaves all low-income individuals worse off and is regressive. By contrast a pure DTQs scheme (ie without any sort of compensation) is highly progressive—in that 70 per cent of individuals in the lowest two deciles would be better off under DTQs than prior to the introduction of a scheme.6

6 This figure is from Ekins, P and Dresner S (2004) Green taxes and charges: reducing their impact on low income households, Joseph Rowntree Foundation, pp 35–36.
DTQs: Fair or Not?

5. Indeed, it is the very progressiveness of DTQs that is at issue in Qs277–278. Here it is suggested that DTQs “move wealth” from “wealth creators” to “non-wealth creators” by means of transfer payments. However, it is important to note that, under a pure DTQs scheme, no transfer payments are actually made. Instead, there is simply the buying and selling of carbon units on the national carbon market. These market transactions result from the equal per allocation of carbon units under DTQs.

6. If one holds that the all adult individuals receiving an equal share of carbon units is just, then the distribution of wealth which results would also seem to be just. So, is an equal per capita allocation of carbon units just? Clearly, it is not self-evidently unjust, given its endorsement by the Royal Commission for Environmental Pollution and given the strong and growing support for the “Contraction And Convergence” idea. And, as noted in paragraph 16 of our original written evidence, there is substantial support within the academic literature on justice for such an allocation.

DTQs: Disadvantaging the Countryside and the Elderly?

7. Q281 raises the issue of how a DTQs scheme would affect the elderly and those living in the countryside. We would not see any problem if a wealthy household chose to move to the countryside where their carbon emissions would be higher. They would simply have to bear the consequences of this lifestyle choice. However, what about a poorer household that has always lived in the countryside? As noted in paragraph 4, 70 per cent of poorer households would currently be better off under a (pure) DTQs scheme than prior to the scheme. Even if only, say, 60 per cent of poorer households in the countryside would be better off, still only 40 per cent would currently be worse off, compared with the 100 per cent who would be so under a (pure) carbon tax.

8. By the time a DTQs scheme was implemented—say 2012, if based on the ID card scheme—the Government would hopefully have achieved its goal of ending fuel poverty in vulnerable households. The improvements in housing stock needed to achieve this goal would mean that, under a DTQs scheme implemented towards the beginning of the next decade, the number of households made worse off by a DTQs would be substantially less than the current 30 per cent and it is envisaged that any compensation mechanisms deemed appropriate would therefore be feasible.

9. The arguments made above with regard to low-income households in the countryside also hold with regard to the low-income elderly.

DTQs: Too Difficult to Understand?

10. To enable the public to become familiar with the workings of a DTQ scheme, “leadership, awareness-raising and education” would clearly be necessary prior to its introduction. Nevertheless, would DTQs be too difficult for some people to grasp (Q279–281)? This is an important question and one which requires careful research. However, it should be noted that people can opt out of having to calculate in carbon units and can convert their experience of the DTQs scheme into something very similar to a tax. An individual is perfectly free to sell their carbon units immediately upon receipt (and this could be done automatically). Then, whenever they purchase fuel or electricity, the necessary carbon units will be purchased by the vendor on the national market and sold to the individual who then surrenders them in the usual manner. All the individual will experience is a surcharge on the cost of their fuel or electricity—essentially a carbon tax.

DTQs: Mired in Bureaucracy?

11. Q283 wonders whether DTQs would be highly bureaucratic. The scheme uses information technology to minimize bureaucracy and make carbon unit transactions as effortless as possible. Carbon units can be surrendered with the swipe of a card or by direct debit and can be bought and sold over the phone, online or in person at banks and post offices.

12. For a DTQs scheme to operate successfully, government must be able to open a carbon account and provide a carbon card for all eligible individuals. Furthermore the enrolment process must ensure that people cannot fraudulently open more than one account. How bureaucratic would such an enrolment process be? The planned ID card scheme aims to authenticate individuals’ identity to a very high level of assurance. Hence basing DTQs on a successfully implemented ID card scheme would eliminate the possibility of multiple applications for carbon accounts and would make enrolment in DTQs relatively straightforward.

13. However, as the recent Home Affairs Committee report on ID cards notes, the proposed scheme is “unprecedentedly large and complex” and “the Government’s record on large-scale IT projects is not encouraging”\textsuperscript{8}. Given this, it is perhaps prudent to consider how a DTQs scheme could be implemented if, as a result of technological or procurement difficulties, the ID card scheme did not proceed. In the absence of an ID card scheme, one possibility would be to base enrolment around passports and driving licences, currently the two documents that provide the highest assurance of identity. Our initial research suggests that enrolling individuals via the UK Passport Service (UKPS) and Driver and Vehicle Licensing Agency (DVLA) over a six-year period could be achieved without imposing an unmanageable extra workload on these services.

\textit{22 December 2004}

Executive Summary

Energy efficiency can contribute to all the major goals of energy policy and needs to be addressed in that context. Household energy efficiency has already improved hugely, but there is still a significant cost effective potential. The short-term policy priority should be to ensure that potential is taken up. Delivering it will need a range of market interventions. EST supports the policy measures that Government has introduced to encourage the supply of household energy efficiency—public expenditure, building and product regulation and energy supplier obligations. If the Government’s policy goals are to be delivered there is a need to do more to encourage demand for energy efficiency. This could be done through fiscal incentives and a stronger local network delivering awareness, advice and support for action.

Introduction

1. This is the submission of the Energy Saving Trust (EST) to the Science and Technology Committee’s inquiry into Energy Efficiency. This submission should not be taken as representing the views of individual members of EST.

2. EST was established as part of the Government’s action plan in response to the 1992 Earth Summit in Rio de Janeiro, which addressed worldwide concerns on sustainable development issues. We are the UK’s leading organisation working through partnerships towards the sustainable and efficient use of energy by households, communities and the road transport sector.

3. EST welcomes the Committee’s inquiry into energy efficiency. We are grateful for the opportunity both to submit evidence here in writing and previously to present at the Committee’s seminar on 19 October.

4. Our submission is not intended to be a comprehensive overview of all policies that are necessary to deliver the Government’s goals for energy efficiency. Rather, it provides a broad overview of issues for the household sector. As one of the key delivery agents for energy efficiency, EST will be undertaking a significant amount of work over the coming months to feed into the Government’s review of the UK Climate Change Programme. Nevertheless, we are already clear about the need for the additional policy measures set out in this submission.

5. Against this background our response focuses on:
   — How does it fit into energy policy?
   — What is realistically deliverable?
   — Which policies deliver best?
   — What more is needed?

   These are addressed in the following sections.

Contribution of Energy Efficiency to Energy Policy

6. We welcome the recognition in the Energy White Paper that energy efficiency has a positive role to play in all aspects of energy policy by:
   — Reducing carbon emissions,
   — Playing the key role in eliminating fuel poverty,
   — Improving the security of energy supplies through reduced need for imports and less pressure on transmission and distribution infrastructure, and
   — Increasing international competitiveness through reduced business costs.
7. We believe that the role of energy efficiency in reducing carbon emissions and addressing fuel poverty is now widely understood. However, it is important that energy efficiency is not pigeonholed as “merely environmental”—it needs to be considered as a key component in energy policy.

8. In this context we believe that the issue for policy is not “whether to do energy efficiency”, but rather to answer the questions “How best can we deliver energy efficiency? How much? And how fast?”

**WHAT CAN ENERGY EFFICIENCY DELIVER?**

9. A realistic assessment of the potential for energy efficiency needs to look at past performance. Figure 1 shows the energy used in space heating in UK homes over the last 30 years. The dark blocks show actual energy use. The hatched blocks show the performance improvements (energy saved) due to insulation and heating. The top line is therefore a plot of what energy use would have been with no improvement in energy efficiency. Actual energy use has increased by 25 per cent over 30 years—without energy efficiency it would be double what it currently is. Improved energy efficiency has contributed far more than any supply option to the additional demand for warmth in UK homes.

**Figure 1 - Energy use for UK Home Heating 1970-2000**

10. Figure 2 shows the same relationship (with insulation and heating efficiency aggregated) extended out to 2020 using ambitious, but realistic projections for energy efficiency by the Cabinet Office Performance and Innovation Unit. Without energy efficiency improvement, energy demand continues to grow, but at a lower rate as average temperatures in homes begin to rise less quickly. This allows the energy efficiency measures not only to curtail increasing demand for energy but also to begin slowly to reduce it back towards 1970 levels. So we are confident that energy efficiency can reduce energy demand in households, but only with aggressive policy measures.
11. In the short term, the measures that can contribute to energy efficiency improvements are well known—they are dominated by improvements in building fabric, boiler efficiency and high efficiency lights and appliances. Current estimates by EST are set out in Table 1. We will be reconsidering these in the context of the Climate Change Programme review, but do not expect major changes.

Table 1

Realistic Potential for Home Energy Efficiency Measures 2000–10

<table>
<thead>
<tr>
<th>Measure</th>
<th>Potential 2000–10 (MtC/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cavity Wall Insulation</td>
<td>0.9</td>
</tr>
<tr>
<td>Other insulation</td>
<td>0.5</td>
</tr>
<tr>
<td>Efficient Boilers</td>
<td>1.3</td>
</tr>
<tr>
<td>Lighting</td>
<td>0.4</td>
</tr>
<tr>
<td>Cold appliances</td>
<td>0.6</td>
</tr>
<tr>
<td>Other appliances</td>
<td>0.9</td>
</tr>
<tr>
<td>New build</td>
<td>0.5</td>
</tr>
<tr>
<td>Efficient Glazing</td>
<td>0.3</td>
</tr>
<tr>
<td>Other</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>5.7</td>
</tr>
</tbody>
</table>

12. It should be noted that these estimates are over and above a “business as usual” baseline of investment that would be made without policy intervention. This is the same approach used in government estimates for energy efficiency potential. However, the amount of energy efficiency measures that would be delivered within the baseline is not always specified (indeed in government energy projections it is not explicitly calculated). There is therefore some confusion about the total energy efficiency investment required to deliver government targets.
WHICH POLICIES DELIVER?

13. The vast majority of the short-term energy efficiency potential set out above is cost effective. Indeed, it is now known that there is a very significant potential for cost effective energy efficiency improvement in all sectors of the economy. The is well-documented, notably by the PIU Energy Review: (http://www.strategy.gov.uk/files/pdf/PIUd.pdf), but also Annex I of the Energy White Paper (http://www.dti.gov.uk/energy/whitepaper/annexes.pdf) and the consultation paper on the Energy Efficiency Commitment http://www.defra.gov.uk/corporate/consult/eec/consultation.pdf.

14. The failure of free markets to deliver investment in this cost effective energy efficiency is particularly evident in sectors where energy costs are a low percentage of total costs and energy efficiency skills are limited—the household sector is a paradigm case. Despite some scepticism from free market economists who have not studied energy efficiency markets, this market failure in consumer markets is now widely understood. A typical analysis is by HM Treasury from the consultation on fiscal instruments for household energy efficiency (http://www.hm-treasury.gov.uk/media/C9A/58/energy—efficiency.pdf).

15. For practitioners in energy efficiency, the key reasons investment is limited may be summarised as follows:

— Some households have not got access to the capital needed to invest, even in highly cost effective projects. This is what underpins the phenomenon of fuel poverty,
— Purchase price is critical to purchase decisions. Goods such as lights and appliances are bought on the basis of the upfront cost; the full lifetime costs (which would be the ‘rational’ basis for decision-making) are rarely known.
— Key trades people—builders, heating engineers, appliance retailers and glazing sales people—often lack the skills to advise consumers effectively. And even good advice may not be trusted.
— Landlords have the responsibility for maintaining and improving their property, but have limited incentive to do it energy efficiently when the beneficiaries of reduced energy bills will be tenants.

In principle, all these issues can be addressed through appropriate information and incentives. However, policy-making needs to reflect the reality that energy efficiency is very low down the list of priorities for most people, so low that it is frequently not a significant factor in the choice of a purchased item and rarely motivates discretionary investment.

16. There are a number of implications of this for energy efficiency policy:

— the propensity of consumers to invest in cost energy efficiency is not very price sensitive; taxation measures alone are not “the answer”,
— general exhortation and Government public information campaigns are not very effective on their own—consumers need to “get the message” from more trusted sources if they are to act upon it,
— regulation can be an effective policy instrument. There is considerable evidence that consumers take the view that “if Government thinks that energy efficiency is important, they would not allow us to buy inefficient products”. Moreover, in a market where market failure is endemic, regulation can be the most cost effective approach.

Overall it is clear that a range of policy instruments will be needed—increasing both the supply of energy efficiency and demand for it.

SUPPLY SIDE MEASURES

17. EST’s assessment of the measures in place to encourage supply side investment is that they are a good mix and delivering reasonably well. Whilst we can see some opportunities to increase their scale and improve interactions between them, there is not need for major new initiatives. The key supply side policies are:

— public expenditure,
— building and product regulation, and
— energy supplier obligations—the Energy Efficiency Commitment.
PUBLIC EXPENDITURE

18. The scale of energy efficiency investment required to deliver the Government’s goals will not be delivered entirely from public expenditure. However, there are areas where public expenditure is the appropriate solution, especially where the principal goal of energy efficiency is social and in the social rented sector.

19. The Warm Front Programme is the main Government programme for addressing fuel poverty through energy efficiency in England. (There are similar programmes funded by the devolved administrations in Scotland, Wales and Northern Ireland.) Increased funding for Warm Front was announced in Spending Review 2004. This is very welcome.

20. ODPM requires social housing providers to bring their stock to the Decent Homes Standard by 2010. Energy efficiency improvement is the main reason for failure to meet the standard, and therefore Decent Homes requirements are the main driver for energy efficiency improvement in the social housing stock. Although the energy efficiency standard required is not high, guidance indicates that the opportunity of renovation should be taken to achieve higher levels.

BUILDING AND PRODUCT REGULATION

21. Building Regulations are probably the single most important policy instrument for reducing carbon emissions in the very long term. The 2002 revision of the Building Regulations secured a reduction in 25 per cent in the heating requirement for a typical new house. The proposals for changes in 2006 would have a similar impact. In the long term there is no reason why a “near zero” heating requirement cannot be achieved. (This does not imply that there is no requirement for heat, but rather that it is supplied largely from solar gains through windows and the heat generated by lights, appliances and people in the house).

22. The short term impact on energy demand of the new build standards is limited by the turnover of the building stock—currently less than 1 per cent annually is new construction and ~0.1 per cent is demolished. However, Building Regulations are increasingly effective in improving the efficiency of refurbishment through the requirements for new glazing and boilers. The 2002 revision effectively mandated the use of low emissivity double-glazing; proposed changes for 2005 will mandate the use of condensing boilers in most applications.

23. Enforcement of Building Regulations requires more attention. There is evidence that a large proportion of “as built” dwellings do not conform to the minimum standard even when designed to do so. EST therefore welcomes the proposal in the consultation on the new Building Regulations for air tightness testing of sample new houses, as this will identify poor construction practice.

24. Regulation of the efficiency of energy using appliances rests with the EU, as these are products traded across borders. The EU Energy label is generally well regarded in terms of its clarity and visibility. EST’s “Energy Efficiency Recommended” label supplements the EU label providing a clear call to action linked to broader energy efficiency messages.

25. We are aware that the Committee has received negative comment (in IEA input at the seminar on 19 October) about the level of European standards compared to the rest of the world. We believe that this needs further investigation. It is clear that processes for altering EU labels and standards have been too cumbersome. We believe that a high priority needs to be given to the proposed “Framework Directive for Eco-Design of Energy using Products”, which offers a route to a more flexible approach in future. The Framework Directive will also allow labelling and standards for consumer electronics (“brown goods”) which form the fastest growing household energy market.

ENERGY EFFICIENCY COMMITMENT

26. The Energy Efficiency Commitment is the single most important household energy efficiency measure for the short and medium term. The Government is currently considering responses to the consultation on EEC for the period 2005–08 (EEC2), having proposed that it should be double the scale of EEC1. EST supports this proposed increase in activity. Given measures to increase demand for energy efficiency from households (see below), we are confident that EEC2 will continue to prove cost-effective. EST hopes that increased demand for energy efficiency will allow EEC3 (for the period 2008–11) to be set at a further increased scale of activity of roughly triple that of EEC1.

27. EEC has proved particularly effective in transforming the market for white goods. The fraction of cold appliances and washing machines that are A-rated has increased hugely, very largely due to the subsidies offered by major retailers with the support of energy suppliers EEC programmes. In the medium term there is a risk in some product areas that changes to the market run ahead of changes to label bands, resulting in an accumulation of A-rated products. A more flexible EU labelling system should prevent this if the proposed
Framework Directive is adopted. In the short term, it will be possible to continue to use EEC to support market transformation with subsidies for fridges and freezers rated at A+ and A++.

28. We believe that some improvements are possible in the interaction between fuel poverty programmes and EEC, in particular to ensure that households receiving Warm Front measures have access to all cost effective measures. We are working with government to see if the EST’s Home Energy Efficiency Database can be used as the information repository to achieve better coordination. EEC programmes will also be a key source of funding for delivery of Decent Homes objectives.

DEMAND SIDE MEASURES

29. As set out above, EST believes that the basic instruments are in place to deliver energy efficiency supply to the household sector through a combination of policy instruments incentivising investment by government, social landlords, the construction sector, appliance manufacturers and energy suppliers.

30. These instruments are not matched by policies to increase demand. Energy suppliers undertake some marketing to encourage uptake of their EEC offers. And the EST stimulates awareness through the Energy Efficiency campaign and provides advice to individual households through the Energy Efficiency Advice Centre (EEAC) network. Increasingly EST will link the two approaches by signposting consumers to EEC offers. However, these activities are not at a sufficiently large scale to match the increased supply of energy efficiency envisaged in government targets. We believe that further measures are needed, both at a national level through fiscal incentives and locally through an enhanced Sustainable Energy Network (SEN). The following sections set out briefly how we believe that might be achieved.

FISCAL MEASURES

31. EST believes that government must signal further fiscal measures to encourage consumers to save energy. This view was supported recently by the House of Commons Environmental Audit Committee who recently reported that Treasury should explore “the scope for introducing further policy measures to promote both renewable energy and energy efficiency”.

32. Such policy measures are needed to stimulate action on the more hidden energy efficiency measures—especially wall insulation. As energy audits for home movers become obligatory in 2007 with the introduction of the Home Condition Report in England and Wales, we believe this would enable government to introduce fiscal incentives for energy efficiency work carried out by a home mover. EST is currently undertaking research on fiscal options, but we believe that Stamp Duty is most likely to prove the best fiscal incentive. We would be happy to share the results of our research with the Committee when it is available.

SUSTAINABLE ENERGY NETWORK

33. In early 2005, EST will begin to pilot the concept of a Sustainable Energy Network (SEN). The aim of the network will be to engage individuals on the main actions they can take to address climate change. It will provide information, advice and support for action locally; it will cover both homes and road transport; and it will seek to encourage both energy efficiency and the use of renewable energy. We believe that this sort of integration is likely to prove more cost effective than separate initiatives. We are also confident it will consistent with the approach of individual citizens, who do not think separately about different measures simply because they are under the aegis of different Government departments. We intend to build upon the existing infrastructure provided by the network of EEACs. We do not seek to replace existing activity by other players in sustainable energy markets, but rather to augment it and make it more easily accessible. We are in discussions with the relevant government departments about the funding to roll out the network.

34. The SEN will enable EST and government to work far more effectively with the English regions. It will act as a delivery mechanism for consumer facing aspects of regional energy strategies. Regional organisation will allow delivery mechanisms that are consistent with regional goals, whilst retaining the ability to share cost effective best practice across a national network and deliver national goals.

35. Delivery of household energy efficiency will always need to be done locally. Local authorities have a key role to play in this, as an exemplar using energy sustainably and as a community leader. Most local authorities are not well placed to deliver consumer campaigns or technical advice to households. There is therefore a synergy between the community leadership role of local authorities and the advice and project work that the SEN will deliver.

1 “Budget 2004 and Energy”, Environmental Audit Committee, August 2004 (http://www.parliament.uk/parliamentary_committees/environmental—audit—committee/eac11—08—04.cfm)
Examination of Witnesses

Witnesses: Mr Nick Eyre, Director of Strategy, and Mr Tim Curtis, Director of Operations, Energy Saving Trust, examined.

Q285 Chairman: Gentlemen, could I welcome you both very much and thank you for coming along to give evidence to us this afternoon. I think you have an information note, both the members of the public and our guests, about our declared interests and so on, so we do not need to repeat them when we speak. Could I ask you for the record, please, just to identify yourselves.

Mr Eyre: Yes. My name is Nick Eyre. I am Director of Strategy at the Energy Saving Trust and with me is my colleague Tim Curtis, who is Director of Operations.

Q286 Chairman: Thank you very much. You will not be surprised to know that my first question is to ask you what your reaction is to the news today that the Government is now abandoning its target for 2020 and seeking advice on what the revised target might be. Could we ask you just to comment on that.

Mr Eyre: Well, you will not be surprised by the answer, I suspect, which is that given the length of time we have had to consider that issue we have not really digested it. We do think it is sensible, broadly, to re-look at all these issues. In the climate change programme review we will be actively involved with Defra and others in the course of that review, but I think we would like to see a target for energy efficiency in 2020 established because whilst targets do not themselves deliver they are of course important drivers.1

Mr Curtis: Yes, you are absolutely right, the correct word is momentum. Once you start building and you have all the good things like the Energy Efficiency Building Regulations they are proposing to have mandatory action plan. We were never quite clear why that was. We think it may be to do with quite technical issues around what the base line is against which these are measured and we presented that in our written evidence. But on the issue of confidence, Tim may want to say more but we do know of some investment which has been put on hold. Obviously we cannot go into details about that because it is commercially confidential. So there is always a risk that government being seen to backtrack on targets does have that impact, yes.

Q287 Chairman: I think it is true to say, is it not, that the target had already been revised on the domestic energy efficiency earlier. Do you think that and today’s announcement is going to cause a lack of confidence in the energy efficiency industry?

Mr Eyre: I think there is certainly the potential for that. It was the 2010 household energy efficiency target that was revised downwards from 5 million tonnes of carbon to 4.2 in the Energy Efficiency Action Plan. We were never quite clear why that was. We think it may be to do with quite technical issues around what the base line is against which these are measured and we presented that in our written evidence. But on the issue of confidence, Tim may want to say more but we do know of some investment which has been put on hold. Obviously we cannot go into details about that because it is commercially confidential. So there is always a risk that government being seen to backtrack on targets does have that impact, yes.

Mr Curtis: Yes. I would add two things. One is that I think the most vociferous has been the insulation yourselves.

Mr Eyre: Yes. My name is Nick Eyre. I am Director of Strategy at the Energy Saving Trust and with me is my colleague Tim Curtis, who is Director of Operations.

Q288 Chairman: I think that is inevitable, is it not? I think our fear in this Committee is that a sort of lack of momentum was beginning to develop and now there is a sort of deflation.

Mr Curtis: Yes, you are absolutely right, the correct word is momentum. Once you start building and you have all the good things like the Energy Efficiency Commitment, which I am sure we will come on to, you need to have a range of other levers and mechanisms to support that and having the target reduced just deflates everyone a bit.

Chairman: Indeed.

Q289 Lord Lewis of Newnham: Could I just ask, how reliable is your data? I read in The Telegraph today that 43 per cent of new homes fail the energy rules which have been applied to them and they attribute this primarily to bad inspection. What control have you got over this?

Mr Curtis: We personally have no control at all. This is a role for the local authority building control officers. But it is one of the major problems. Whilst Building Regulations are being toughened up, have been toughened up, the level of adherence to Building Regulations is a major problem. There have been various surveys to indicate that there is serious non-compliance and I know in the next phase of Building Regulations they are proposing to have mandatory pressure testing, which will hopefully have a significant effect on stopping that happening. But at the moment it is a real problem. The detail of the work on buildings is the problem. It is not done to the right air tightness standards.

Q290 Lord Lewis of Newnham: But how far does this influence the actual statistics which appear? Do you measure that actually by measuring some energy factor or do you take it that if N houses are being put
up which are energy efficient, therefore you set $N$, whatever the appropriate factor for each house will be?

*Mr Eyre:* I think apart from the survey that you quoted today we have not done a great deal of work on new-build. So I think that is the best information that there is on new-build, that there is a significant failure to meet the standard. I think more important in terms of energy statistics as a whole is the rest of the building stock, because clearly there is only one per cent new-build every year. We have done a good deal more work on monitoring the effects of energy efficiency measures put into the existing stock and I think we understand that quite well. In general, the monitoring does show that there is a reduction in energy demand and that the energy efficiency measures undertaken are cost-effective. In some cases, particularly for insulation, some of the benefits, not surprisingly I think, are taken as improved comfort, that the home is warmer after the measures than before the measures, and there are still some other discrepancies between theory and practice which we are doing more work to try to understand. But the broad picture is pretty well understood and the general model of energy use in the UK building stock agrees pretty well with the energy data, the actual metered energy data.

**Q291 Lord Lewis of Newnham:** This is a compendium type question. Could I ask you to give a summary of the Energy Saving Trust's work with respect to energy efficiency. We are slightly concerned at the fact that there appear to be two organisations. As well as yourself there is the Carbon Trust. How do you allocate the working between these various components? Could I also ask a subsidiary section to this. In the Energy report quite recently it states that the Energy Saving Trust used up to £14 million budget for its power sharing and clean-up grant midway through the last financial year and that in fact you have been only able then to actually fund about one-third of your grants and that you actually got a submission of an extra million or so towards your granting, whereas I believe in the last round of the pre-Budget report £20 million was allocated to energy efficiency and it seems that this has mainly, if I understand it correctly, gone to Carbon Trust?

*Mr Curtis:* I will take those in three chunks. First of all, the Energy Saving Trust in the context of energy efficiency. We work in four main areas. The first is consumer awareness and advice, so advertising campaigns, websites, help lines. We have a network of fifty-two energy efficiency advice centres across the UK as well. The second area is working with the energy efficiency trade, the retailers, the installers, the manufacturers of energy efficiency goods and services, training and promotional activities in that area. The third area is with local authorities. We work very closely with local authorities, particularly on their Home Energy Conservation Act obligations, helping them to achieve those, providing advice, support, information and funding for innovative projects. Also, a little bit of work there with housing associations too. The fourth area is best practice, so providing information to people who specify energy efficient works or building works, architects and such, to give them help going beyond current Building Regulations and making the highest standards possible in new houses and also refurbishments. So those are the four areas that we work in. I think from going through those areas I can then come back to the Carbon Trust issue. There are clear boundaries in what we do and what the Carbon Trust does. For example, they have no role with consumers and we do not have a role with big business. Where we do have a role, where we both work with the same kinds of organisations such as local authorities, we clearly work on the housing stock of the local authority and their role in influencing their communities while they work on the public sector buildings. So we know where we stand. There are clear boundaries. We work together and I think it is a complementary set of services. The final point you talked about, those were transport grants. Indeed, they did run out before the end of the last financial year. We did receive some extra funding from the Department for Transport in that area and we have basically put in a new on-line system this year to make sure that our grants are administered and allocated more evenly throughout the year. But that was not energy efficiency, that was transport.

*Mr Eyre:* If I could just add to the point which you raised about the £20 million additional funding for the Carbon Trust which was announced in the pre-Budget report. That was for the development of new energy efficiency technology and we certainly welcome that announcement because anything which can be done to bring forward new technologies is important in delivering the 2020 targets more than the 2010 targets, which will rely largely on current technology. We do not begrudge them that £20 million and if you have not noticed, in Defra’s five year plan announced this morning there were two announcements, perhaps in the small print. One was an additional £10 million to the Energy Saving Trust, which we will use to take forward the Sustainable Energy Network concept that we set out in our written evidence, and the other is an additional £10 million for the Community Energy programme, which gives grants for district heating and combined heat and power for use in households and other non-profit sectors. So we have got £20 million as well.

**Q292 Lord Lewis of Newnham:** So financially you are happy? You have got no problems?
Mr Eyre: I would never go that far! The more money we get the more we could do to drive things forward for energy efficiency and to deliver a low carbon economy. But I think we are fairly pleased today, yes.

Q293 Lord Wade of Chorlton: Could I ask, how do you measure your effectiveness in delivering these objectives?

Mr Curtis: We have an extensive evaluation team, that is the key answer. So in the work that we do for our different Government funders we lay out targets at the beginning of the year, we monitor against those targets and our evaluation team assesses whether we have met them or not. Then we report back to our funders and then, because we are Government funded, we are subject to regular Government review and audit as well. So it is quite a strong process, I think, to check on the work that we have done and the targets we have sought to achieve.

Q294 Lord Wade of Chorlton: What measurement is used in the targets? What do you measure your success by? Is it by the amount of carbon you save, the amount of energy you save, the amount of money you save somebody, the amount of money you cost the taxpayer? How do you measure it all in understandable terms?

Mr Eyre: All of these. The main indicator we use is pounds or Government money spent per tonne of carbon saved, which is, I think, an understandable cost-effective indicator.

Q295 Lord Wade of Chorlton: What is that? What figure are you achieving?

Mr Eyre: It varies across the programmes. For programmes which are delivering new technologies we would not necessarily expect a very high cost-effectiveness because the main role is to start an industry sector up, to start up a new market. For our biggest programme, the Energy Efficiency Advice Centre network, the figure is from memory between £10 and £20 per tonne of carbon saved, which we think is a very respectable figure.

Q296 Lord Wade of Chorlton: That is what it is costing you to achieve that target, that saving, as an organisation?

Mr Eyre: That is right, yes, but clearly for some of the programmes it is quite difficult to see the direct carbon saving. For instance, with programmes that are there to raise awareness, it is difficult to track that right through to carbon savings so there are subsidiary and different targets about raising awareness, about the number of customers that we contact, for example.

Q297 Lord Wade of Chorlton: Is that a fair measure of that which could be used in other fields? In other words, if you were to set out a plan for an individual or a company to save carbon, or a company to improve its efficiency, is that a figure that one could use generally as a way of saying that is a worthwhile achievement, or it ought to be a greater saving, it ought to be a less cost order?

Mr Eyre: It is a measure of how effectively Government resources are being used to reduce carbon emissions in the economy and in that sense it can be used across the range of different instruments that Government uses. It should not be confused with another measure, which confusingly is also pounds per tonne of carbon, but where the pounds are the effect on the economy as a whole. For energy efficiency measures we know that pounds per tonne of carbon where those are national pounds is generally a negative figure; in other words money is being saved whilst carbon is being saved. For instance, for the Energy Efficiency Commitment the pounds per tonne of carbon is something like minus £100 to minus £200 per tonne of carbon. So that is a measure of the value of a carbon saving programme to the economy.

Q298 Lord Wade of Chorlton: So if you saved a tonne of carbon then the economy is benefited by £100 to £200? Mr Eyre: That is right.

Lord Wade of Chorlton: Thank you.

Lord Paul: You have described very nicely what work you do to make people more knowledgeable about savings, etc., and the other two organisations, that is the Carbon Trust and Energy Efficiency, but it also comes out from some of the evidence we have seen that the main problem is really the builders, the actual workmen and the people who are inspecting them. So what is being done by any of your organisations to solve that problem? I have in two of my factories people from Carbon Trust giving wonderful advice but what do you actually achieve after that advice?

Mr Curtis: I think that is a very pertinent point because there is some distrust of tradesmen. People do not always trust tradesmen and therefore it is very important to get the tradesmen trained, to get the industries behind those tradesmen committed to training and to rolling out energy efficiency. What we are doing—and an example I can give is in the heating area—it is very important that heating engineers are trained. At present there are new Building Regulations coming in in about four months’ time so we, along with a number of different partners, are developing training. In fact the training has now been developed. It has been formalised using a City and Guilds qualification. It is being rolled out and the
training is being done by manufacturers, private training providers and colleges. We ourselves are doing a lot of marketing work to try and get to the maybe 70,000 or so heating installers there are in this country, but it is hard work. These people are often one-man bands. They do not necessarily do things until they really have to. So I guess it is progress, but quite slow progress, and I have no doubt that when the Building Regulations come in there will suddenly be a rush of interest in being trained in energy efficiency because they will only be able to fit energy efficient boilers. But we are certainly working very hard on it at the moment.

Q300 Lord Paul: I think some more points have to be made, but if I can request you to say, maybe in writing, with all that training you have talked about what practices are getting worse not so far and how you are going to achieve that. So maybe you can write to us.

Mr Eyre: We could certainly provide more information, but in that specific case we know that the use of condensing boilers is going up and going up quite rapidly. For many years it was around a few per cent. It is now something like 25 per cent of new installations. That is partly driven by the incentive programmes, which the energy suppliers behind me may want to talk to you about in a few minutes, but it is also partly driven by this knowledge that regulation ahead is going to force the issue.

Chairman: Thank you.

Q301 Baroness Platt of Writtle: What are the main barriers to uptake of energy efficiency measures by home owners and how can these be overcome?

Mr Curtis: First of all, I would say that the supply side is not the major issue here, I think. The industries concerned with energy efficiency can usually respond to demand levels, so whilst there are issues about installers and training and about manufacturing capacity, the real issue is a demand one. It is about getting home owners in the domestic energy efficiency sphere to understand the benefits of energy efficiency both in terms of money saving and crucially, of course, the environmental benefits. At the moment I think there are some key reasons why they are not really taking enough action. One is that there is an initial cost barrier. People do not necessarily have several hundreds of pounds up front and they do not understand that if you invest several hundreds of pounds you will save several hundreds of pounds back over two, three or four years. It is just not a priority. People have got many other things in their lives and energy saving is not currently a priority.

Q302 Baroness Platt of Writtle: How would you overcome that?

Mr Curtis: I think it is carrots and sticks in very simple terms. I think we need to give them incentives. I think the Energy Efficiency Commitment, certainly the enlarged Energy Efficiency Commitment –

Q303 Baroness Platt of Writtle: What about fiscal incentives?

Mr Curtis: Yes, absolutely. That kind of stick we would like to see –

Q304 Baroness Platt of Writtle: That is not a stick, it is a carrot, is it not?

Mr Eyre: It could be either.

Q305 Baroness Platt of Writtle: I was not suggesting it as a stick, I was suggesting it as a carrot.

Mr Curtis: We would like to see people who buy efficient products rewarded by reduced VAT, for example, and for people who buy inefficient products like standard tungsten light bulbs we think there is an opportunity for an inefficiency tax. We have seen it in other countries, I think, have we not, Nick?

Mr Eyre: Yes.

Mr Curtis: That kind of thing could work. We also think Stamp Duty rebates would be a very good idea. One of the energy companies behind is now working with a local authority on a council tax rebate if you install energy efficiency goods and services. You could get a rebate on your council charge.

Q306 Baroness Platt of Writtle: That is a fiscal incentive, is it not? I was rather interested in your graphs. I could not see how, on pages 2 and 3, you could possibly prophesy the amount of energy savings in 2018, for instance. How can you work all that out? I can see it seems as if the energy used is to remain static, but that is dependent upon a vast increase in savings?

Mr Eyre: Clearly it is not a prophecy. It is a projection given various assumptions.

Q307 Baroness Platt of Writtle: A fantasy you might call it?

Mr Eyre: As we say in the text above that, they are ambitious but we think realistic assumptions. It was done by the Cabinet Office.

Q308 Chairman: In the light of today's announcement it sounds as though they have rather abandoned that particular projection. It seems unlikely given that they are already –

Mr Eyre: I do not think it is particularly unlikely. If you look at the real data, the data from history, which we know is correct, that does show there has been a significant improvement in energy efficiency over the past thirty years.
Q309 Baroness Platt of Writtle: Yes, but everybody knows that extrapolation is extremely difficult and dangerous. I speak as an engineer with an engineer next to me.

Mr Eyre: Indeed. What I was going to go on to say is that that was achieved in a period in which there is actually relatively limited government incentive, government regulation and government policy aiming to deliver energy efficiency. There now is more. We have got tighter Building Regulations, we have got a much increased Energy Efficiency Commitment, we have got energy efficiency labelling on products now, energy efficiency standards, and I think we have got a growing awareness in the population (not as much as we should have but still growing) that something does need to be done about climate change. So I agree, it is not a prophecy and we are not saying that will happen, but we are saying that with serious policy measures it could happen. So the situation is not hopeless, we can actually do something about it.

Q310 Lord Lewis of Newnham: But over the last three years energy use has gone up, not down.

Mr Eyre: Energy use in the domestic centre does bob up and down from year to year, largely depending on the weather, but over the last few years it has been broadly stable, which means that the increased pressures because homes are warmer, because we have got more appliances, are being broadly matched by the increase in energy efficiency. They are broadly in balance and what we have got to do is increase the rate of energy efficiency improvement so that it outweighs that growth in energy services.

Q311 Lord Lewis of Newnham: But is that not one of your problems? As energy efficiency goes up, then people actually use alternatives, they use more energy themselves. So it is a paradox. You are in a situation where by getting an energy efficient system you produce then a greater use of energy. We have been told, for instance, about conservatories. When they were single glazed they were used in the summer. They are double glazed and they are now used in the winter as well. So the attraction of the utilisation of these things means you have brought in a new amenity for them.

Mr Curtis: I think if you take it to the nth degree certainly it is not impossible that we will have zero heating dwellings if we get our building standards right. So I do not think that is going to be a problem in the long-term. If building standards are improved then you will not need to have a heating source in your home eventually, so there will be a net reduction.

Baroness Platt of Writtle: That will take a number of years.

Q312 Lord Lewis of Newnham: What is your date for that?

Mr Curtis: Well, that depends on building standards. We certainly think that the Government now should be flagging up in 2010 that we should be moving very close towards zero heating buildings. There is nothing technologically to stop that.

Chairman: That is referring to new-build, it is not referring to existing stock. I think we should perhaps move on, very smoothly actually because it logically follows on. Lord Young of Graffham.

Q313 Lord Young of Graffham: Could we just turn for a moment to the EU energy efficiency standards. We are told, for example, that these are lower standards than in other countries and indeed air conditioning units on sale in Europe would not meet the US minimum standards. How much of a lead does the EU take in actually defining tough minimum standards and how do you work with the Commission in setting them?

Mr Eyre: If I can answer the last one first, because it is the easiest. We do not have a formal role as the Energy Saving Trust with the Commission. Those negotiations on labels, standards, etc., are done by government, as you would expect. Clearly we try to keep an eye on what is going on as part of our monitoring of the energy efficiency situation in this country.

Q314 Lord Young of Graffham: So have you complained to government about the standards in Europe?

Mr Eyre: I do not think we have complained to government, no. I mean, I think government is aware and it is in the Energy Efficiency Action Plan that it would be helpful for energy efficiency standards at a European level to be tightened up. I was present at the initial seminar that you had where I think it was Dr Meier from the IEA who gave this evidence. We have gone away and looked at that. We have not completed looking at it yet.

Q315 Lord Young of Graffham: But could we set higher standards ourselves?

Mr Eyre: At a UK level, I think that would be difficult for traded goods. Clearly we do that for buildings because buildings do not have a very high propensity to cross borders, so the standards can be set at a UK level. For things like white goods, brown goods, I think it would be ineffective and I suspect (although I am not a lawyer) probably illegal under European law to do that.

Q316 Lord Lewis of Newnham: I think European law states you can improve it, but there is a minimum standard they set. My understanding of European
law is not that you cannot exceed those standards if you wish.

Mr Eyre: Well, it would be whether it was done for protectionist reasons, I think would be the discussion. My point is that such a large amount of goods are traded across the European borders that the most effective place to set the standards is at a European level and I think most people involved in energy efficiency would say that the Government should be putting its energy into securing higher standards at a European level. I do think, though, that Dr Meier’s evidence was perhaps a little one-sided. I think in the United States and some other countries they rely very heavily on energy efficiency standards. In this country of course they are important but we do not rely on them as much. If I could give you one example, one area where there are energy efficiency standards is on refrigeration appliances. If we look at, say, the fridge/freezer market what is required is a ‘C’ labelled product but 75 per cent of the fridge/freezers sold in this country are now ‘A’ rated and that is because we have put in place a number of other measures, the Energy Saving Trust’s own Energy Efficiency Recommended label, but also the energy suppliers’ Energy Efficiency Commitment programmes incentivise ‘A’ rated appliances. So whilst it is true that improved energy efficiency standards would certainly help, I do not think we should assume that that is the only measure that can be used in these sectors.

Chairman: Yes. Lord Wade of Chorlton, I think this leads into your question.

Q318 Lord Wade of Chorlton: I believe it does. What are the other main threats, in your view, in terms of domestic energy use to meeting the Government’s targets for energy efficiency?

Mr Curtis: I would say that the key areas to focus on in the short-term, to 2010, are insulation and heating. Those areas are the ones that are going to make up about half of the savings. I would say the biggest risk area is cavity wall insulation. We know that there are many cavity walls uninsulated. Estimates vary between, say, six and ten million but that is an area where we think the rate of installation has got to go up by two or three times over the next four years if we are going to get to the 2010 target level. So I think that is a key at risk area. I think heating hopefully will be covered largely by Building Regulations but making sure adherence to Building Regulations happens I think is another major risk area.

Q319 Lord Wade of Chorlton: Could I just ask a further question, if you have got nothing further to add to that. How do you think, from a domestic point of view, the consumers need to measure what they are doing? We have heard various opinions on how consumers react to what it costs them in terms of accepting standards of electricity use and yet what you talk about is CO₂ emissions. Do you think there is a need to reappraise that measurement in such a way that the consumers can more generally understand how effective their energy saving or energy efficiency measures are?

Mr Curtis: I think consumers do not understand about the impact that their switching on their television in their home has on climate change. They simply do not understand it. So I think there is a need for significant more impetus and indeed in Defra’s five year plan today they have announced that they will be putting significant support into a climate change communication programme, which we very much welcome. It is a hard job. What I think we have got to get to is people taking the attitude, “It’s people like me who do this.” There is still a perception that all this environmental stuff is for people who are not like me, it is for green types. There is still a perception of that and we have got to do something to change it and make it so that people say, “It’s for people like me.”

Mr Eyre: If I could just add to that. You mentioned cost. Clearly price matters but it does not matter all that much. In technical terms the price elasticity of demand is not very large in the household sector. For the majority of people their fuel bill is quite a low fraction of their total cost so they are not hugely sensitive to price. For those people on low incomes who are sensitive to price, they often do not have the
ready cash to invest in energy efficiency. So raising prices clearly would tend to improve energy efficiency but it is perhaps not the most effective way to do it, certainly given the point that Tim has made about people’s understanding of the impact of their own uses on the environment.

Q320 Lord Wade of Chorlton: So you would agree we need a different way for the consumers to measure the efficiency of their energy use which is not just on a cost basis?

Mr Eyre: I suspect it is over-optimistic to think that we are going to get consumers having an exact measure of anything to do with energy use in their minds. They need very straightforward advice from trusted sources about what they can do that will help them lower their energy bill and help climate change. It really does need to be made simple, not because consumers are stupid but because it is a low priority for most people and we have to work within the real world rather than the world that we would like to be in. It is that sort of simple message, getting out there and telling people, that we can do from the Sustainable Energy Network that we are trying to set up with the additional resources we have got from government. That is why we are encouraged and positive today.

Lord Wade of Chorlton: Thank you.

Q321 Lord Broers: Could I ask, do you generate simple literature to help people?

Mr Curtis: Yes, we do. We have a whole range which goes out via the Energy Efficiency Advice Centres primarily.

Q322 Lord Broers: Because there are amazing misunderstandings. I mean, people will think they would like the window open in their bedroom and then they will leave the door open to the house and they will have no awareness of what they are doing by doing that and some simple explanations about sort of exposed areas which can be put in simple terms could be hugely effective, I think.

Mr Curtis: Yes, and I think, as Nick said, the important thing is to deliver that on the ground locally with knowledgeable people providing that sort of service.

Q323 Lord Lewis of Newnham: You have equivalents here in the waste industry. I can remember ten years ago people were speaking exactly as you are speaking, but I think their education came through the children.

Mr Curtis: Yes, that is correct.

Mr Eyre: I would just add that one of the things we want to look at is whether we can at a local level work with people who are trying to do the same sort of thing in waste and recycling and therefore improve the efficiency of the overall message, because people do not tend to come to us interested in just energy, they may be interested in a broader package of what they can do for the environment, and we think there is a strong case at looking at providing a more integrated service in that way.

Q324 Lord Lewis of Newnham: Do you put any information into schools? I think that is really what I am saying to you.

Mr Curtis: Yes, we do.

Q325 Lord Lewis of Newnham: You have a very, very powerful mechanism of influencing parents.

Mr Curtis: Yes. We do have some funding from the Department for Education and Skills working with schools and we take what we call the whole school approach. So you look at the curriculum side and you look at the school buildings side and then you also look at getting the children to take it home with them. So, yes.

Q326 Lord Lewis of Newnham: I have looked at the environment side in certain schools and it is very much organised towards the waste side. I have never seen very much mentioned about energy at all.

Mr Eyre: There is quite a lot in the National Curriculum both in geography and science on energy now. I am constantly heartened compared with what I went through at school to see how much things have improved, and you may want to ask the same question to the energy suppliers whom you are interviewing next because some of them also provide very high quality information for schools.

Q327 Baroness Platt of Writtle: The Construction Industry Training Board gave the WISE campaign a fascinating building block thing, for primary schools which they have developed with the Girl Guides and I can recommend it. It is very practical and it is all about energy saving and there is a competition at the end. What impact do you think proposals for Part L Building Regulations will have, and do they go far enough?

Mr Eyre: I think we are very positive about the proposed changes to Part L of the Building Regulations. The proposals for fabric measures should lead to a 25 per cent improvement in energy efficiency compared with the existing regulations. That is quite a significant change. Clearly, as Tim mentioned earlier, we would like to see that go further in the long-term and I think the priority there is for Government to set a long-term framework for very high performance buildings, long enough to give the industry time to see it coming and to adapt to the changes which are needed. I think it is that clarity of long-term regulatory framework that is needed. Clearly there is the important issue of enforcement
and I think that does need to be addressed. On top of fabric the Building Regulations are now also requiring minimum standards for boilers and glazing and in the short-term particularly that is a very, very important measure.

Q328 Baroness Platt of Writtle: Going back to what you were just saying about enforcement measures, I live in a village, in a conservation area, where you will have brick houses, you will have board and plaster houses, you will have very strict planning regulations and I have to say that I cannot see practical measures that could be enforced that would meet planning for the older buildings. For new buildings I can quite see that that can get more and more strict but we all know that the vast housing stock is old buildings and I think it is extremely difficult for that to be worked out and then enforced.

Mr Curtis: I think it is true that it is more difficult in, say, conservation areas but there are a lot of products out there. For example, you can get very well made double glazed sash windows. A lot of houses have sash windows but you can get double glazed units now, so you can get almost the same performance as you would in a new building.

Q329 Baroness Platt of Writtle: I was thinking more of wall insulation really.

Mr Curtis: Yes, I think solid wall insulation is a major problem, whether it is a conservation area or not, because once all the cavity walls have been filled then we need to find a solution to treat the many millions of solid wall properties as well. At the moment whilst that can be done, regardless of whether it is allowable in a conservation area, it is very expensive and there is a lot of work going on now to look at trying to provide lower cost alternatives, which would be very important in meeting targets beyond 2010.

Mr Eyre: I think, along with micro generation technologies, solid wall insulation would be at the top of our list for where technological improvement is needed.

Q330 Chairman: Of course there is a real problem with the Victorian properties where there is no cavity. I mean, they are just nine inch brick walls. You cannot do much about that.

Mr Eyre: I think perhaps what can be done in the short-term is where there is major refurbishment you can do internal wall insulation. That is clearly not practicable when somebody is living in a home, but with the big regeneration projects that are going on, many of which would be covering some of those Victorian homes, that is something which could certainly be looked at in more detail than it often has been.

Q331 Baroness Sharp of Guildford: Could I first of all put a tail end question on this one. One of the problems, as we said at the very beginning, is this whole question of the inspection of new-build. Who trains the inspectors? You will say, “It’s nothing to do with us, it’s all to do with the local authority,” but somebody must have responsibility for training them and making sure that they effectively are up to standard. That is one question. Then can I go on to another question, which is how far is the Energy Saving Trust undertaking work on the potential impact of domestic micro-CHP and other renewables on the overall energy efficiency targets?

Mr Curtis: Okay. Just on the first one, my only knowledge is that it is the local authorities’ responsibility to manage building control and I assume that they also train building control officers. I do not know any more than that. Do you, Nick?

Mr Eyre: I do not know a great deal about the training of building control officers. We could get back to you on that. If it is of interest we will do that. I think the evidence we have is that it is not particularly a training problem, it is a time and priority problem. The priority that building control officers have is, will the building stand up? Will the building burn down? That is, I guess, understandable and inspection to ensure compliance with Part L is not high on their priority list.

Q332 Baroness Sharp of Guildford: Yes, Equally, it is pretty useless us, so to speak, tightening up the regulations and having Part L if, quite frankly, it is not going to be adhered to and compliance is minimal.

Mr Curtis: But the proposal in the new Building Regulations will be to have a mandatory pressure testing, actually testing the air tightness. If that happens, it will be far more difficult not to comply because a sample will be tested, and we think that is a very big step forward.

Mr Eyre: Regarding your other question on micro-CHP and so on, the long-term potential is very large indeed. If we had a cost-effective fuel cell micro-CHP technology, for example, applied in every home that would generate more electricity than homes use or will foreseeable use. So the implications for the electricity system and network are very large indeed.

Q333 Chairman: Have you any idea what the cost of that would be? I do not mean nationally but for each individual home, say for an average four bedroom house?

Mr Eyre: There is no commercially available fuel cell technology, so that is a very difficult question to answer. The technology that is now coming on to the market is a Stirling engine micro-CHP technology. That produces less electricity than a fuel cell, but we would still expect it to generate typically half a
home’s electricity use. Costs are obviously commercially confidential, but I would say that they will only get a significant market share if they are a few hundred pounds more than a boiler. So we are talking about a significant investment but when a boiler is changed, not changing the order of magnitude of investment that is needed. That is the target of the manufacturers of those devices. I think with the measures that the Government has already announced, VAT reduction, an enhanced support under the Energy Efficiency Commitment, that should help those technologies begin to penetrate the market, but clearly it will probably be the next decade, the decade 2010 to 2020, when we might expect to see them on the market in large numbers. So long-term it is potentially a very, very important technology.

Q334 Lord Wade of Chorlton: In the light of what you have just said, would you agree there is nothing like sufficient resources available for research into the development of micro-CHP units and that an awful lot more could be achieved if there was more money available to actually help the development of research into that area?

Mr Eyre: Yes. As you may know, the Carbon Trust with ourselves are supporting field trials of the technologies which are at the point of coming on to the market but, as I said in my initial response, I think it is probably in the long-term that the fuel cell technology may be more interesting and clearly large amounts of R&D are required there. Whether the UK is well-placed to undertake that R&D I would leave to others who are better placed to judge.

Q335 Lord Wade of Chorlton: The other question I would just like to ask is, would you not agree that one of the issues is the metering system which allows electricity to ebb and flow back into the grid and that an awful lot of work needs to be done in that area if you are going to get practical use of small-scale CHP in people’s small premises?

Mr Eyre: I think most of the developers are now a good deal happier than they were about the requirements for metering under the relevant provisions. Until last year there needed to be half-hourly export metering at a very large cost for any generator, whether it was a 2000 MW coal-fired power station or a 1 kilowatt household generator, and clearly that was not very sensible. But I think the DTI and Ofgem have done quite a lot of work in the Distributed Generation Coordinating Group to address some of these issues and one of those changes is that all you now need is a simple export meter. So you need two meters rather than one, and the cost of the meter is not very much. So I think that barrier has been dealt with quite effectively.

Mr Curtis: Just to clarify, micro-CHP is one of the several micro generation technologies, so we should not just concentrate on micro-CHP. Whilst it may have a very major impact, there are photovoltaics, there is micro-wind, there is a whole range of different technologies which all may be applicable in different circumstances.

Q336 Baroness Sharp of Guildford: Am I not right that in terms of export you get the wholesale price for electricity and you are of course importing at the retail price, so the differential is roughly speaking 2p per kilowatt hour for the export price and you are paying 8 to 9p for the import price?

Mr Eyre: It depends. It is a commercial arrangement with your supplier and clearly the value of electricity produced at times of high demand from a micro-generator is quite high and it might be better to put that question to the suppliers about why they will not give a fair price to electricity that is produced from micro-generators.

Q337 Baroness Sharp of Guildford: There is quite a differentiation here, I believe, between the sorts of tariffs that are available in this country and the sorts of tariffs available in some continental countries, in particular Germany, where there is a very favourable tariff to individuals?

Mr Eyre: Yes. Germany has always supported its renewables through a tariff-based system, through giving a guaranteed price, whereas the UK has had first NFFO and then the Renewables Obligation, which I think are seen as more cost-effective ways of supporting these sorts of technologies. So whilst clearly that option needs to be looked at, I do not think it is being looked at in great detail by the DTI at the moment.

Q338 Chairman: I am afraid we have run out of time. We have two or three questions which, although at least two of them have been partially covered, we have not quite managed to explore. Would you be kind enough, perhaps, to put a note to the Clerk in writing of your answers to questions about raising the skills, particularly in the trades, and measuring the energy use (the actual energy use as opposed to the theoretical predictions) of homes and perhaps something about encouraging landlords with any financial or other incentives for them to improve their energy efficiency.

Mr Eyre: Yes, we would be happy to do that.

Chairman: Thank you very much, and anything else indeed which you feel, when you reflect on it, we did not ask you or you wish you had said, or any other thoughts you have. If you send them in to the Clerk we will publish any further written remarks in the same way as we publish your oral evidence. With
8 December 2004  Mr Nick Eyre and Mr Tim Curtis

that, may I thank you very much indeed for a very interesting session and I hope that you keep the momentum going in spite of what has happened today.

Letter from Scottish and Southern Energy plc

I am delighted to have this opportunity to submit written evidence to Baroness Perry’s Sub-Committee’s inquiry into energy efficiency. If you or any of the Sub-Committee’s members would like more information about the comments made in this submission, or would like Scottish and Southern Energy to give oral evidence to the Sub-Committee, please do not hesitate to get in touch.

Scottish and Southern Energy (SSE) is one of the largest energy companies in the UK. It is involved in the generation, transmission, distribution and supply of electricity and in the storage and supply of gas. From next year, SSE will also have a major interest in gas distribution. It is the fourth largest supplier of energy in the UK, with well over five million customers.

SSE totally endorses the statement on page 32 of the Energy White Paper that the “cheapest, cleanest and safest way of addressing our energy policy objectives is to use less energy”. As one senior politician recently pointed out, a British home consumes, on average, over three times as much energy as a German home.

Against this background, SSE also agrees with the White Paper that a “step change” in energy efficiency across our economy is necessary and that it is reasonable to expect that energy efficiency can contribute around half of the emissions reductions the UK is likely to need by 2020. The White Paper also includes a comprehensive list of the many opportunities that exist for improving energy efficiency in homes, offices and businesses.

The fundamental barrier to meaningful progress is, however, behavioural. Huge amounts of energy in the UK are carelessly wasted because there is not enough pressure on people to use less. While recent increases in the cost of electricity and gas might encourage people to think a little more about the value of energy, the attitude that underlies the basic problem is not going to change overnight.

Three examples illustrate the behavioural problem which needs to be tackled:

— The majority of heat is lost through either the roof or the walls of houses but, despite falling costs, most properties in the UK do not have adequate insulation;

— Electricity consumption by appliances is significant and accounts for around 20 per cent of electricity used in the UK. Fridges and freezers, in turn, account for 25 per cent of the electricity used in the home. Despite this, it is still possible for people to buy these “cold” appliances with energy efficiency ratings as low as “C”—and there are no standards for the multitude of electrical gadgets that can be purchased for the home.

— Condensing boilers have over 85 per cent efficiency, yet customers continue to retain or buy boilers with significantly lower efficiency levels (although new building regulations in April 2005 for England and Wales should ensure that 80 per cent of boilers installed are condensing boilers, this does not go far enough).

Plainly, the Energy Efficiency Commitment (EEC) which the Government has imposed on electricity and gas supplies helps to improve energy efficiency. But, without any behavioural changes, there is a great limit on the contribution it will make to securing the necessary emissions reductions. Indeed, the limitations of EEC may be thrown into even sharper relief when EEC is extended from 2005.

We believe, therefore, that the Sub-Committee should recommend the introduction of legislative or fiscal changes to facilitate the behavioural changes which will be required if the UK is to achieve its energy efficiency ambitions. Such legislation would have two objectives:

— To place progressively greater incentives on property owners to ensure that their properties are adequately insulated. For example, this could be done by varying tax rates so that the owners of well-insulated properties pay lower stamp duty when the property changes hands than poorly-insulated properties or pay lower council tax or business rates than poorly-insulated properties. There is also a major need to address the housing stock with solid walls which can’t benefit from cavity wall insulation.

— To reduce the availability of appliances with relatively—low energy efficiency. The implementation of the EU Maximum Competition Directive from September 1999 only allowed the sale of “A” to “C” rated cold appliances for the majority of such appliances. As a result, by 2002, 70 per cent of cold appliances sold were “A” or “B” rated. A new EU voluntary industry commitment aims to
remove all “C” rated appliances form the market and introduce new higher ratings of “A+” and “A++”. This voluntary industry commitment should be supported with formal backing from the Government. In addition, energy efficiency standards need to be devised for the range of electrical equipment that is now purchased for use in the home. These should address in particular the issue of use of power when such equipment is on “standby”.

It must be clear that this general philosophy towards attaining energy efficiency objectives needs to extended well beyond the household sector. In particular, there must be a major onus on the public sector to lead the way in showing how energy efficiency can work in practice in new commercial and public sector buildings as well as publicly owned housing stock. The adoption of higher building standards is case in point. While the Government is committed to raising standards over the next decade, learning lessons from the standards achieved in other comparable countries, there needs to be a more clearly set out plan for action to deliver this commitment in practice.

More broadly, the “energy services” model should be extended as soon as possible so that energy supply companies are able to establish longer-term contracts than 28 days with all customers and at the same time provide energy efficient products and services such as home insulation, energy efficient boilers, domestic appliances and low-energy lightbulbs. The pilot programme announced by the Department of Trade and Industry earlier this year was a step in the right direction but, in due course, the initiative 1 and customers—would benefit from confirmation that it will be extended to everyone.

In addition, the fight against fuel poverty needs to become energy efficiency-based. SSE has developed a proposal for a “Social Obligation”, modelled on the Renewables Obligation. Its key principle is that there should be an incentive on energy suppliers to play their part in tackling fuel poverty by helping to make the housing stock more energy efficient so that homes are easier to power and heat. It believes that making homes more energy efficient is the only sustainable way to reduce fuel poverty and contribute to the government’s emissions reduction ambitions.

The comments set out in this letter may once have been viewed as radical. SSE believes that the urgency of the need to reduce emissions is such that they represent a sensible package of measures that would be effective within a foreseeable timescale. If the Sub-Committee would like more commentary on any of the points in this submission, or on the “Social Obligation” proposal, please do not hesitate to get in touch with me.

13 October 2004

Memorandum by British Gas

1. INTRODUCTION

1.1 British Gas is part of the Centrica group formed in 1997 following the demerger of British Gas plc. It is the UK’s largest domestic energy supplier with 12 million gas customers and 6 million electricity customers. As part of its broad strategy to become Britain’s leading home service provider, it also sells a range of home services including the installation and maintenance of central heating and appliances, maintenance cover for kitchen appliances, drainage and plumbing cover.

1.2 British Gas employs over 8,000 engineers across the UK. These engineers check around 3.6 million boilers and other gas appliances a year.

1.3 As the largest domestic energy supplier, British Gas has the largest energy efficiency programme of any company in GB. Through the Energy Efficient Commitment (EEC), British Gas provides free and discounted energy efficiency measures to help its customers save energy and reduce their fuel bills.

1.4 British Gas works closely with government and other agencies active in the areas of energy efficiency and fuel poverty, including the Energy Saving Trust, NEA and Defra/DTI. In addition it has established a unique partnership under the banner “Here to Help”—involving social housing providers and national charity partners working together to tackle fuel poverty and social deprivation in some of the most deprived areas of Britain.

1.5 British Gas welcomes the opportunity to provide the Committee with information and opinion based on the company’s extensive experience in delivering energy efficiency measures to households throughout the country.
2. Measures of Energy Efficiency

2.1 British Gas believes that targets for energy efficiency schemes should be made clear at the outset to avoid confusion at a later stage. If the aim of the programme is to reduce the level of carbon emissions being produced through domestic energy consumption, then the correct measure is, clearly, the amount of carbon saved. This links through to other issues such as the carbon emissions of the various home energy sources, including the electricity generation mix.


3.1 Schemes aimed at those in social housing have been very successful; however, the decision-making audience in this case is not the end-consumer. Awareness of the value and importance of energy efficiency measures is high among social housing providers such as local authorities and housing associations. Measures in these schemes are largely introduced in partnership with the social landlord who arranges installation on behalf of their tenants. However, even though the measures are free to the end-consumer, there remain some cases where these are not valued by them and the short-term disruption can be resented. A great deal of effort has been expended in informing this, potentially fuel poor, audience about the benefits which energy efficiency can bring to them in terms of reduced energy bills combined with more comfortable living conditions. Such advice is provided by energy companies including British Gas, social landlords, charities and other advice groups.

3.2 British Gas’s “Here to Help” programme combines energy efficiency measures with advice to clients on a wide range of issues which affect them. Of particular benefit to many, and highly popular, is a check that the household is receiving all the benefits to which the residents are entitled. Taken together, the whole package has been welcomed by those who have so far been involved and the programme continues to reach households in new areas. Through carrying out this assessment, we have found that on average, those eligible are underclaiming by around £1,400 per annum. By making the benefits assessment a formal element of these programmes, thousands of households could be helped.

3.3 For most people in the UK, domestic energy costs make up only a small percentage of their overall household budget. Other costs, including Council Tax, Water bills, transport costs, insurance and even pay-for TV services are often higher than annual gas or electricity bills. In these circumstances, saving money by being more energy efficient is often not seen as a key driver of behaviour. Consumers, particularly those who would be expected to pay towards the cost of energy efficient measures in their homes, are not yet motivated to do so in sufficient numbers. An analogy could be drawn with the differences between the private car market here and in the United States. Petrol prices in the UK are significantly higher, due in part to the fiscal policies of successive governments, and car-drivers in this country are more likely to consider fuel economy when selecting a vehicle than their counterparts across the Atlantic where fuel is comparatively cheap.

4. Incentives for Improving Energy Efficiency

4.1 Dramatically increasing taxes on domestic energy would, of course, be likely to have an impact on the public’s perception of the importance of energy efficiency. However, there would be considerable downsides to such a step, particularly to those on low or fixed incomes. Indeed, greater efforts are currently being made by energy companies to cushion such consumers as much as possible from the effects of rising energy costs—including the free installation of energy efficiency measures. Rather, other methods of encouraging or providing incentives for energy efficiency need to be explored.

4.2 Energy efficiency has been promoted by energy companies, government and other bodies for some years, with some success. However, there has not yet been a step change in the attitude of the general public.

4.3 British Gas supports the use of economic instruments to encourage more energy efficient behaviour. We welcome the Treasury’s decision to apply a reduced rate (5 per cent) of VAT to energy-efficient micro-CHP systems, but there are further measures which could be applied.

4.4 We believe a temporary financial incentive designed to “kick start” the market for micro-CHP should be considered by Defra. Such incentives have already been successful in the areas of A-rated white goods such as refrigerators and washing machines. The micro-CHP industry is seeking a similar temporary arrangement under the next phase of the Energy Efficiency Commitment (EEC). We hope that the EEC order shortly to be laid before Parliament will contain sufficient flexibility to allow the Secretary of State to introduce EEC enhancements for micro-CHP and other such energy-efficient technology, without the need for new parliamentary legislation.

4.5 We believe that VAT should be reduced to 5 per cent on all energy-efficient appliances and materials which will remove the inconsistencies that currently exist.
4.6 However, adjustments in price alone through, for example, VAT reductions, will not significantly stimulate the market in areas such as home insulation. It is important to make people want to invest in making their homes more energy efficient—this could be done through fiscal incentives for a “whole house” or “significant home improvement” approach. Reductions in stamp duty and council tax rebates for energy efficient homes will be important in the longer term if the Energy White Paper targets are to be met.

5. POTENTIAL FOR TECHNOLOGICAL IMPROVEMENTS

5.1 A cause for concern is the apparent lack of co-ordinated effort in the area of research into new energy efficient technologies. Considerable efforts are being made in introducing existing technologies, such as improved insulation measures, but there are many houses for which such technologies are not suitable, for example properties with solid external walls.

5.2 Many improvements have been made to building regulations in the field of energy efficiency, and these could have an effect as the housing stock is replenished. However, the issue of energy wasting older housing remains.

5.3 Greater use of distributed generation techniques, such as micro combined heat and power systems, would reduce the energy wastage caused by the losses incurred by transporting electricity from remote power stations. Work is ongoing within the energy industry to make such a prospect a reality, including addressing the issues of multiple input points to the local electricity distribution network.

5.4 Installation of energy-efficient light fittings into new housing and where refurbishments/extensions are being completed could have a significant effect on the take-up of energy efficient lighting. Currently only a very small proportion of new light fittings are energy efficient.

6. DEVELOPMENT AND PROMOTION OF ENERGY-EFFICIENT CONSUMER GOODS

6.1 As part of their energy efficiency programmes, several energy companies including British Gas have established partnerships with retailers to subsidise the costs of the most efficient consumer white goods. This, together with promotional campaigns to encourage their purchase, has resulted in an increasing market share for the most energy efficient appliances.

6.2 Manufacturers need to consider how to make their appliances more energy efficient and to promote this to their customers as part of their marketing messages. For example, the electricity used on “standby” by televisions can vary markedly between manufacturers and models. Those customers interested in saving energy could find such arguments convincing.

6.3 In the area of home heating, British Gas has promoted the more efficient condensing type of gas boiler for some years. The company has subsidised the costs of this boiler to bring prices into line with traditional models and has seen the market share of condensing boilers increase dramatically. With the introduction of new Building Regulations from 2005 which will require the use of energy-efficient heating systems such as condensing boilers, such subsidies will reduce significantly under the Energy Efficiency Commitment but we hope that the increased volume demanded by the market will lead to the manufacturers being able to reduce their unit costs. However, we are concerned at the increased bureaucracy surrounding the installation of energy efficient boilers. This is provided for in the Building Regulations where customers will have to notify the planning authorities of each new boiler installation. As well as the potential for complexity for consumers, this will involve additional costs at the same time as the loss of much of the EEC subsidies.

6.4 Further development work is continuing by a number of manufacturers into micro combined heat and power systems (mCHP). Taken overall, these condensing boilers which also generate electricity in the home are significantly more efficient than conventional boilers and transporting electricity large distances.

6.5 District heating schemes and larger-scale CHP have their place in the energy efficiency mix, but they are largely limited to suitable new housing only. Retrofitting existing housing stock can be prohibitively expensive.

7. FUNDING AND CO-ORDINATION OF RESEARCH

7.1 Other than the work carried out by the Energy Saving Trust there appears to be very little funding and research into general energy efficiency measures. Companies such as British Gas, of course, analyse the results of their individual energy efficiency programmes and share much of this with the EST. Further research needs to be carried out to establish what will persuade consumers to take the subject of energy efficiency seriously.

7.2 Such research needs to be widely shared with manufacturers and others to enable the results to shape future technological innovations which will appeal to consumers.

25 October 2004
Examination of Witnesses

Witnesses: Mr David Sigsworth, Generation Director, Mr Alistair Phillips-Davies, Energy Supply Director, Scottish and Southern Energy plc, Mr Jon Kimber, Head of Energy Efficiency Delivery Programmes, and Mr Patrick Law, Director of Corporate Affairs, British Gas, examined.

Q339 Chairman: Could I welcome our visitors from Scottish and Southern Energy and from British Gas. I repeat that I think you can see who we are from our labels and information has been circulated in the pack which has gone both to the guests at the back and to our witnesses, so we shall not repeat our declarations of interest when we speak. May I thank you very much for coming to speak to us this afternoon and I hope you found it interesting to listen to the previous witnesses giving their evidence. May I ask you for the record to identify yourselves, in whatever order you choose.

Mr Law: I am Patrick Law. I am Director of Corporate Affairs at British Gas. My colleague Jon Kimber is Head of Energy Efficiency at British Gas.

Mr Sigsworth: I am David Sigsworth, the Generation Director from Scottish and Southern Energy. My colleague is Alistair Phillips-Davies, our Energy Supply Director.

Q340 Chairman: Thank you very much. Perhaps I could start by asking you also for your reaction to the announcement today. You in your various companies have developed initiatives towards energy efficiency. How do you react to the announcement that the targets which have provided momentum are now to be suddenly radically revised?

Mr Law: Well, I think we would like to have a look at those targets in more detail before commenting specifically. I think that in the short-term the energy companies do have some targets going ahead and going forward under the eco obligation and that certainly provides a sort of ramping up of activity under energy efficiency which is going to take us forward at least three years, but clearly if there is going to be a shift in energy efficiency, particularly amongst consumers across the nation, then we do need to have some sort of certainty as to what those targets are going to look like going forward, not just in respect of the eco obligation but within the wider context as well.

Mr Sigsworth: I think I reflect a similar view that we have to look at the detail before commenting fully, but I feel that Scottish and Southern Energy see that if 50 per cent of all the White Paper expectations, in terms of climate change, are to be fulfilled through energy efficiency measures by 2020, then what we are doing, which is excellent work at the moment in the energy efficiency field, has to be ramped up into a big business. People have to get a business edge into this market and create a lot of new opportunities to get to the expected targets. So we welcome the increased initiative.

Q341 Chairman: Perhaps I could ask you a supplementary question, which refers to your own companies. You are the energy efficiency manager, I think, within British Gas, Mr Kimber. How are your energy efficiency directors or managers, whatever their title, represented within the company? Are they at board level or directorate level? Perhaps you could just give us a feel for the emphasis which is given in the company’s structure to these issues.

Mr Kimber: Energy efficiency is placed very highly within the company in terms of the managerial structure and primarily through the Energy Efficiency Commitments. It is a huge commitment on energy supplies. For British Gas alone over the next three years we will be spending somewhere in excess of £500 million on energy efficiency. So it is a huge amount of money and obviously that focuses the minds and attention of people at board level. In terms of the way the energy efficiency is structured internally we are represented indirectly on the British Gas board through our marketing director. Energy efficiency sits within marketing, which we believe is the right place for it to sit because it we need to use all of the marketing skills that we have in our organisation to sell this product. It is a very difficult range of products to sell and to change people’s behaviour about energy efficiency.

Q342 Chairman: So energy efficiency is part of the marketing division?

Mr Kimber: Absolutely.

Mr Phillips-Davies: Within Scottish and Southern I am responsible for the energy efficiency area. They report through to me basically and David Sigsworth is responsible for the environment. We are both main board directors of the company. We frequently have discussions about energy efficiency, fuel poverty and things like that. I am an executive and I have a team of people working within my tariffing and pricing area who actually do a lot of the operational work, but in terms of the thinking and the direction of the company then that will clearly come from myself and David, who are both represented on the board.

Mr Law: Perhaps I could just add to that. I sit on the British Gas executive team and we do debate these things very regularly and about three weeks ago we sat through an hour and a half discussion amongst my colleagues about the Energy Efficiency Commitment going forward and what the company strategy would be in terms of that and also fuel poverty issues would feature in that as well. The managing director of British Gas takes a very strong personal interest in these issues as well. He is a
member of the Energy Saving Trust board and he is also a member of the Fuel Poverty Action Group.

**Chairman:** Thank you.

**Q343 Lord Paul:** Could I just ask, what will be the incentive to a company which is marketing energy to try and promote energy efficiency? What goes into the minds of those people?

**Mr Law:** I think there are two things. First of all, there is an obligation on energy suppliers to fulfil their energy commitment and that is a very large commitment which energy companies have to comply with. That is a licence obligation and there would be consequences for that company if it did not comply with it. That is really just looking at it, I think, from the regulatory compliance programme. But if you look at, for example, British Gas’s Energy Efficiency Commitment for next year it is around £130 million. Now, you can either sit there and say, “That’s an obligation that we’re simply going to have to discharge,” or you can say, “Let’s get creative about this. How are we going to discharge this obligation but do so in the most creative and compelling way for our customers so that it provides a commercial edge in terms of how we compete in the gas and electricity market?” But also moving on from that, British Gas has a prosperous home services division. We have about 8,000 engineers and we sell boilers and we service those boilers and we believe the home services market is a very large market for British Gas, very large indeed, and we believe that working with our customers deepens those relationships and will enable us to branch out into other areas. For example, condensing boilers is, I think, probably a very good example where I think about 40 per cent of the boilers that we install are high efficiency condensing boilers. That is a new product area for us and a new product area that we will want to continue to exploit.

**Baroness Platt of Writtle:** I thought that when I got my gas bill last week.

**Chairman:** I am going to bring Lord Lewis of Newnham in now to ask a question because he has to leave.

**Q344 Lord Lewis of Newnham:** Well, really I think it is a continuation of your present discussion. How far do you see the present Government’s emphasis on energy efficiency and reduction as posing a threat to the supply companies and the possibility of opening up new business opportunities?

**Mr Phillips-Davies:** I do not think there is any real threat there to supply companies from what the Government is doing. I think there are in actual fact opportunities in that sense. As a company, the only thing I would have added to what Patrick said on the previous question is that we are very, very committed as a company to environmental targets and to sustainability generally because we believe we have a genuine place within society in order to act responsibly. The sort of measures proposed by the Government we see as an opportunity to continue something that we firmly believe in ourselves. As Patrick said, it gives us an opportunity to differentiate ourselves in the eyes of the consumer as well as actively engaging with the public and consumers on some of these issues.

**Q345 Lord Broers:** But do you see this as in essence a tax on your operations or do you have a financial model that comes up with actually making new money?

**Mr Phillips-Davies:** Well, I think both those points are valid. If you look at it cynically you can clearly say that, “Okay, we’ve got an obligation to discharge,” as Patrick says, “and therefore we must just try and find a way of doing that,” and that pushes that out of the way and we can get on with making money elsewhere. That would be a cynical view. I think the fact that you place a general obligation on a number of different companies encourages competition amongst us to try and do those in an effective way. When some of us find effective ways of doing it, it probably gets around the market and you actually get some competition in there, which is probably what you would want at the end of the day. Finally, I go back to my other point that despite the fact that we are not a charity and we clearly have to make money for our shareholders and pay dividends at the end of the day, we do feel a very, very strong commitment internally to driving things forward on an environmental front and having a sort of wider responsibility to society. Often if we do things like cutting the amount of paper we use and doing a lot of recycling, we actually find it makes very good business sense in terms of making money as well. There are a number of examples I am sure David could cite as well, he has got responsibility for environmental issues, but we do find that our commitment there has made us money and has actually improved the returns to our shareholders.

**Q346 Lord Wade of Chorlton:** Could I just follow up on that. I agree entirely you are a commercial company and you have, both of you, got to give profits to your shareholders, but from what we have heard (not just earlier this afternoon but previously) a lot of people see tremendous opportunities with the development of new technologies, new ways of producing energy, new ways of creating energy in the home small-scale, all these sorts of activities, which clearly are going to be the future of the energy industry. So are both your organisations investing now into these new possibilities or are you hoping
that somebody else will invest in them and then maybe you can move into them when the time comes? What is the view of your end of the trade as to what you are going to be doing in ten or fifteen years’ time in the light of these changes?

Mr Law: Well, I think clearly there is a lot of truth in what you say. We do not pretend to be a technology and research company; we are essentially a marketing organisation. So what we would look to do is to spot new technologies and make agreements with the manufacturer of those agreements to market those, and indeed that is exactly what we are doing in the area of something like micro-CHP, for example, and we are also looking at a number of other technologies for the future. Trying to spot the technological winners is tough. I mean, it is not something that we can sit here and say, “In ten years’ time we know exactly which the technological winners are going to be.” So what we will try and do is develop a portfolio where we have various things under tests, we will look at various propositions with consumers and see which the consumer will go with, and once we find which the consumer will go with we will go with it big time.

Mr Sigsworth: I have probably a different model to the one Patrick has just described because whilst I accept the model of developing today’s technologies and looking for tomorrow, I actually am firmly of the belief that there are some new technologies which can be applied today in the energy efficiency field; for instance, some of the small renewable technologies. If we look at wind, there are several small devices now coming on to the market. We have made an investment in a small start-up wind company and are finding there is huge interest in both the small and medium enterprise area as well as for the domestic sector. If you also look at biomass, there is a lot of talk about does biomass work in the domestic sector. People are arguing about it, but we have only to go to Austria and see that there are many, many devices available. What we have to do is create the supply stream to get the renewable fuels, like coppice willow, grown in this country and processed into a pelleted form that can work with those devices. Our model for applying that in SSE is not necessarily the traditional relationship with the customer. We intend going beyond the meter and as well as supplying energy we would like to supply some of these technologies along with the right insulation envelope, so as to improve the energy efficiency of the built environment. We also want to offer energy efficient appliances and have a customer contract package where (over a longer duration than we have traditionally expected in the utility market) we see a pay-back, whilst actually getting lower electricity and gas bills for the customer along with more comfort, and helping address the environment. But at the same time, and I made the point earlier, we must see the UK adopt this approach and build a big business because we are going to have to have very successful businesses doing this to achieve the Government’s target.

Lord Wade of Chorlton: Thank you.

Q347 Baroness Sharp of Guildford: Can I bring you back to the Energy Efficiency Commitment. I think it would help us if you could give us some idea of how these targets are set by the Government and how their achievement is measured. Also, could you perhaps pick up this question of how far they do pose a potential conflict in imposing a duty on the one hand to increase energy efficiency on the supply companies but your interest is also here in selling more energy. It picks up the same point that we have been looking at, that you are being pressed on the one hand to limit the amount you sell and at the same time your main interest is in selling more energy.

Mr Kimber: In terms of how the target is set we, along with other represented industries, obviously consult with Government on the size and scale of the targets. The target is set, let us say the energy saving target, a terawatt hour target, and it is also expressed in terms of carbon savings as well. The target is actually apportioned between suppliers based on customer numbers, so as British Gas is the largest supplier we have the largest share of the target. There is a cut-off threshold for smaller companies supplying around fifty thousand customers. Obviously the obligation is not applied to them. It might be seen by them as a barrier for new entrants into the marketplace. In terms of the target itself, it is split between environmental and there is a social angle as well in terms of the target; 50 per cent of the target is focused on what we class as the priority group and it is based on people on benefits. In terms of the actual cost of the programme, that is estimated by Defra or the Government. That is currently estimated at £8.97 per customer per bill. I think it is fair to say the suppliers actually disagree with that. We believe that contribution is actually understated by about 25 per cent. So going back to the potential threat to our business, we actually believe the cost of delivering the Energy Efficiency Commitment is probably going to be significantly greater than estimated by Government. In terms of the mechanics of how the programme actually works, for every energy product that we supply (either we sell to a customer or we supply free of charge) we receive an energy saving credit and that credit will differ for a particular product, for instance cavity wall insulation will be a different value attached to a two bedroom property as opposed to a four bedroom property, and end of terrace property as opposed to a four bedroom detached house, depending on the size and scale of the energy saving. Once we have actually installed or
supplied the product we can then claim that against our target and every energy saving that we deliver has to be accredited by Ofgem, our regulator. At the end of the year obviously we will make a submission to Ofgem and they will then audit the work that we have completed and accredit us accordingly.

Q348 Lord Broers: Could I ask, in that context, that is clearly one way you can do this but it is a theoretical measurement, however, of energy efficiency. Do you work with the EST and other people to actually, as it were, go out and poll and check that these savings have been made?
Mr Kimber: We do actually work with the Energy Saving Trust and we have provided customer data to them to help them in terms of their validation.

Q349 Lord Broers: So how do you do that? Do you allocate a certain street and then say, “We have put in so many energy-saving boilers,” etc, and see what has happened?
Mr Kimber: We would do that by providing meter readings for them so that they could actually check the energy consumption before and after the product was introduced.

Q350 Lord Broers: Because there is clearly the possibility that if you provide lower energy consumption people may actually take advantage of it and use more hot water or keep their house warmer, etc, etc. So it is rather important to have a real-time measure, is it not, that we are actually accomplishing this?
Mr Kimber: It is, and there is a factor built into the energy saving, which everybody in the industry refers to as the “comfort factor”, which assumes that basically if you put these measures into people’s properties then they actually will use more in terms of their energy consumption. So there is a factor that is built into that, but obviously that is an estimate which we apply across every single energy product that is installed.

Q351 Lord Broers: I think some of your television advertising actually is suggesting that if insulation and so on is supplied by you people can be warmer; not better off and fitter, but warmer?
Mr Kimber: Yes. The actual advert you are referring to is our “Here to Help” programme, which has been phenomenally successful and in that particular programme we offer free insulation to vulnerable customers, people in the priority group, people on benefits. So we are actually hoping to make them warmer, that is the purpose there, and hopefully at the same time to save them money on their energy bills as well.

Q352 Chairman: Our concern and the point of Lord Broers’s question is that you have these theoretical models, and I understand that a lot of the time you have to work on that—the kind of house, the number of occupant and the energy efficiency appliance that you put in—but how do you measure the actual result of the different appliances? It may well be, for example, if somebody’s use of gas goes down it is because at the same time as they had a more energy efficiency boiler put in they also switched from a gas stove to an electric stove. So they are using just as much energy except they are not using it in gas. How do you get figures for the actual output of energy, or your input of energy use for a household?
Mr Kimber: We do not actually calculate the energy savings. That is something that people like the Energy Saving Trust are responsible for, but certainly we work alongside the Energy Saving Trust, providing data where we can to actually help them validate the energy saving attributable to each of the products that we install.

Q353 Chairman: You do that by telling them when you have introduced a more efficient boiler into a house and also by the energy consumption, at least as far as your energy is concerned, as far as gas is concerned, against that?
Mr Kimber: No, specifically we would work on individual projects with the Energy Saving Trust and provide them with consumer data to allow them to validate their figures on the energy saving potential of the product.

Q354 Chairman: You see why we are concerned about this?
Mr Kimber: Absolutely, yes.

Q355 Chairman: A lot of it is done on a theoretical basis, but it is very, very difficult to measure the actual total savings.
Mr Kimber: It is, but if you look across the entire Energy Efficiency Commitment programme we will deliver in the next three years to suppliers 1.7 million cavity wall insulations, 1.1 million loft insulations. Each of those will go into different homes and there will be a different scenario in each of those homes. So the theoretical model is important to give us an average view but you are right, it will vary depending on the usage in the home.

Chairman: Thank you very much. I think we will continue to pursue this with several of our witnesses.

Q356 Lord Paul: First of all, just before I ask my question, you might create energy efficiency in the properties, etc., but you still want to sell the same amount of energy or more. How does it totally help as far as the Government’s desire to consume less
energy is concerned, because it goes directly against your own marketing? Then if I can come back to my question, it has been argued that low prices are a disincentive for energy efficiency. What is your view on this? Perhaps it is the wrong question to you people, but I would be delighted to know. That is the first thing, and do you think we are at the start of sustained high prices for energy?

Mr Law: Let me have another crack at this. People do have difficulty with the idea that energy suppliers should be interested also in energy efficiency. I think there is a couple of things I can perhaps say which might help your understanding of this and how we look at it commercially. The biggest drivers, I think, to energy suppliers’ success as businesses now are how well you compete in a highly competitive market. So things like your market share, your costs, are going to be very, very important factors. The other important factor for British Gas, as I mentioned before, is the depth and the variety of the relationships that we have with consumers in terms of the additional product that we would sell them. So yes, selling them electricity and gas is important to them, but selling them condensing boilers is very important to them, servicing those condensing boilers, and there are other opportunities that we see arising. We believe that the potential sort of dampening down, if you like, of energy demand is, yes, of course, a factor we will always look at, but the key component to our success as a commercial entity is to do with how successful we are in the competitive market and how we control our own costs as well. So I think there is a sort of complex set of reasons and it is not simply about the overall demand for energy. I think there is perhaps one other point I would just add to that, which is that in relation to electricity demand in particular people are fantastically inventive about finding more and more uses and more and more things that they want to power by electricity. Three or four years ago we did not all have mobile phones that we recharged every night. That is just one example, but there are many others, whether they are PCs or whatever. So I think electricity demand in particular will probably continue to grow, albeit perhaps slightly more slowly. Shall I now move on to your other question?

Mr Sigsworth: If I could just add to what Patrick has said there, maybe a different approach, because all of the discussion that we have had so far has been about basically the domestic sector and energy efficiency applies equally in the industrial sector. In fact, the hardening prices that we have seen recently in the energy markets bring back into prospect some of the technologies that I believe personally, and I know my company does, are vitally important to achievement of the overall objective. I refer to CHP, which really has been in the background for several years. Since the new electricity trading arrangements emerged there has not been an economic case for large CHP and yet, if we talk about how we are to achieve the energy efficiency target, some of the biggest opportunities in terms of the size of the improvement would come from CHP. So we have to find a way of incentivising business use and business efficiency, and again the concept I outlined earlier, where you look for investment in, and a long-term relationship with, those customers works equally in that sector to my ideas for the domestic sector.

Q357 Lord Young of Graffham: Could I just ask, what is the smallest effective size of a commercial or industrial CHP, because they are not effective yet at the house level?

Mr Sigsworth: No.

Q358 Lord Young of Graffham: Presumably they get more effective the larger you go, or more economic?

Mr Sigsworth: Well, in our own fleet we have almost £150 to £200 million worth of CHP assets on our balance sheet and some of those vary from a few hundred kilowatts (we have a hotel at Heathrow Airport which is a few hundred kilowatts) right up to an installation that is 250MW. So there is a range. But when you ask what is economic; at the moment very little is economic without grant aid, and we have to find a way forward. I know Defra now are looking at schemes to actually drive into that with new initiatives, but we need them soon.

Q359 Lord Broers: Could you elaborate on that? What is the cost problem? Is this a capital depreciation cost or is it just a fuel cost? What is the difficulty?

Mr Sigsworth: The difficulty has been that if you are particularly a sole trader or even a single company which used CHP the opportunity to benefit from the export has been very limited.

Q360 Lord Broers: Yes. Could you fix that?

Mr Phillips-Davies: I think there is a market there basically since the interaction of NETA (the New Electricity Trading Arrangements) in 2001. We essentially have had a market which has not adequately rewarded generators for investing in any technology, never mind CHP, because although CHP given greater efficiency in one sense it gives less flexibility. The market as currently constructed does reward flexibility quite heavily, particularly with the basic nature of the market, and therefore it is simply not economic to build up any new CHP plant in this country at the moment.
Q361 Lord Broers: You inferred there was an upper limit. Is there an upper limit to cost as well? Is that what you said?
Mr Sigsworth: There has recently been a huge CHP, probably one of the biggest CHPs that has been constructed for a long time, just recently commissioned by CONOCO and I believe that was 400MW. So the concept can be taken to very large proportions, but in general I believe that in the sort of 5 to 20MW range there are huge opportunities for industry and commerce. Let us not forget that this applies equally to community heating and local authorities applying this and finding matches within their different applications for heat. If I could say, my Lord Chairman, we do not reward heat at the moment, we only reward electricity export, and we have to find a way of reflecting that in future energy equations as well.
Chairman: Yes, I agree.

Q362 Lord Wade of Chorlton: On the basis of what you say, if we were to recommend a fresh look at how CHP can be developed, what would be a simple number of issues we could put to the Government which they ought to consider in order to bring it to the level that, as you so rightly say, could have an enormous impact upon CO₂ emissions over a period of time and energy use?
Mr Sigsworth: There have been many reviews and it may take us a while. There are some simple things which I will mention, but could I actually write to the clerk with a fuller answer. At the moment, there is a proposition on the table that suggests the amount of profit that can be made from electricity exports is guaranteed through a government scheme for some period to help the amortisation of the investment. Again, I do not know to what extent that will be successful but that has been a proposition that the Combined Heat and Power Association has put forward and is being considered, I believe, by Defra. In some ways it works like the Renewables Obligation and gives a special subsidy to make investments in renewables work. It is a similar initiative to make CHP work.

Q363 Lord Broers: Has the situation changed? When I was the Master of Churchill College we persuaded ourselves it would work and we installed a CHP unit. At that time we persuaded ourselves it was saving us about £5,000 a year. I do not know whether we were right or wrong or whether we measured it, but we did that. Has the situation improved since then, do you think?

Mr Phillips-Davies: When was that?

Q364 Lord Broers: That was 1994, I think.
Mr Phillips-Davies: I would say during the mid and even into the late 90s, the economic case for CHP and building a new gas-fired generation was sound, and that case started to turn probably around 2000 and turned very, very badly at around the time of the introduction of the new electricity trading arrangements when prices in the market for electricity crashed and despite the fact that energy prices have risen substantially there is still not enough margin in building new gas plant. It is as simple as that. The market price is not there. You would not build a new gas plant today in this country with current prices.
Mr Sigsworth: Could I just make a specific exclusion to that, my Lord Chairman, and that is biomass-based CHP, because that would get renewable obligations and obviously change the economics considerably.

Q365 Chairman: Yes, indeed. That is what we saw and a previous investigation in Scandinavia, for example, showed exactly that, as you say.

Mr Phillips-Davies: Could I quickly try and briefly answer Lord Paul’s question as well. I think, yes, when energy prices came down considerably over the last ten to fifteen years (perhaps with the exception of the last six to twelve months) and particularly shortly after the introduction of the new trading arrangements, that was bound to have taken the focus away from energy efficiency to some extent. It certainly took a lot of people out of fuel poverty as well, which helped. It is, I suppose, one of the few fortunate consequences of energy prices rising now that people will focus more on that. I think the publicity is the key thing there, but in the same way as we have seen with petrol prices, you do not get everybody rushing out and buying hybrid vehicles and diesel cars, and prices would have to rise substantially from where they are now, I think, to really drive behaviour. I do not think we want to see that because of the issues around fuel poverty. So what we still need to do is make sure that there are significant other stimuli such as EEC2 and things of that nature in order to drive all of us to do the right thing for the long-term good of the country, our children and our grandchildren and all the rest of it.

Q366 Lord Paul: Can you guess at what kind of price it will start affecting people?

Mr Phillips-Davies: Well, I suspect you could double the cost of energy and probably for most of the people in this room who are reasonably fortunate we probably still would not think about it that hard really in terms of our bills. I think there would be a lot
of other people out there who would suffer very badly from that and that clearly would not be good. I think what we need to do, working with Government, is to make sure that we put the right incentives in place to ensure we all continue to focus on it and that is what a lot of the discussion has been about.

Mr Law: I would echo those sentiments very strongly. Even with relatively low fuel prices the payback periods on some energy efficiency measures are very, very short indeed and very economically rational consumers might choose to do that. I think there are probably other barriers that stand in the way of that investment, whether it is to do with the up-front capital cost involved or, talking plainly, that energy efficiency, cavity wall insulation, loft insulation, just does not weigh very heavily on consumers’ minds. If there is a straight choice between buying a plasma television and having your walls insulated or your loft insulated I am afraid that people are more interested in the former than the latter.

Q367 Lord Young of Graffham: There is a difficulty about rising prices not affecting perhaps people in this room but affecting a number of other people outside, which is that they get squeezed just at the time they can least afford to make an investment. Do you have a number of schemes that are available in those circumstances that would actually give a delayed payment over the period so that it would equalise the cost?

Mr Sigsworth: I think the scheme I outlined, utilising the energy service company-type concept, can provide these services. The company makes the capital investment and recovers over a longer period in a customer relationship which provides more than just energy.

Mr Phillips-Davies: I mean, for people who are in priority groups or who are disadvantaged, as Patrick said earlier, both our companies will offer cavity wall and loft insulation to houses essentially free of charge, and we also offer schemes with attractive financing and things of that nature. That is not to say that we cannot do more, maybe for those people who are in a grey area at the bottom end of the well-off and perhaps the top end of the not so well off, but those are all things that we are thinking about and we are committed to carry on and try and improve those schemes in moving forward.

Q368 Lord Young of Graffham: I think that is a convenient point just to come on to energy services as a whole. Our understanding is that that has been limited by the liberalisation of energy markets, in particular the limitation of contracts with consumers to twenty-eight days. Ofgem is conducting a pilot programme allowing for longer-term contracts. Do you see this as something positive, something which will develop, and if so how would you see your own companies taking advantage of that?

Mr Law: Yes, we do see this as a positive development. Some of you may have seen earlier in the week that we have announced an initial trial on an energy services proposition where we are making an explicit connection between the bill, if you like, and cavity wall insulation. Basically, the way that works is that we will offer a consumer free insulation upfront and in terms of the conditions of that, the consumer will pay 9 per cent higher on the standard tariff. That would give an increase in the bill of about £60 but what we believe they would then get back through the insulation measures would be about £90 per year. So the first year the consumer will be ahead and will also have their cavity walls insulated. Now, we do not know how successful this is going to be. This is very much a new proposition that we are putting into the marketplace, but it will test the idea that one of the barriers, if you like, to people investing is that they do have to find the up-front capital amount of money. So effectively what we have done is we have designed a tariff that removes that barrier, but I hesitate to make very radical predictions about how that market will develop because I think in a sense it is a matter for the consumer as much as anything. We are going to put in as many innovative offers and we will test as many innovative offers as we can to entice consumers into the energy efficiency market, but precisely what those packages will look like and how the consumers will respond to those I think we have yet to see but we are certainly committed to investing in that proposition.

Q369 Lord Young of Graffham: I must say the concept of the marketing programme to pay a consumer to consume less of your products and services is a difficult concept!

Mr Sigsworth: My Lord Chairman, I think the important issue is, that by actually including the insulation Patrick talked about (and SSE have very similar plans for a similar approach) you actually give the customer more disposable income because you reduce his energy consumption. Some people will choose to use that to even go further to improve the energy effectiveness of their house, maybe by choosing to put a solar panel on the roof or to purchase energy efficient appliances.

Q370 Baroness Platt of Writtle: So it does depend on diversification, in a way, of your services?

Mr Sigsworth: Yes, very much so, and that is where we will have extra profit streams. So the actual business of reducing energy will drive new profit streams and I think, as I have said a number of times,
that has to be big business if energy efficiency targets are to be met.

Q371 Lord Young of Graffham: I agree, until you arrive at the end of the road and they do not consume any gas.

Mr Sigsworth: But there will still be a big business, having got customers to that, and you then have to maintain them there. But if I could say, and it was mentioned on the evidence that the Energy Saving Trust gave, the Government has to drive through the change in behaviour of customers and some of the fiscal incentives that were mentioned are actually imperative, and we need them to make these models work.

Mr Law: I think that is absolutely right and I would strongly echo that. We have been experimenting with a reduction in the council tax together with Braintree Council in Essex where, working with Braintree, we have said that we will offer a £100 rebate on the council tax to people who invest in energy efficiency. It is quite interesting because it is that sort of compelling offer that begins to shift this market, we believe, and we have had a whole lot of other councils who are rather interested in this. But also, interestingly enough Braintree do not seem to have to market this very hard for people actually to come forward and say, “That’s a very interesting proposition and I would like to know more about it,” because it is framed in a compelling way. Clearly, it is not for commercial companies to provide tax breaks but I would say very strongly that if as a nation we will lead the ends of energy efficiency, if we want that as an outcome, then we must will the means as well and that does mean making energy efficiency more compelling for the consumer. I believe, and I think Scottish and Southern believe as well, that the best way of doing that is by providing tax inducements. I do not believe they have to be particularly big. I just think that they have to be compelling and imaginative.

Chairman: I think this leads very well to your question, Lord Broers.

Q372 Lord Broers: We have touched on this before to a certain extent, but the question is how do you market energy efficiency to customers? We have been talking around this. I do not know whether there is anything you would like to add?

Mr Sigsworth: Could I just add one thing. I think the model we have pursued has the belief that electricity and gas is available to all customers, and of course there are elements where gas is not available and some of the technologies that we have not mentioned like ground and air source heat pumps, along with biomass solutions, are vital and I think that the approach we have outlined, both of us, could work. But generally I think we have to address that issue. I just wanted to make the point about rural issues.

Mr Kimber: I think there is not a single answer to this. We at British Gas use a number of different channels to entice customers, to encourage customers to take up energy efficiency products from marketing consumer products, insulation, through partnerships with local authorities to encouraging social housing tenants and other residents in the local authority area. We also work with retail partners as well. We have a number of schemes running with the likes of B&Q and Currys where we use our eco subsidy to incentivise customers to buy energy efficiency products such as loft insulation and ‘A’ rated appliances. Those particular schemes have been incredibly successful, one in achieving market transformation, particularly in the ‘A’ rated appliance market where we have now seen a very heavy penetration of ‘A’ rated energy efficient appliances, but also in terms of raising awareness of energy efficiency amongst consumers because a lot of our marketing in conjunction with B&Q and people like Currys is actually getting the message in front of consumers and to making a big difference. But it is very, very difficult to sell this product and at British Gas now we are looking at more and more innovative ways. Patrick has mentioned the council tax. We are also looking at ways where we can integrate energy efficiency propositions with our mainstream products, for instance boiler sales, condensing boilers, where we ran a promotion three months ago where we actually offered free insulation as part of a boiler package. Those particular propositions have been very well received by consumers. I think it is finding those innovative niches in the marketplace which will capture the consumer’s imagination, but it is very, very difficult.

Q373 Lord Paul: We have talked about insulation and the EEC programmes seem to be very gung-ho about it, but in your opinion is there sufficient capacity within the insulation industry to meet the targets? There appear to be two diametrically opposite views. The National Insulation Association is confident that the capacity is there. The ERA says that “high dependence on cavity wall and loft insulation poses a serious risk to the delivery of energy saving targets.” What is the view of both your companies on that?

Mr Phillips-Davies: I think the insulation industry can clearly increase its current capacity. Whether it can meet what appears to be required for the next round, which is something like a doubling of capacity every year for the next two or three years, I think is questionable. I think you are probably seeing a bit of profiteering as well by some of the insulation companies that actually manufacture the product
that goes into the wall as well. So it will be our belief.

Mr Kimber: In terms of offering information through
the bill, we believe that is very limited in terms of
what we can and cannot do. We are looking at a
major redesign of the way that we provide energy
efficiency advice to consumers. We will be
introducing a new product which will be available to
consumers soon to access energy efficiency advice,
which will again not just provide advice but will
provide an insight into the environmental
consequences of their energy use. That will be
available through a whole host of different media.

Chairman: Thank you. We are really almost out of
time, but perhaps if we could just have a very quick
question and answer from Lord Wade of Chorlton
and yourselves.

Lord Wade of Chorlton: I just want to ask you about
the consumers’ awareness of the environmental
impact of their energy use and whether you have any
comments on how your bills can be redesigned to
draw attention to this, or whether we need a different
method of measurement which gives people a greater
indication of their energy use and the impact of CO₂,
etc. Have you any thoughts on these matters?

Q374 Chairman: Perhaps we could roll in remote
to metering as well as redesigning the bills.

Q375 Lord Broers: What about obvious metering
for the consumer? I mean, the metering is appalling.

Mr Kimber: In terms of offering information through
the bill, we believe that is very limited in terms of
what we can and cannot do. We are looking at a
major redesign of the way that we provide energy
efficiency advice to consumers. We will be
introducing a new product which will be available to
consumers soon to access energy efficiency advice,
which will again not just provide advice but will
provide an insight into the environmental
consequences of their energy use. That will be
available through a whole host of different media.

Lord Broers: I disagree. I think that if the homeowner
has no idea, there is no incentive. If the homeowners
had a meter it would stare them in the face and they
would go around turning things off. That is the main
problem, and there are people leaving lights on everywhere, unnecessarily heating rooms, and yet they have no real-time indication of how much power they are using.

Q376 Lord Wade of Chorlton: I agree with that entirely.

Mr Phillips-Davies: Somebody has got to want to pay for that at the end of the day. Meters are pretty cheap. You are talking six or seven pounds for a standard electricity meter these days. If you want any kind of smart technology you have firstly got an issue about who is actually going to pay for that, something that is a little bit more user-friendly to the consumer. Secondly, you may well be right. I am not so sure. I have never seen it myself, but I have never seen a study that indicates that consumers are very interested in it. Possibly as a drive towards energy efficiency you could do it, but on top of the cost of the meter you have also got the cost of fitting it and maybe the asset cost of stripping out large amounts of meters anyway. I think really the whole framework for competitive metering in this country is pretty flawed anyway, in our view, and it does not allow for any sensible investment in any kind of new smart technology or anything that would be particularly helpful or advantageous.

Q377 Lord Broers: Well, I would challenge that. Modern micro electronics would make this dirt cheap. It should not be that difficult to install it. I think it is an unnecessary obscurity. They have done it in cars and I think it made a difference. You have a simple economy meter and it educates the person that if they accelerate hard or if they travel faster they are using more petrol, and I think it has an effect. What your industry is doing is essentially being obscure. It is very difficult for people to get any real-time simple indication of energy use.

Mr Phillips-Davies: In all fairness, I do not think our industry has done it. I think what has happened is you have had a regulatory regime or a legal framework which has driven us to the lowest cost denominator and the lowest cost denominator is what you have got. You have also got the fiasco which has been foisted onto us in metering, which means that whereas maybe in China, Pakistan and other countries they have got smart metering and things like that, because they have got critical mass in an area where they are putting metering in; you have got no incentive or framework in the UK market to motivate anybody to invest in anything of this nature on a long-term basis. So you will not see anything like that for many years to come unless somebody substantially changes the way the metering market works.

Q378 Lord Wade of Chorlton: But you could provide equipment that would measure the amount of electricity being used without changing your existing metering system for payment purposes. Surely there could be a mechanism that went on the wall which even showed how much it has cost to run the cooker for an hour. I would have thought that would have been a very simple thing to do.

Mr Phillips-Davies: If there was a demand for devices which did that then we would consider it.

Q379 Lord Wade of Chorlton: Well, you have just been telling us how much you are already paying to help people increase their efficiency. You have been explaining the amount of money that you are prepared to invest. You are prepared to put insulation in a house. This would be a fraction of the cost of that sort of activity.

Mr Phillips-Davies: Well, there is an issue about whether people would find it useful in a few houses and I think it has an effect. What Lord Wade of Chorlton said could be done without replacing your existing meter, it could be an additional option feature and a trial run of whether people would find it useful in a few homes might be very interesting to see, because it is quite difficult to watch the disc going round and get any idea of whether you are using a lot or a little.

Lord Broers: I do not want to waste time, but I am a sailor and on a boat you have to watch your battery the whole time. The one thing you always check is the net current out of your battery if you want to stay alive on the sea and there is a very simple meter there. When you go to sleep at night, if your boat is in the harbour, you make sure that current is very close to zero. There is no such simple thing in a house and I think if there was it would help in energy saving.

Q380 Lord Wade of Chorlton: I agree.

Mr Law: I agree that that issue of awareness is probably something we can all look at in terms of creative devices within the home which simply give an indication, perhaps not even connected to the metering system at all, but almost to tell the consumers what is happening at a certain point within their home and that is something that we need to look at.
Chairman: I am sorry, we have run out of time. We were just getting into a lively discussion at this stage, but thank you very much indeed for a very interesting and informative session. Could I repeat that if you have any thoughts you would like to contribute which did not come out in the discussion today or anything which on reflection you feel you would like to say further, do please write in to our Clerk and we will publish, of course, any additional information which you send in in a written form in the same way as we publish your oral evidence. Baroness Platt of Writtle: And the questions which have not been answered.
Chairman: That particularly, as Lady Platt says, applies to the couple of questions which we did not specifically cover, although I think they were covered in earlier discussions. Thank you again very much for coming.
WEDNESDAY 12 JANUARY 2005

Present Lewis of Newnham, L Lindsay, E Paul, L Perry of Southwark, B (Chairman) Platt of Writtle, L

Sharp of Guildford, B Taverne, L Wade of Chorlton, L Winston, L

Examination of Witness


Q381 Chairman: Mr Meier, welcome and thank you very much indeed for agreeing to come and talk to us this afternoon. Most of us managed to hear you speak at our seminar and enjoyed that very much, and we are looking forward very much to hearing your evidence this afternoon. You and members of the public have had an information note which sets out our declared interests and therefore there is no need for us to read our interests into the record. May I also welcome the members of the public and draw your attention to the information note which you have. We will try and conclude a little before five so that you can go. Do you want to just identify yourself for the record as we start, just say who you are? Mr Meier: Thank you. My name is Alan Meier, I am presently a senior energy analyst within the International Energy Agency in Paris.

Q382 Chairman: Thank you very much indeed. Before you start answering our questions, can I just say that the acoustics in this room are terrible, so we will do our best to speak up so you can hear us, if you could also be kind enough to do the same. It would be helpful to the Committee if you would tell us first of all exactly what role the IEA performs regarding energy efficiency policies internationally and particularly what role it has in regard to the United Kingdom. Mr Meier: The IEA has several roles with respect to energy efficiency. First, it collects, compiles and tries to interpret information about energy efficiency policies in its member countries—that is the 25 member countries of the IEA—and also some of the non-member countries because China, for example, is a non-member country but is certainly important. The second role is that it promotes the exchange of information about energy efficiency policies and even some information data and technologies between these countries. In special cases it identifies opportunities for co-ordinated efforts—that is, where a co-ordinated effort will lead to either a more rapid implementation or a lower cost of implementation (or both) of some sort of efficiency technology or policy. The United Kingdom is a significant member of the International Energy Agency so it participates in all of these activities and through this participation in various committees that oversee our work. In addition, the secretariat of the International Energy Agency participates in what is called an in-depth country review of every one of the 26 countries, and that takes place every four years. The last time the UK was reviewed was in 2002 and, I will say right now, I have not looked at that study; looking at that study was one of my homework assignments that I did not do, so I cannot tell you what the conclusions were then. Chairman: We will start with a clear mind then. Lord Wade. Mr Meier: The International Energy Agency is often thought of as an oil agency, because that is why it was created, to deal with the oil shocks and management of oil supplies and stocks. But this is no longer the case because now a large and an increasing number of our activities deal with understanding how energy is used around the world, in terms of both supply and demand. Based on these broader perspectives, the IEA believes that the argument for higher energy efficiencies and the policies to achieve them are stronger than ever. The IEA believes that an energy-efficient global economy would be gentler on the environment and make more resources available to improve people’s lives. I say that because you need to decide whether that is a social policy or not. You asked is there a most appropriate measure of energy efficiency and whether there is any agreement about objectives for an energy efficiency policy. The IEA certainly has no formal position on the definition of...
the most appropriate measure for energy efficiency. If you asked me personally, I would say I try to evaluate how much energy is needed to provide a certain level of service, whether it is to make a car, or heat a home warm, or to refrigerate ice cream. Usually I will go one step further and ask about the fuel used to provide the service, because that will have some influence on the total amount of energy. If electricity is used, then I prefer to calculate the primary energy—that is, how much energy went into the power plant. You asked also about the objectives for energy efficiency: again, reasonable people can disagree and each country will have a different viewpoint of its objectives and justifications for instituting energy efficiency programmes. The first is purely economical: you save energy because you are saving money. So it makes sense, because it is a good investment. Many of the investments in energy efficiency have paybacks even now of less than a year. Improvements in energy efficiency have environmental benefits such as reduced sulphur emissions from power plants. There are security benefits if you have a situation where you can minimise unreliable supplies of energy—oil from the Middle East or perhaps certain renewable supplies. Efficiency improvements are also an alternative to building as many new power plants, new oil delivery facilities and other energy supply facilities. Another reason you may select energy efficiency is simply because you want to be more comfortable. For example “I am putting cavity insulation in my home, not because I want to save energy but because the insulation will make the walls feel warmer and I will be more comfortable. The energy and monetary savings are secondary.” A few countries, notably Korea and maybe Japan, have realised that high-efficiency technologies can be exported, so building efficient products domestically is trade and export policy. There are probably some more, but each country is going to have its own list.

Q384 Lord Wade of Chorlton: May I come back on that quickly because you said as part of your answer that energy efficiency would bring improvements to people’s lives. Do you see that improvement coming about as a result of state action or do you see that improvement coming about from people being able to do things for themselves that they would not otherwise be able to do because they could save money to spend on other things? How does that actual improvement come about?

Mr Meier: The improvements come about in two ways. One is like I described, with improved comfort or improved services—the refrigerator is larger or the temperature is more constant, or the illumination is better. Second, by reducing your energy consumption and energy bills you free up money that can be spent on other things. You asked then is this a result of Government action or individual action?

Q385 Lord Wade of Chorlton: I just wondered where you saw the improvement coming. It is a result of personal decisions that will bring the improvement rather than the state having benefits as a result of the energy efficiency, is that what you are saying?

Mr Meier: In many cases the consumer will be the prime beneficiary.

Q386 Lord Paul: Mr Meier, what kind of role do you see the UK has within the EU in promoting energy efficiency policies?

Mr Meier: Do you mean until today or in the future?

Q387 Lord Paul: You could tell us until today shortly and then what do you think it should be.

Mr Meier: May I avoid the “until today” part and work on the future?

Q388 Lord Paul: Are you saying they have played no role?

Mr Meier: I know more about possible future roles than the past and I suspect that you may know more than I do about past policies. First of all, what I have seen in several countries is that if a country and a large enough part of the population have the will it is possible to have large energy savings and improvements in efficiency. Inside the European Union, the UK could stimulate energy efficiency policies through participation in the European Parliament, the EC, and various technical committees. I believe that the UK could have considerable leverage in these venues if it chooses to make a coordinated, sustained commitment. I think that this is true for many things and I believe that if the UK wanted to do something in this area it could. The UK can also lead by example, that is, through aggressive and innovative implementation of existing, and forthcoming efficiency Directives. Finally the UK can pursue its own policies to promote energy efficiency. It appears that EU rules pre-empt the UK and prevent the UK issuing regulations (or even require labels) affecting energy efficiency in many products with significant energy use. (In other words, the UK could not establish its own minimum energy efficiency standard for motors.) Nevertheless, many other policies to promote energy efficiency are still available, including government procurement specifications, building codes and sponsored research into new, efficient technologies.

Chairman: Thank you very much. Lady Sharp.

Q389 Baroness Sharp of Guildford: How far do you think the European Union countries generally, and the UK in particular, compare with other developed
Mr Meier: I would like to refer you to a recent publication of the IEA called “30 Years of Energy Use in IEA Countries”, because the picture is very, very complicated. In certain areas some countries have made dramatic improvements, but because their situations are unique. I hesitate to make a broad generalisation about the progress of the UK relative to other countries because it is complicated, but since you asked me and I will take a chance. I think the UK has made great strides in improving the energy efficiency of the economy, however I believe that a large part of those gains is derived from a one-off benefit from fuel-switching and certain transformations that have occurred in the economy, and those will not occur again. In the future there are going to have to be serious measures to deal with the end users, so while it looks to have dramatically improved over the years, it is not in a position to continue that improvement because of those one-off opportunities that have disappeared.

Q390 Lord Taverne: By which you mean the abolition of the coal industry.

Mr Meier: Here is a case where you know much more about exactly how the UK has succeeded in doing this, but I do know that the wider use of natural gas, oil and electricity for various end uses has led to a huge increase in overall efficiency.

Q391 Baroness Sharp of Guildford: You spoke earlier of the impact of some of the smaller countries; what are the lessons that we may learn from other countries?

Mr Meier: Let me make sure I answer the right question, do you mean inside the EU or in general?

Q392 Baroness Sharp of Guildford: The original question was the EU in general vis a vis other areas, the specific question that I think I put to you is what can we learn from other countries and in that sense what are the lessons that the UK can learn from other countries?

Mr Meier: The countries that have been most successful have employed a collection of policies to address energy efficiency, but there is no single policy that will suddenly create an energy efficient economy. You have to realise that you cannot solve it with one single policy, and you will see that in Japan, you will see that in California and you will see that increasingly in Korea and Denmark.

Q393 Baroness Sharp of Guildford: Do you think that the UK is in danger of putting all its policy eggs into one basket?

Mr Meier: No, I do not think so.

Q394 Chairman: Perhaps I could just press you about this. You circulated a graph to us which shows how California, after the oil crisis, had introduced policies and measures and that its energy use was much lower than the United States average as a whole and dramatically lower than in states like Texas which had not introduced these policies. Where would the UK come on that graph; would it be below California or above it?

Mr Meier: Thank you, my Lord Chairman, I believe everybody has a copy of this chart which shows the per capita electricity use over time for three regions—some people may say countries but three regions—California, the United States and Texas, and the time period shown is from 1960 to about 2002. Around 1975 something caused California to change to a different path and its electricity consumption per person has remained essentially constant for the last 25 years. This has occurred even though California had a period of unprecedented growth for almost a decade—Silicon Valley is in California—sometimes eight per cent growth year after year, and yet you do not see the electricity consequences of that growth on this graph. Why is that? I believe that energy efficiency is one of the reasons, because starting in 1977 California began implementing the first energy efficiency standards for buildings and appliances, so it essentially began addressing electricity energy use efficiency. It also started many “Demand Side Management” programmes. The result is that California led, eventually the United States Government assumed some of those responsibilities, but not all of them. There are some parallels between California and Washington DC and the UK and Brussels which we can come back to. In the meantime, Texas did much less, it was more or less a laissez faire kind of situation and it also had very low electricity prices, lower than California, so this is one difference, and it had a slightly different industrial make-up, but I believe that most of the energy savings or the electricity savings that you see in California, at least the divergence in these two, is due to a collection of electricity efficiency policies.

Q395 Chairman: My question was a simple one really. Let us say as of 2000 and the use per capita of electricity, where would the UK be, above or below it?

Mr Meier: The UK is about 10 per cent below California.

Q396 Lord Winston: Presumably if you were looking at transport in those three areas it would be completely different.
Mr Meier: It would be a very different situation.

Q397 Lord Winston: Oil usage, for example.  
Mr Meier: Yes, but this is only electricity.

Q398 Baroness Platt of Writtle: Did they go into gas?  
Mr Meier: In this case gas does not play a role because this is only electricity consumption.

Q399 Baroness Platt of Writtle: I realise that, but it could be that they just changed to gas.  
Mr Meier: That is a very good point, but if I showed you the gas consumption per capita you would see a precipitous drop in consumption, by about one third in the last 20 years.

Q400 Earl of Lindsay: Despite everything else that California did, to what extent was the price that was charged for electricity the most significant factor in the flat line that California achieved?  
Mr Meier: That is a very important question and I think there should be several dissertations on that subject because I cannot give you the answer. It clearly plays a role but it is not the only factor.

Q401 Chairman: You did mention that Texas prices were very low.  
Mr Meier: I did say, yes, that in Texas prices were lower and also the average US price is lower than in California.

Q402 Earl of Lindsay: Is this not a critical factor to understand in terms of predicting the benefits which could arise from increasing efficiency? If you do not understand what the decisions that will be made in the future will be, subsequent to greater efficiency being available in respect of the cost of electricity, then how can you evaluate the advantages that arise from certain policy decisions that are made today?  
Mr Meier: That is a very good question and, as I have tried to say, this is an area that needs to be constantly examined to understand the role of the price, but there were technical features here too that resulted in this reduction. I am not sure I can answer your question any further except to agree with you that price is important and we cannot ignore it.

Q403 Lord Lewis of Newnham: Surely the important feature is not the actual value, it is the slope of those lines which is significant.  
Mr Meier: That is certainly one of the points.1

Q404 Baroness Platt of Writtle: EU involvement means that individual Member States are somewhat restricted as to the measures they can apply independently. Are there any differences in the flexibility shown by various Member States in enforcing more or less stringent energy efficiency policies?  
Mr Meier: I should preface this by saying that as you can tell by my accent I am not a European citizen and I do not know all the rules about European law, so I do not know the extent to which there are restrictions. I also would like to say, before I try to address your question, that you could also indicate that the UK benefits from some of the other activities of other States, so if other States have pressed the Europeans to make a standard that you benefit from, it works both ways. You asked if there was any difference in the flexibility shown by various Member States and I think that some countries have pursued more aggressively the implementation of the energy efficiency policies inside Europe and have tried to complement the implementation of those with other policies that make them more effective. So the simple answer to your question is, yes, some countries have shown more flexibility, I guess, or aggressiveness in implementing some of the efficiency actions.

Chairman: Thank you. Lord Winston.

Q405 Lord Winston: You talked about there being no single policy that reduces energy demand, but what do you see as being the greatest barriers to reducing energy demand in developed countries?  
Mr Meier: First, I think it is important to keep in mind that energy demand is already being reduced, so people are investing in energy efficiency every day; when they are making decisions in industry, in transportation, in households they are investing in energy efficiency and if they did not make those kinds of investments the energy consumption would be higher than it is today. That is why I like to show California and Texas. Many studies have demonstrated that the energy saving potential is still very large, there are cost-effective savings, so I think your real question—and please correct me if I am wrong—is how can we increase the activity in investment in energy efficiency beyond what it is already today? One important barrier is market failures in energy consumption. By “market failures” I mean situations where the individual who invests in an energy-using device never pays the electricity bill or the energy bill for that device. One example I would take from the United States—which probably exists in the UK to a different degree—is the purchase

1 The slopes of the lines are also informative. Lower prices in Texas can easily account for part of the difference in absolute levels of electricity consumption but not for the expanding divergence in per capita electricity use.
of an energy efficient refrigerator. In the United States we believe about 30 per cent of the refrigerators are bought by people who never pay the utility bill for them, so they have no incentive to behave rationally—at least, to behave rationally for them is to buy the cheapest possible unit. So you can see that the investment requirement and the benefits are separated. Probably you have this in the case of home construction in the UK with boilers; if a contractor is building a house in the UK they put in a boiler, but there is no incentive for the contractor to put in an efficient unit because he or she is not going to pay the utility bill for it. So there are many, many situations where you will have somebody making the investment but another person has to pay the utility bill. There are other kinds of market failures that deter investments in energy efficiency. There are information failures: many devices provide no information about their energy consumption, so consumers ranging from industry to householders—have no clue about how to make a rational decision about energy efficiency. Another situation may be a high transaction cost where the actual savings are so small that it is not worth going to another store or doing the research to find something better. This is the situation with standby power in devices; the range in standby power consumption for compact audio devices is about one to 25 Watts. Is that a lot of money? It is a few pounds per year of electricity consumption, but there is no way for a consumer to know which uses 25 Watts and which uses one Watt. That is the first problem. The second problem, however, is even if they did know is it really worth their time to go to another store? Finally, I want to mention another kind of failure; I do not know whether it is a market failure, but the Australians call it “firm failure”. Many firms have an operating budget and a capital budget. You will find that it is very difficult to move money from one of those budgets to the other. Ideally, you want to use projected savings on the operating side as your source of capital. But most companies have a list of capital items and energy efficiency projects go at the bottom of the list, and if there is capital rationing, they never even rise to the top. So even in a company where you would think it would behave rationally you will have an effect of market failure because of the way they have divided up their budgetary situation. I suspect that a large amount of energy consumption is affected by these kinds of market failures.

Q407 Earl of Lindsay: The EU has extensive powers in the field of energy demand and supply, and also in energy efficiency. Do you see the EU institutions taking a strong lead on policies to reduce energy demand? If not, can you give us some examples of policies you believe the EU could adopt which would reduce energy demand?

Mr Meier: First of all I will limit my response to energy demand, because I do not know anything about the supply side. Compared to Japan, Korea, Canada the United States and Australia, the EU does not yet have extensive powers. But it has the ability to create them if it wants and in fact that is what it is doing now. Several new directives—the EcoDesign Directive and the Energy Services Directive—create the framework, but right now it does not even really have the tools to do it. It potentially has a tremendously powerful role through this kind of legislation that is being decided right now, but the devil lies in the detail here because at this point I do not think the EU is capable of effectively implementing this legislation. They do not have sufficient staff, they do not have independent expertise which is separate from industry and they lack a transparent procedure to make decisions about setting the regulations such as energy efficiency standards or product labels and so on, which is absolutely necessary because otherwise we do not know how they will set these standards. They need to have a transparent and clearly laid-out procedure to do this and they also will need to do comparisons with policies in other countries on levels of standards such as those in Japan, Korea, the United States and Canada. The answer to your question therefore is they do not have much power now, they will have power and I think—but I am not an expert in this area of European law—they have pre-empted it from the individual countries and, if done well, they will have an excellent collection of tools to implement energy efficiency.

Q408 Earl of Lindsay: Can I further ask, therefore, if there is a series of challenges that they must address in order to create real progress, driven by themselves, in the area of energy demand and energy efficiency, where do you see within the EU family of institutions this drive coming from? Is this very much from a DG and the Commission itself, do you think it is the Parliament that will be, provoking greater activity from the Commission and the Commission will be, perhaps, the more reluctant partner, or will it be perhaps one or two or more individual EU Member States shaking the EU tree in order to achieve broader progress?

Mr Meier: I have to say again I am not an expert on European politics but I think you have listed all the places where movement has to take place. The Parliament is pushing—I believe there are members
of Parliament who are eager to have some energy efficiency legislation on the books and it seems to cross parties and beliefs—but the Commission itself has to be willing to do it, the individual countries have to support it and there will have to be some boosters who are especially pushing because there are some countries that will resist it.

Q409 Baroness Sharp of Guildford: Would I be right in interpreting what you are saying as being that at EU level you can lay down building standards or these standards of energy efficiency, but you are going to be looking to each individual Member State to actually police those standards?
Mr Meier: I am not sure what you mean by “policing” but I would hope that each country would want to monitor the extent to which they are getting the maximum benefit from those standards. Also, I believe the specific levels of building standards will be set by the individual countries.

Q410 Baroness Sharp of Guildford: If you take building regulations, within the UK we have quite a problem already in that at the moment we have our own standards in terms of building regulation but we rely on local authority inspectors to make sure that they are adhered to. What we know is that actually many builders do not adhere to these standards, so there is a failure somewhere along the line between those who inspect these buildings and actually accept substandard implementation of these building standards.
Mr Meier: I think the answer to your question is, yes, that there will be still a substantial—

Q411 Baroness Sharp of Guildford: However high you set the standards it is at the local level that they have to be implemented.
Mr Meier: I do not think the UK is alone in that in Europe. I heard a story that in Belgium only 25 per cent of new buildings meet their building standards in respect of efficiency. Training and inspections are essential parts of a building standard; unfortunately they are often neglected. This is another kind of market failure.

Q412 Lord Paul: This Committee is visiting Sweden and Germany to see how their policies and also implementation differs from the United Kingdom. Do you have any advice about what kind of things we should focus on; also is there any other country in Europe that you think would really be an ideal place for us to visit?
Mr Meier: When you go to Sweden I think the most important part for you is to see how the Swedes make a quality building. Just as Lady Sharp was describing, there is a quality problem in the UK; how does Sweden manage to have such high quality standards in their construction and how do you bring that back to the UK? I do not know what the answer is, but to me that is probably the most important question that you could have. The answer may not lie just in the quality of the craftspersons but it may be the materials that go into the buildings and then the inspections, the servicing and the maintenance and so on. These are the several networks that need to be created and maintained, so that is what I would look at in Sweden. Of course, these buildings are very energy-efficient too so it is important to see that the Swedes use less energy, given their climate, than the UK and somehow they still walk around in short-sleeved shirts all winter. They must have something there. In Germany, I think there I would look more at programmes because the Germans are very decentralised. They have a weak federal energy efficiency agency but there are a lot of municipal utilities, cities and small regions that have created their own programme. I think it would be worth seeing there what can be done at a local level. However, if I had the budget I would suggest you visit three other places. Within Europe I would say you should go to Upper Austria because this is a place that has become much more active in energy efficiency and renewables and has really moved away from the rest of Austria and led the whole country and I think a lot of that part of Europe—that is, Southern Germany, Switzerland and Austria—to higher levels of efficiency. It is all really due to a small energy agency in Upper Austria, in Linz, and you should see how they have done it, because they have not put much money into it but they can show you the numbers of how they have created higher quality and also improved the economy. Then I would go to Australia—

Q413 Chairman: That is a bit far.
Mr Meier: It could have been worse, I could have told you to go to New Zealand, but in Australia, in a very short time, probably less than 10 years, they have moved from a completely laissez faire situation with respect to energy efficiency to a collection of, I think, carefully considered energy efficiency programmes. It succeeds by creating a consensus. There have been some unusual situations where the manufacturers asked for energy efficiency programmes. That is unheard of. Then if you are in that part of the world you have to go to Japan, you need to see how the Japanese consume much less energy than any country in Europe, have a higher level of income, and what sorts of devices they use. To me it is always fascinating to visit Japan to find out what they are regulating, what they are encouraging, how do they spend their money. I think you would learn more there just because it is a different culture.
Chairman: We will obviously have to undertake a world tour.
Lord Paul: That is why my question was within Europe.
Chairman: Lord Wade.

Lord Wade of Chorlton: What role do you think the EU and other developed countries have in encouraging developing countries to improve energy efficiency? How can developed countries help to mitigate the impact of the rapid economic growth of countries such as China and India on global energy consumption? That is tied up with the question how much more important is the economic growth and the wealth creation than is the energy efficiency?

Mr Meier: Let me try to answer the first part of your question. I think there are two ways in which the developed countries and the UK can influence efficiency in less developed countries, and the first is by setting an example themselves with aggressive policies on energy efficiency. If they do something in that direction then the developing countries will in fact copy them, and that is why, for example, Japan looks quite impressive from the less developed country perspective because they have a very aggressive collection of policies. So too does the United States. If you go to many countries in the rest of the world you will see that they are modelling their efficiency programmes after the United States. The second thing is that an aggressive programme for efficiency in Europe lowers the cost of all products that are energy efficient and that makes it possible for developing countries to afford them, and to market transformation is an extremely important tool.

Lord Paul: My experience has been that some of the developing countries are getting far more serious about energy efficiency than even the developed countries. Is that your observation also? They may not be efficient at the moment, but they are certainly far more aware of it and doing something about it.

Mr Meier: I think the record is spotty in that regard. With respect to China it is probably the environmental cost of energy production or energy use in China that has forced them to realise that they must improve efficiency in order to save themselves from environmental destruction, interest in energy efficiency is certainly rising very rapidly. I see a little bit more in India but not nearly to the extent that I have seen in China. After that there is Brazil, yes and no, but after that it becomes very patchy.
Chairman: Thank you. Lord Lewis.

Lord Lewis of Newnham: But if you look at industry as opposed to the individual homeowner, very often they increase their efficiency which gives them more capital and what they do is reinvest that back into the industry, which is then going to lead to the consumption of more energy.

Mr Meier: But the actual energy demand created by that investment is going to be much smaller than the savings because that money that they freed up from saving energy—it is very difficult to describe it except to realise that when you save energy or you reduce your utility bill you are saving a lot of energy, basically pure energy, but any time you put the money into the rest of the economy you are not going to get nearly as energy-intense a result. Several input and output analyses have been done where you trace the impact of energy efficiency through the whole economy, trying to model it through input and output analysis, where you can actually follow the macro implications. While of course there will be some further energy consumption caused by the re-spending it is much smaller than the savings that you got from the efficiency investment.

Lord Taverne: Just to follow that up, there are certain kinds of activities which have taken off enormously as a result of economic growth and the higher standard of living which are very energy-consumptive, like foreign travel by air.
Mr Meier: I tried to give that example, that if you insulate your house and with the money that has been freed up—let us call it £1,000—you take a trip to the Canary Islands, to the sun; you buy a package trip and maybe 15 per cent of that package trip which also cost £1,000 is going to be for jet fuel, but you saved £1,000 of energy by insulating your house and now you are going to spend £150 in jet fuel. That is getting close to the worst case situation.

Lord Wade of Chorlton: May I just follow that up? Are you telling us what you think or have you got sound scientific evidence of that fact?

Mr Meier: There have been input and output analyses done in several countries following the implications of that. I am not sure about the UK and I am not sure about Europe, but I have seen them for the United States and I believe Japan.

Baroness Sharp of Guildford: To some extent you have covered the issue which I was going to raise, which is examples of different countries and we have talked quite a lot about that, but can I come back to this whole question of the energy intensity of use, because the issue is really how far there is a one per cent increase in the demand for energy as a result of a one per cent increase in GDP. I think I am right in saying that in the 1970s the energy elasticity of demand was actually greater than now; in other words we were using more than one per cent more energy for every one per cent increase in growth, but since then this has now decreased and most countries are actually below the one per cent level as it were.

Mr Meier: In fact the word that is often used for what has happened is decoupling.

Baroness Sharp of Guildford: As indeed your graph of California and Texas shows.

Mr Meier: Yes. It is very complicated because if you look at Japan during the 1990s when they had a recession, the GDP was dropping and the energy consumption was continuing to rise because of increased demand for certain kinds of energy and certain services like air conditioning. So you saw this very unexpected behaviour.

Baroness Sharp of Guildford: It does raise the very fundamental question, which we come back to time and again, which is are we pursuing energy efficiency or are we actually anxious to save carbon emissions because insofar as you pursue energy efficiency you make these gains in energy efficiency because they feed back into economic growth, you do not actually of course achieve the same carbon savings as you do in terms of energy savings.

Mr Meier: That is true and it is a very important point. Most of my career we have been concerned about energy efficiency, that is getting more services out of a single unit of investment. However, the problem now with carbon emissions means that many people are concerned with the absolute level of emissions. In some cases we have had perverse results, where people buy very efficient but also very large new homes, so the absolute energy consumption has actually increased over their small inefficient home. This is going to create a requirement for new kinds of policies, but I think the first-order effect is that we need to increase efficiency and in certain areas we have to be careful where we might actually be promoting a situation where people are actually using it more in some way and creating more emissions. It is a difficult problem, and is a new area that we have to work on.

Chairman: You have given us the example of California, which had economic growth without increasing its energy use and you talked to us very helpfully about that.

Lord Taverne: Electricity use.

Mr Meier: I have observed several countries that, for brief periods, reduced their electricity consumption or their energy consumption. I have become interested in this as a special topic which I call saving electricity in a hurry, or saving energy in a hurry because there may be some sort of supply crisis. For example, Norway reduced its electricity consumption briefly by about 8 per cent but then after the drought was over it increased it. Similarly, New Zealand reduced its consumption by 10 per cent and Brazil reduced its consumption by about 20 per cent and consumption did not return to original levels for several years. That happened while the country was growing—it did not have boom times in terms of economic growth but the economy did not collapse during the time that the electricity consumption dropped 20 per cent. There are some areas where, because of fuel switching and other activities going on, a single fuel has dropped but curiously, in the case of California, natural gas consumption for homes—not per capita consumption over the whole state—has dropped about 50 per cent in the last 30 years.

Chairman: Has there been any other fuel switching? What about oil?
Mr Meier: There are situations where certain regions have tried to get out of certain fuels for various reasons—some countries have decided they do not want to use oil for heating and they have tried to put in natural gas and you can see that. You have to really look at the whole energy consumption and the reason I start hesitating about California is because, as the residential consumption declined, the gas consumption for power plants increased greatly.

Q426 Lord Paul: Is it the fact that California pushed a lot of its industries away from California into neighbouring states and which they were happy to attract?
Mr Meier: That is a very important point. If you look at the reverse side of this chart that I gave you, there is a list of some of the explanations and in fact there have been changes in the infrastructure in California and taxes in some of the other states. I can only say that, yes, it probably did move some of that energy-intensive industry, but again it was in a period of very high economic growth, levels that you have not seen in Europe.

Q427 Earl of Lindsay: The demand-side management programs that were run by the utilities in California, do we have in the United Kingdom comparable programmes? Could we be learning from the success that the utilities in California achieved in demand-side efficiencies?
Mr Meier: I am not an expert on the UK’s energy efficiency programmes but as I understand it there are some very effective programmes that have been developed by the Energy Saving Trust and so on, although I do not have the evaluations to know how much energy they saved.

Q428 Earl of Lindsay: In California the programmes are run by the utility companies themselves.
Mr Meier: Sometimes.

Q429 Earl of Lindsay: But as you note here it was a factor in the energy efficiencies that were achieved.
Mr Meier: It was definitely a factor, yes.

Q430 Earl of Lindsay: Are there any programmes within the United Kingdom that you are aware of, or should there be programmes within the United Kingdom, also being run by the utility companies themselves which could perhaps echo the success that they achieved in California?
Mr Meier: I think so. I do not know enough of the detail, but I have heard that they exist and there is no reason why these programmes could not be copied. To me the utility is a natural provider of some energy efficiency services, simply because it is at the interface with the customer. On the other hand, it instinctively opposes these actions because it is trying to sell more of the product. During the time when utilities were delivering most of the efficiency services the regulatory authorities figured out a way to reward utilities independently of the loss of electricity sales.

Q431 Lord Taverne: I want to switch to a somewhat smaller scale and ask you about the importance of attitudes towards the domestic use of energy. Most people see domestic improvements as consisting of greater comfort and convenience; you have told us that this can be combined with reduced energy use when you have better insulation and more effective refrigeration. In other cases, however, it can be seen that reduced energy use could be contrary to their thoughts of convenience—take SUVs for example. How important relatively are regulation and technological development, and how important is the role of attitudes? Do you have any views on measures that can be effective in promoting the reduction of energy use in the home, which go beyond just more efficiency such as technology and perhaps standards enforced through regulation?
Mr Meier: Beyond the technologies and the standards the question is behaviour, how much does behaviour influence the energy consumption.

Q432 Chairman: Mr Meier, could we have perhaps a very short answer on this because we have one last question we want to get in.
Mr Meier: In some cases where the user has a lot of discretionary ability, obviously the attitude and behaviour can make a difference, but in many situations like a refrigerator the user has almost no influence on the energy consumption so it really does not play a role. There are a few end users of services where attitude can make a huge difference, in other cases the energy consumption is almost determined as soon as you buy the device.²

Q433 Baroness Platt of Writtle: What is your assessment of the EU energy labelling system and what improvements, if any, would you like to see? How do EU product categories compare with those in other developed countries? You may like to refer

² The impact of behaviour on energy consumption varies widely. Behaviour affects energy consumption in at least two ways. The first is an attitude towards investing to lower future operating costs. Those operating costs include water, energy, materials and even services. Some cultures appear more willing than others to invest today to minimise future operating costs, but this may also be strongly influenced by policies related to labour, taxes and the environment. Numerous studies have shown that cost-effective efficiency investments could cut energy use by as much as 40 per cent with no change in services or quality of life. Behaviour can also affect energy use through the operation of energy-using equipment but the impact ranges from small to huge. For example, consumers are often urged not to open their refrigerator door as often. This measure actually has a negligible impact in refrigerator energy use. On the other hand, choosing to walk instead of driving an auto or lowering the thermostat in a home, have large energy impacts.
particularly to air conditioners, because you were quite critical of that at the seminar.

Mr Meier: Yes. First of all I did distribute a chart with three labels of a hypothetical appliance—

Q434 Baroness Platt of Writtle: This is for a refrigerator.

Mr Meier: The EU label itself is excellent. I think it is probably the best label in the world in terms of two features, first of all consumers understand it and they understand the direction of higher efficiency. Manufacturers, likewise, have the ability to distinguish themselves on this scale so that if they want to convey to their potential customers that they have a quality product, they can make themselves an A and the consumer will recognise that. The label has spread far beyond Europe, and it is used or is recognised in many other countries. But I think that making and maintaining an energy label is a dynamic process and one cannot simply make a label and then stop, it requires verification, enforcement and procedures for regular updates. The example I distributed illustrates the consequences of gaps in the procedures. In this case I think the European Union did not have sufficient staff or the independence to be able to do the reclassification. They had promised that the As would become Cs and the Bs would become Ds and so on, but they were not able to do that. I do not know the whole story behind this but it would appear that political pressure by the manufacturers was too great and so they were forced to create the A+ and the A++. If you are a consumer who looks at just the label on the left with the B you would think that you are getting just one step below the best, but the fact of the matter is that there is now an A+ and an A++. I think that that change greatly undermined the credibility of the labelling. I think it is repairable, but it really reflects the fact that the European Union lacked the staff and the process to do the upgrading.

Q435 Lord Lewis of Newnham: I do find this rather misleading because in fact if you look at the A++ and A+ and B and then look at the energy consumption and so on in the body of the label, the rest of it is identical. It seems to me that if you are going to be A++ then the energy consumption should be considerably lower than it is for a B product.

Mr Meier: You should not look at these numbers, it should not read 350 kilowatt hours; if these were real labels they would have different numbers.

Q436 Lord Lewis of Newnham: Then you are answering my question because certainly, when I went to buy a refrigerator, I took with me a little calculator and saw that by looking at that particular figure and multiplying it per year, although this was a more expensive refrigerator in fact over the year I made my money back.

Mr Meier: Yes.

Q437 Lord Lewis of Newnham: These other figures are tremendously important. What worries me about this present labelling system is that people do concentrate on that A, B nomenclature rather than looking at some of the other detail there which is really telling you how the thing is effectively working.

Mr Meier: But how many people bring a calculator with them, how many people know what cost-effective means?

Lord Lewis of Newnham: I think that is up to a good salesman.

Q438 Chairman: Mr Meier, I think we have kept you a very long time. If you have other things that you would like to say to us, particularly on this subject here, please not only feel free but we would welcome anything in writing from you, and indeed when you reflect on the discussion this afternoon, if there are points that occur to you that you wish you had made, please do write them in and we will of course publish what you write alongside just as we are publishing the oral evidence that you have given to us. May I thank you very much indeed for giving us a very interesting session of evidence and particularly for producing such interesting graphs and charts for us to look at at the same time, we are very grateful to you.

Mr Meier: It has been my pleasure.
WEDNESDAY 19 JANUARY 2005

Present

Broers, L
Lindsay, E
Patel, L
Paul, L

Perry of Southwark, B (Chairman)
Platt of Writtle, B
Taverne, L

Examination of Witnesses

Witnesses: Mr George Fullam, Head of Technical Affairs, and Mr Peter Evans, Senior Manager Environment, Europe (Sony), Intellect; Dr Guy Hundy, President, and Mr Ray Gluckman, the Institute of Refrigeration, examined.

Q439 Chairman: Can I welcome you very much indeed. Thank you for coming to give evidence to us this afternoon; we look forward to it very much indeed. Can I also welcome the members of the public who have come in, and just remind everyone that an information note about our interests and about the Committee is available for you. It means that we shall not read out our interests onto the record. Perhaps we might begin by asking you just to introduce yourselves for the record, as we are being broadcast, so that you each of you say your name and where you come from.

Mr Gluckman: My name is Ray Gluckman. I am a past president of the Institute of Refrigeration and I am representing the Institute business this afternoon.

Dr Hundy: My name is Guy Hundy. I am currently President of the Institute of Refrigeration and I am also representing the Institute this afternoon.

Mr Evans: Good afternoon, Peter Evans of Sony. I am representing Intellect here this afternoon, and I chair a number of working groups within Europe on energy consumption products. I work for Sony in design and development, looking at new technologies and how we can implement new technologies into products.

Mr Fullam: My name is George Fullam, I have worked for Intellect, the consumer electronics section, as my specialist subject, and I am here representing the manufacturing members of Intellect. I am going to do my best to cover both IT and consumer electronic services.

Mr Gluckman: Shall I start from the refrigeration and air conditioning side? We wanted to give a brief introductory comment about the whole of the refrigeration and air conditioning market because we think it is very important that you put air conditioning in perspective of that. About 75 to 80 per cent of the energy use of the whole of that market is in refrigeration, which would be things like cooling required in food manufacturing, chemical manufacturing, retailing of food and domestic refrigeration—so it is the whole of the sub-ambient temperature market. It is a mature market, it is not a growing market; efficiency of equipment is generally getting better so we are seeing absolute reductions in CO₂ emissions because of the maturity of the market and the improvements. The air conditioning market, which probably represents 20 to 25 per cent of the energy use of the whole sector, is a very immature market, as you have already implied. That market is dominated by the non-domestic use of air conditioning; we would estimate more than 95 per cent of air conditioning currently in the UK is non-domestic and less than 5 per cent is in domestic dwellings (possibly significantly less than 5 per cent, that statistic is not well-understood yet). In terms of market penetration, however, whereas, as I said, refrigeration is a mature market with 100 per cent penetration in many areas, in the non-domestic air conditioning market, although there has been significant growth in the last 20 years, still a relatively small proportion of floor space in the UK is air-conditioned—we would estimate about 10 per cent of non-domestic floor space, and that would be in offices, hospitals, education establishments, etc. Offices have probably got the highest penetration—maybe 15 per cent. In domestic dwellings, the market penetration is miniscule, less than one per cent of dwellings have got air conditioning—probably quite a bit less; less than half a per cent would be our best estimate. One general characteristic we would like to mention of both refrigeration and the air conditioning market is that in both those markets some very good equipment is available, the equipment efficiency is generally improving steadily.

Q440 Chairman: Thank you very much indeed. We will not introduce ourselves because we have our names up on the table in front of you so you can see who we are. We are very conscious that you represent two sectors, refrigeration and IT, including air conditioning, which we are very interested in. Both of you represent areas which are not only rapidly expanding now but are likely to continue to expand in the future, but it would be very helpful if each of your pairs could give us an overview of your projections for the development of this sector over the next 10 years.
and has improved enormously in the last ten years or so. However, there are barriers caused by the fact that end-users, often, do one of three things, which is either they buy very cheap equipment than the best that is on the market (that is very common), or, secondly, they often operate that equipment badly. There is a lot of education needed. I, personally, think it is this operational area that is the greatest cause for concern. Thirdly, they do not necessarily maintain the equipment in an optimum fashion. In terms of the actual growth—referring to your specific question on the air conditioning side—in the domestic sector, first of all, the Market Transformation Programme (and the BRE representatives, who you are meeting in another half-an-hour’s time, have really got better information than the Institute has on this)—although I am referring to some of their information) estimate a three-fold increase in the floor area of air-conditioned buildings over a 20 year period. If you work that back, it is a 6 per cent compound growth over 20 years, which is significant. The on-going growth is probably going to continue at that sort of level. In the domestic sector, we would estimate growth is probably rather higher in percentage terms but it is starting from a very tiny level. So, actually, in energy terms it is the non-domestic sector that, year-on-year, is adding more to the Kyoto emissions, as it were, but in the long term it is feasible that the domestic sector could change more significantly. There is evidence in, for example, the use of mobile air conditioning in cars. Ten years ago the penetration in that market was that probably about ten per cent of new cars at the luxury end of the market had air conditioning. This year about 75 per cent of new cars have got air conditioning. Having said that, there is quite a different characteristic. In cars the turnover is relatively short—we replace our cars every few years—and in a domestic situation it is quite complicated to retrofit air conditioning. So I would not expect dwellings to reflect mobile air conditioning growth, but it is something that we need to watch out for.

Q441 Chairman: That is very helpful. Thank you very much indeed.

Mr Fullam: I am not sure I can give quite such a full answer and quite such a clear answer relating to IT and consumer electronic products. As far as IT is concerned, as we have looked before at mature and immature markets, it is quite an immature market. In the same way, the improvements are being made for efficiency through smart design, and this is of course encouraged by the energy star regime. In the other direction, there are a lot more computers being used, particularly in homes, so we have got the immature part of the market meaning that more people are going to be using computer equipment year-on-year. As far as the positives are concerned, then, of course there will be more people hopefully buying online, and not necessarily going to shopping centres and filling up car parks when they make purchases. As far as consumer electronics is concerned, once again, there have been pretty good records of improvements in design. Some examples might be late in the 1960s when we first saw colour TV. The first colour TVs were usually 19 inch in size and they would consume something like 525 Watts. That was a typical value. An equivalent TV now with equivalent colour pictures will consume somewhere in the region of 60 Watts. You can see the improvements in design. What has happened in the other direction is that we have wanted larger screens, we have wanted more facilities—flicker-free—and sometimes even the flat, hang-it-on-the-wall type designs that I am sure you have all seen in the department stores. This improvement in design is not because the industry is particularly virtuous; the improvement in design is actually one of these things that benefits everybody. The improvements in efficiency give rise to lower temperatures inside the cabinets, which leads to more reliability. Once you have got the design established, because you can use smaller components, they are actually easier and cheaper to manufacture. That is why the power consumption has taken a downward trend, but it opens up another can of worms where we might talk about standby power because the remote control has become something of a standard requirement.

Chairman: Thank you very much indeed. That is very helpful to us.

Q442 Lord Patel: I am following up both those introductions. If we are talking about the expansion of IT and electronic equipment it could swallow up all of the energy efficiency gains. Yes or no?

Mr Fullam: No, I do not think so. The improvements in “smart design” caused a steady reduction in power consumption. I think that we are likely to see the improvements that we have identified up to now continue.

Q443 Lord Patel: So we do not need to do anything about it? We do not need to have any policies about trying to reduce—

Mr Fullam: We are doing something about it. The energy star initiative that came from the USA has been very successful in this area, bearing in mind that, for the most part, the IT industry is dominated by big players that produce world products, so we are looking at the international market. Energy star, of course, came from the States and was established and helped greatly by policies of public procurement in the States. I think it would be fair to say that it got the
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energy star system off to a good running start, and we are benefiting.

Q444 Lord Taverne: Really, to follow this up, what you are telling us is that the development of TV is really driven by a number of other factors, and energy was a by-product?
Mr Fullam: Yes.

Q445 Lord Taverne: You did not build the need for energy saving into the research programme, as such?
Mr Fullam: Well, that is not quite true.
Mr Evans: If I can come in here, certainly energy consumption is one issue that is considered as part of design. As George says, there are many factors that influence energy consumption, but energy consumption is one objective we have as producers in actually designing and developing products. For example, my own company has a target of reducing energy consumption by 10 per cent over a five-year period. So we do actually have targets and the drive to do it. The way we are achieving it is by miniaturisation and the factors that do improve the performance in some senses and, also, reduce the power that is actually making them more reliable as well. So it is a trade-off between that which we can achieve and that which is available and being developed.

Q446 Lord Taverne: How far does the same reasoning apply to air conditioning and refrigeration?
Mr Gluckman: I think, first of all, the industry as a whole makes a lot of effort to improve the efficiency of equipment that is available on the market. The Institute runs lots of conferences, and manufacturers are very conscious of energy consumption as a selling point of their equipment. However, I think there is a great need for intervention, because we have got this market that is immature, and three things will happen in this market: one is people will put equipment in because they can afford it rather than they really need it. So there is a question of: can we avoid people using it at all, particularly in this domestic end and in some office situations, where we have managed for many years without air conditioning? However, I guess, as we become a wealthier nation people want all these things, and the market penetration in the USA of air conditioning is very high indeed. So there is a need for some sort of market avoidance policy. I do not know how one develops that because it becomes a bit of a hair-shirt sort of philosophy, if you are not careful; nevertheless, I think it is needed. The thing that, really, I feel, is needed, is something about the way in which people operate the equipment. If I give an example of the possibility of a domestic building putting air conditioning in; if you think about it there are probably 10 or 20 days a year when it is really hot and you want to cool that bedroom down or you feel awful going to bed. If you put in an air conditioner for five or six hours a day for 10 days a year actually it would not have much impact on the energy consumption of the country; the problem will be that once you have got it you will probably use it 50 days a year or even 100 days a year, so it becomes an operational issue rather than an equipment efficiency issue. The same applies in the commercial sector. We see situations where, for example, a heating system will be on at the same time as an air conditioning system is on in the same part of the building because the control system is not good enough to do it. So there are technical solutions available but it is a hearts and minds issue to make people do it properly. I think we desperately do need policies to address those sorts of issues. Minimum equipment efficiency standards, yes, we need them, and they are on the books coming out of Brussels, anyway, with labelling schemes and so on, but it is that next level which is more difficult, I am afraid.

Q447 Lord Patel: You also mentioned equipment in standby mode, which might consume power, we are told, of between one and 25 Watts, but you do not have a solution to that. What should happen?
Mr Fullam: I was inviting some questions.
Mr Evans: If you look at standby, within the consumer electronics market and the IT market there is more work going on in standby and there is more operation of products going on in an active mode, whereby the product is in an active mode and is waiting for information to be downloaded over air and from other sources. We, as consumers, are becoming much more dependent on information being downloaded overnight—electronic programme guides are all being downloaded overnight, etc. So the reality of what producers are doing in terms of standby is that they are now looking at two methods of standby and they are looking actively at how they can wake products up at a specific time so that they can download this information. In real terms, to give you some data on standby, the industry has had a voluntary commitment on standby, and the average standby of a television set now in Europe is 1.7 Watts. We are targeted to get that down to 1 by 2007. So there are some active agreements that are on-going and will deliver low standby levels for products. There are also other agreements on standby, such as hi-fi, where, again, there is the same target of 1 Watt by 2007.

Q448 Lord Paul: What is the effect of potential expansion in your industries on energy use? All these things on which you have standby, where you have an
Mr Gluckman: I think that Defra is quite aware of this in their UK Climate Change programme. Obviously, they are worried about those bits of the market where energy could well go up, and, as Guy has said, in the air conditioning field it does look inevitable that the market growth will overtake the efficiency improvements. So Defra need to be taking steps—no question. However, we have good relationships and it is a very open and friendly debate usually. So that is good.

Mr Fullam: As far as Intellect is concerned, in the consumer electronics and IT areas, the Energy Saving Trust has a specialist group, the brown goods group. I am the Vice-Chairman of that group and my colleague here is the Chairman of that group, so we have a lot of contact with the Energy Saving Trust. We are also both members of the European groups that are creating voluntary agreements and codes of conduct for energy use, and we are fairly regularly in contact with the DTI and Defra with relation to the Market Transformation Programme. So we have quite good and also, I would like to say, quite friendly relations with these bodies.

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Mr Gluckman: Yes, work on energy use in the air conditioning sector is being done by BRE and the Market Transformation Programme. It depends on which scenario you take. Under present policies we could see an energy increase of something like 250 per cent by 2020—I am sorry that is without any improvement policies; under current policies it is more like 200 per cent. So this is mainly for commercial, non-domestic air conditioning because the domestic sector is still very small.

Q449 Chairman: Mr Fullam?
Mr Fullam: Forgive me, I missed the question.

Q450 Chairman: The question was about have you done any modelling of the potential expansion on energy use?
Mr Fullam: We have co-operated with the Market Transformation Programme by providing information, etc. There are one or two difficulties with trying to predict beyond the immediate future in the consumer electronics field. There are a couple of effects that have been put on the table. One of the effects is a thing called “convergence” where it is predicted that telecom, IT and consumer electronics may well come together. There are other ideas that products may remain in clusters in different parts of a household, where, rather than a family sitting around a single fire and a single TV, they might well go and watch their own television programmes or recordings in separate rooms. We are not really quite sure how this is going to go, and this makes modelling extremely difficult.

Q451 Baroness Platt of Writtle: What sort of contacts do you have regarding energy issues with Government, or with agencies such as the Energy Saving Trust?
Mr Gluckman: Certainly on the refrigeration and air conditioning side I would say we have very good contacts indeed—regular meetings with Defra, the DTI and the Carbon Trust. To date, the Energy Saving Trust actually is not doing very much on air conditioning. I believe they are considering some sort of domestic programme, but it probably, again, reflects the tiny market penetration. So it has not yet hit their radar screens, but I would imagine that will change.

Q452 Baroness Platt of Writtle: Do you feel the Government is taking note of the sort of statistics that you have told us about in the first instance—when you first came in?

Mr Gluckman: I think that Defra is quite aware of this in their UK Climate Change programme. Obviously, they are worried about those bits of the market where energy could well go up, and, as Guy has said, in the air conditioning field it does look inevitable that the market growth will overtake the efficiency improvements. So Defra need to be taking steps—no question. However, we have good relationships and it is a very open and friendly debate usually. So that is good.

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conditioning—and he needs air conditioning for many London buildings—but he does not want to pay too much for it. So he buys something of relatively low efficiency that does the job and then the tenant ends up paying the bill for the next 20 years but he had no influence on the purchasing decision. I think the way round that is that the Building Regulations need to go further into that sort of equipment to ensure that people are not allowed to put in inferior systems and inferior controls—this business of fighting heating and controlling controls.

Q454 Baroness Platt of Writtle: Are they labelled A and A+ and things?
Mr Gluckman: Not in that larger market, but coming on to the domestic market—

Q455 Baroness Platt of Writtle: I was thinking in the rented sector that you were talking about.
Mr Gluckman: No.

Q456 Baroness Platt of Writtle: Probably that would help, would it?
Mr Gluckman: There needs to be some form of rating system. I think it might need for that market to be more sophisticated than a simple rating scheme, but somehow we need to force people to look at it.

Q457 Lord Broers: No attempt has been made to do that? You could have a maximum power per BTU specification.
Mr Gluckman: Yes. I am not sure how far Building Regs go.
Dr Hundy: I do not have any specific information on the Building Regs scenario. I think there is a Directive going through on energy efficiency in buildings, but I would probably need to defer to the experts for that.

Q458 Lord Broers: I think that is something we should look at. As you say, it is the commercial air conditioning sector that is going to consume vast quantities of power, and if that is done in the way you suggest, which I think it probably is, is it not, in many buildings, then regulation could control that?
Mr Gluckman: Yes, I think there have been certain sectors that have been particularly bad. I am just trying to remember the name—I think they are referred to as “Information Hotels” or something. A lot of buildings have gone up with a lot of internet-based IT equipment; so internet service providers have buildings with tons and tons of electronic kit that gets very hot and therefore needs air conditioning, and some of the systems that have gone into those buildings have not been good, and they have certainly slipped through the regulations. It could be that commercial office buildings are already covered, and maybe some of the people giving evidence in a minute could comment on that from the BRE. At the domestic end of the spectrum, I think a labelling scheme, as Lady Platt was just talking about, is a good way to go, and the domestic refrigerator labelling scheme is a terrific example of how it can work. It was introduced about 10 years ago with labels A-G and then after a few years they banned E, F and G—they took the worst ones out of the market altogether—and they had to invent a label A+. So it moved the market in the right direction. It still does not address the hearts and minds problem, however.

Chairman: Of course, it also does not get over the problem that you identify in relation to the people who build the building. If you are building spec office buildings and you are not going to be using them, it is not to your advantage to buy the most expensive equipment.

Baroness Platt of Writtle: Unless it was in the regulations, of course.

Chairman: Of course, if it is controlled by regulation that is different, but there is no market motivation because somebody else is going to use it. That is very helpful.

Q459 Earl of Lindsay: Can I ask Intellect the same question?
Mr Fullam: There are two answers, really: one for IT and one for energy star. Lots of people that purchase IT equipment, because of the nature of the market, often research quite thoroughly what they are going to buy, and information relating to how much energy or how much power it consumes will be fairly well available, I am sure. As far as consumer electronics is concerned, there is an industry self-commitment that makes sure that prior to purchase potential customers have the opportunity to see three figures on energy consumption: with a TV product, standby consumption; consumption when it is on and yearly consumption. I think there is a Directive going through on energy efficiency in buildings, but I would probably need to defer to the experts for that.

Q460 Earl of Lindsay: This is a voluntary initiative?
Mr Fullam: This is a voluntary initiative.

Q461 Earl of Lindsay: How much take-up is there by the sector?
Mr Evans: There are 12 manufacturers currently signed up to this for CRT-bearing equipment; there are six manufacturers who have signed up for non-CRT equipment, which is flat panel products, which cover, roughly, in the CRT market, about 60 to 70 per cent of the total market. Again, this is on new products being launched on the market, so it will take a period of time to become on all products in that model range. In non-CRT equipment it probably covers about 40 per cent of the market. In terms of
non-CRT equipment, there are many more new producers coming into the market with products and as yet, we, as an industry, have not convinced them to sign up to this voluntary agreement. However, I would like to say, contrary to our colleagues in the refrigeration sector, certainly the industry is not supportive of A-G labels for TV products. The major reason why we are not supportive of the A-G label is because there are so many functions within the functionality of a TV that to actually be able to compare an apple and an apple in terms of a TV set becomes very difficult. As I say, there are so many different functions that affect the performance, such as 100Hz which gives you a flicker-free picture, the sound quality—these aspects that make the picture quality better do tend to impact on the energy consumption of a product. So what we are trying to do is make the consumers aware of what the energy impact is and get them to make a balanced choice on the features they wish to see. Also, we find that one of the problems is that the industry is moving forward very, very quickly with new innovations and we are finding that the A-G labels, particularly on things like refrigerators, are not necessarily keeping pace with the technology that is being developed. There is also the issue that consumers view stickers with disregard on many of the appliances, and the research work that has been done is that consumers, particularly of brown goods, are very concerned about them. We believe the only way we are going to succeed is with some form of sticker to make it more aspirational. For example, on a PC many people leave the “Intel Inside” sticker on the PC because it is aspirational. What we need to do is somehow get that sort of message to consumers; that they need to buy the product and not be ashamed because it has an energy label sticker on it.

**Lord Broers:** This is a very general question, as it were, as to what you are doing to improve the efficiency of refrigeration.

**Chairman:** Especially air conditioning.

**Q462 Lord Broers:** Yes, especially in air conditioning but across the board, I would say. It is not only efficiency, is it? I suppose it is more expensive to build a refrigerator that has higher levels of insulation and better closing doors, etc. Are you self-regulating in these respects?

**Dr Hundy:** I think the industry is always working towards higher standards of efficiency. As Ray has already said, high efficiency products are available, and I think the industry knows very well technically what has to be done to improve the efficiency. It is always a trade-off between costs and, eventually, you have to come to a compromise. So the key question is to encourage users or purchasers to invest slightly more on what can be, these days, very attractive payback periods, in terms of energy savings and reducing electricity consumption.

**Mr Gluckman:** I would certainly confirm that and there is a lot of research work and development work going on into continually improving the efficiency of the systems available. Compressors are getting better and better, pumps, fans etc, but it still comes back to persuading people to use the technology that is already available. We do not need R&D here, we need market uptake of the best that is available. Particularly in refrigeration itself, not air conditioning, bearing in mind refrigeration is 75 per cent of the market compared to air conditioning (and I am thinking here of industrial, big food manufacturing plants, ice-cream or whatever; I am thinking of Sainsbury’s and Tesco’s and so on—the big refrigeration plants that they have), there is room for improving them. Things are definitely getting better but there is no compulsion to do it; there are no regulations at all that would tell, for example, Tesco’s what level of efficiency they have to achieve. The recent increase in the electricity price has focused minds, and the Climate Change Agreement mechanism in the food industry has been tremendously successful at getting them back on the road to energy savings, but we probably need more of it.

**Q463 Lord Taverne:** What role can “passive” design play in reducing the need for refrigeration, or air conditioning?

**Dr Hundy:** This is passive cooling. Yes, I think it has a significant role to play. There are many occasions in the UK where the ambient temperature is sufficient to allow passive cooling to be done. The products are available and it is important, also, to recognise that passive cooling can play a role in conjunction with mechanical cooling. Products are available which will allow passive cooling to be used in addition to the mechanical cooling. However, these products are invariably more expensive than the straight mechanical cooling equivalents, and we come back to the trade-off between initial cost and operating cost making people reluctant to purchase those types of products.

**Mr Gluckman:** When you are designing buildings, particularly in city centres when you are trying to squeeze buildings in with high concentrations of people and IT equipment, and so on, within the building, obviously you need air conditioning, partly because of the sun heating down on the building—the solar gain (and that can be affected by passive design, but you have to take away a lot of windows, for example, on the south-facing side of the building)—but a lot of load comes from internal heat gains from the people and the equipment—IT, photocopiers, etc. If you pack people in, as you will in the city
centre, then air conditioning becomes inevitable, unfortunately, even in the winter time.

Q464 Lord Broers: Does your Institute cover passive cooling as well? Do you regard that as the same as refrigeration?

Mr Gluckman: We do not regard it as the same as refrigeration—

Q465 Lord Broers: You treat it the same but you compare one against the other?

Mr Gluckman: Yes. A good designer is trying to come up with the lowest cost and the most efficient way of cooling something. I mentioned that you air condition in winter time; it is very frustrating to see air conditioning equipment cooling the inside of a building to, say, 20 degrees when it is less than 20 degrees outside, but there are problems about bringing sufficient air through the ventilation system.

The other thing that, again, is an example of how you can overcook things, is if you picture going to a conference in an American hotel; how many times have you sat there with your jacket on freezing in the middle of summer? If they just had a thermostat you could take your jacket off!

Q466 Lord Broers: I have just come back from Singapore and I always insist on wearing jackets in Singapore, yet it is 100 degrees outside.

Mr Gluckman: Yes, it is crazy and it is a control issue.

Chairman: Can we thank you very much for the extremely interesting three-quarters of an hour that you have given us on that? You have certainly given us some very important statistics to work on, particularly on the expansion of air conditioning and refrigeration, and, also, on the work going on in the IT sector. Thank you very much for coming to talk to us.

Examination of Witnesses

Witnesses: Mr Paul White, AEA Technology, Mr Roger Hitchin, BRE, and Mr Robert Harrison, examined.

Q467 Chairman: Can we welcome our guests from the Market Transformation Programme? I notice that you have been listening to our earlier evidence—you must have been wishing you could chip in! Now is your opportunity. Can you, for the record, identify yourselves?

Mr Hitchin: Yes. My name is Roger Hitchin, I am the Technical Director of the Energy Division of the Building Research Establishment. In terms of the Market Transformation Programme, my main activity has been in analysis of the air conditioning market and most of our conclusions have been very ably presented by the Institute. At the moment, I am actually quite heavily involved with the implementation of the European Directive which will require the energy labelling of buildings. So I was interested to hear that came up in the previous session.

Mr Harrison: My name is Robert Harrison. Good afternoon. My background is that I am a senior scientist consulting now for what was the Consumers’ Association Research and Testing Centre. I am now consulting for the company that runs that centre but still tests for the Consumers’ Association, and I am Principal Scientific Consultant for the consumer electronics section of the Market Transformation Programme. In the years I have worked with the Market Transformation Programme a lot of my involvement has been in the outreach to various European activities, especially to the voluntary code of conduct committees and organisations in Europe supporting industry voluntary codes of conduct. I have made the link between the Market Transformation information base, what we see in terms of development and innovation, to influence European direction in that respect.

Mr White: Good afternoon, my name is Paul White and I am from AEA Technology. We are the contractor for the Market Transformation Programme. My role is that I have been involved with that programme since it has largely had sufficient funds to be able to apply itself directly to a wide range of products, both in the domestic and non-domestic sector of the UK. I am currently the Project Director. I would like to say that each of us are members of the Market Transformation Programme, but what we are doing today is offering our advice in terms of independent expert opinion.

Q468 Chairman: Thank you for clarifying that. Perhaps you could just help the Committee by giving us briefly an outline of exactly what the Market Transformation Programme is and what it does, how you relate to it (you have already mentioned that) and what your roles are within it?

Mr White: I will answer the main part of the question. The purpose of the Market Transformation Programme is to improve the eco design performance and, therefore, the energy performance of products over time. The key part of this is actually the development of product performance standards and information. That is the basis of the programme. All policy measures relate to those performance specifications. I think, however, the important aspect
of the programme is that it is international in its concept; in other words, the markets we are dealing with here are about international manufacturers. Therefore, we have a great deal of involvement with Europe and wider world developments in this area. Second is that we work closely, as you have heard, in stakeholder engagement—that is with the various trade bodies and retailers and so on. Therefore, the representations that come from the MTP are a commonly owned opinion about the current state of performance and the future state of performance. I think the main thing that the programme offers is the signalling of potential concerns and the opportunity to mitigate energy increments before they actually arise. So it is really about us encouraging innovation and competition in the area of product performance. In a nutshell, that is a short description of the Market Transformation Programme.

Q469 Chairman: Thank you. Can you give us a formal shape to it? First of all, where does the money come from? Who funds it?
Mr White: The funding comes from Defra and the DTI. I think, centrally, it comes from Defra's budget so that the programme is funded in that sense. However, very recently there have been some changes (actually just over the last few months) in terms of the sources of funding. One of Defra's five key strategies, the development of sustainable production and consumption, has led to and introduced a new budget group for that and, also, there have been receipts from the Landfill Tax providing some funds back in to support business, and through programmes like the Market Transformation Programme and others like Envirowise that is significantly increasing the opportunity we have to perform our functions on MTP.

Q470 Chairman: It has, presumably, a secretariat? It has a team within Defra, does it, who actually operate the programme, or who is responsible for it?
Mr White: There is a programme manager and a small team dedicated towards this. In fact, they are here in the audience today. The direction of the programme is particularly set by the priorities that we see in terms of the products, their impacts and their future growth. The policy initiatives are a mixture of those that take place that we can deal with here in the UK but, also, the international aspect of this cannot be underestimated. Therefore, Defra has a responsibility to inform and respond to policy developments at European Commission level.

Q471 Chairman: So, when you say “we” (forgive me for being stupid but it is difficult to get one’s head around this from outside)—you are all part-time and have other jobs to do—you are a committee, are you?
You meet regularly with the secretariat that carries out your wishes and does research for you and so on?
Mr White: We are not a committee, we are a consortium of experts. My own skills are from my own organisation, the AEA; BRE are part of that consortium and Bob from what used to be the Consumers’ Association—but it is much wider than that. We have a much wider consortium of experts, and the objective of that consortium is to provide the evidence to support the rational application of policy measures.

Q472 Baroness Platt of Writtle: May I ask a question? You were talking about the experience that you bring to bear—and then I found it difficult to hear you. Do you have experience in manufacturing yourselves?
Mr White: No.
Mr Hitchin: No, no. I am from the Building Research Establishment. We have very close links with all aspects of the construction industry but we provide expertise and management sort of skills; we do not build anything.
Mr White: Actually, I will correct what I just said—

Q473 Baroness Platt of Writtle: It must be very difficult to giving advice on innovation and competition when you have never actually done it.
Mr White: I wanted to say that I should just correct myself. I have been in the industry, particularly the semi-conductor manufacturing industry.

Q474 Baroness Platt of Writtle: You have?
Mr White: Yes.
Mr Harrison: I have an engineering background, a long association with the BBC, and as consultancies for various manufacturing companies in the electronics products field. So I am quite close to manufacturing.

Q475 Chairman: You know where the snags are?
Mr Harrison: Exactly, yes.

Q476 Chairman: Can I just return to what MTP chiefly does? You can commission studies and research, you can commission the output of posters or booklets or information; you can advise Ministers on policy areas. Can you give us some examples of what you actually do?
Mr White: I think that is best illustrated by an example and one of the better examples that the programme has to offer is the influence that we had over the development of the set top box. As the product came to the market the first thing that we did was to identify a problem; the second was to bring together the market players that were affected and could influence that problem; and the third was then to go forward and influence the direction of...
European policy to enable mitigation of growth of consumption from that product. Bob, would you like to explain a bit further about that process?

Mr Harrison: The mechanism, as Paul has said, was initially to scope and identify the impact of digital television and the set top boxes that would service digital television. We then had an outreach to industry; we consulted industry and we identified the key players, both in the UK and across Europe.

Q477 Chairman: May I stop you there? You said you had “an outreach”. Who was the outreach? Was this civil servants?

Mr Harrison: No, effectively experts within the Market Transformation Programme. I was considered one of those experts and there are two or three others, who would actually make contact with industry, through Intellect, who you talked to earlier, through various leading manufacturers in Europe and, more importantly, through the BBC and BSkyB and so on as the service providers who will be dictating much of the form of that equipment that would be going into the domestic environment. Having scoped the problem and identified what the potential impact of it was we then involved other players, key players, policy makers in Europe—obviously we had our own policy agenda for this sort of thing and we had our own digital development agenda in the UK—and from this we predicted what the impact of these devices would be and they came very, very high up the list of devices that would impact energy consumption in the UK. Our outreach then was to various European Commission initiatives to contain that energy through the SAVE programme, and so on, and then to fully support, with our evidence base and with our contacts with industry—and the UK took the leading role in this—a Code of Conduct which the Europeans put in place to actually set criteria for these devices—energy efficiency criteria. And the success of that has been that currently without that Code of Conduct we have seen between 0.3 and 0.4 extra Megatonnes of carbon going into the atmosphere today. So it was very easy to measure the outcome of that particular initiative.

Q478 Chairman: A final question from me before others come in to question you. You meet as the members—you call yourself the MTP—within the Consortium, regularly—once a month, once a quarter?

Mr White: We meet when it is important to have that meeting because up to date we have been insufficiently funded, we feel, to be able to enable the entire team to meet on a regular basis. It is quite a large team now covering over ten sectors of products.

Q479 Chairman: How many, roughly?

Mr White: Over 10 sectors; I think we are currently covering 12 sectors.

Q480 Chairman: So 12 people, 15 people?

Mr White: We work by means of sector managers who have specialist interest and expertise in those areas, but it is very much supported by information and the way that that information is gathered and maintained. So there is quite a large infrastructure of the team as well.

Q481 Chairman: And the infrastructure is in Defra, is it?

Mr White: No, the infrastructure is within the organisations that form the Consortium and wider experts where appropriate.

Q482 Chairman: But your organisations are given money by Defra to do that?

Mr White: Essentially, yes.

Chairman: I understand. Thank you very much, you have been very helpful.

Q483 Lord Patel: How do you measure the impact for these different sectors?

Mr White: The measurement of impact is based upon assumptions about sales and product, the degree of use of that product, its performance and the degree of ownership. So, for example, for TV sets typically we might say that there are two TV sets in a home, a large one and a small one; how many of those TV sets are sold annually, and the efficiency of those products today? That will give us a picture of where we are today and if we look at the sales of previous years we can work out what the current stock of TV sets is and therefore the total energy impact today. Also, and importantly, we make projections of the performance improvements that can be achieved with TV sets into the future and, together with our colleagues in the industry, make an assessment of the future sales of those products and the degree of ownership. So we have a set of assumptions and we build those into a model which gives us a prediction of the future energy consumption of that product, and those are the reasons why we are able to generate signals that areas of products are growing faster than others.

Q484 Lord Broers: Have you set yourself specific targets? What do you expect to achieve through the MTP between now and 2010 in terms of reduced energy consumption and carbon savings? And how does this compare to the government’s overall targets for carbon savings by means of energy efficiency?

Mr White: Our projections indicate that the growth of consumption from all products in, say, the domestic sector is such that even though there are potential reductions that are capable the overall
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Mr Paul White, Mr Roger Hitchin and Mr Robert Harrison

Effect is that there is... Let me put it this way, and start again. By 2010, if we were to do no more in terms of introducing policy measures other than the ones that exist today, in the domestic sector we estimate around 4.9 megatonnes of carbon could be saved.

Q485 Chairman: Could be saved?
Mr White: I am sorry, I am getting myself in a twist here. Let me start again. If we consider that no more policy measures were introduced the market would actually grow. The impact of policy measures that we propose for introduction would actually reduce the growth of carbon by about 4.9 megatonnes.

Q486 Lord Patel: Wait a minute, would it reduce or would it be that it will not increase by another 4.2 megatonnes?
Mr Harrison: If I may interrupt Paul, I think the best word is mitigate. There may well be an increase, for example, if the trend to large screen televisions continues, and there is no dramatic innovation to control their energy consumption—but the likelihood is from what we see there will be new technologies which do do that—but if it continued, say, on a plasma screen trend then there would be a dramatic escalation in energy consumption for the same stock of product in UK homes. What we would hope to do, if that trend went on, would be to identify innovations in energy efficiency applying to that technology and influence industry directly and through Europe and through other mechanisms to actually bring in that innovation to reduce the energy trend. So it would be a mitigation.

Q487 Lord Broers: Do you sit down and analyse how to be most effective in this? You choose your sectors according to how much you think you are going to be able to save, do you?
Mr Harrison: Our analysis—and I am really referring specifically to electronic products—if the same technique applies is to actually identify the risk areas, and in identifying the risk areas prioritise them, both from the scope of the work we have to do to influence them and from the efficacy of immediate action. In other words, if we can be as proactive as possible we are in a specific area. We gave an example, for example digital television set top boxes, where we could see a dramatic escalation in a very short time—that was well predicted—and any proactive work we did in 2001 and 2002, that short a time ago, has had quick returns.

Q488 Lord Patel: In what way?
Mr Harrison: Reducing carbon impact. For example, the BSkyB platform—and BSkyB are the biggest service provider at the moment with almost eight million homes using their technology and their hardware—without involving them within the European Code of Conduct, taking them on board and influencing them to be proactive in that field as big procurers, the average hardware for that contract would still be consuming 27 watts continuously. That is the average power consumption. That is now down to between 12 and 15 watts. So you can make a significant impact very quickly involving the right people and the right parts of industry proactively and using the right policy tools, whether they are voluntary or mandatory through Europe.

Q489 Lord Patel: My question to follow on is related, and we saw the Government’s Energy White Paper having the first target of domestic reduction in carbon of 5.2 megatonnes of carbon. That was downgraded to 4.2; why?
Mr White: Defra has already offered advice directly on this. It is a combination of two things, as I understand from the information I have gathered. About half of that is due to the fact that there is a change in the technical assumptions that were used for that projection, so things like the degree of comfort cooling that may be taken by 2010 compared to not; what type of lighting was used in those assessments. The other part was to do with an assumption about the energy efficiency commitment and the fact that it is doubling now and might triple in terms of the funding provided towards it in 2008, and that is no longer the case so the adjustments were made according to that.

Q490 Lord Patel: In your role, in contributing to that reduction you have already mentioned about looking at domestic appliances, but is there any other role? For instance do you get involved in what we heard earlier on about changing the behaviour of consumers?
Mr Hitchin: First of all, let me say that Ray Gluckman was absolutely right, particularly in the air conditioning sector, that we know that the typical air conditioning system uses about twice what a well managed system uses, so there is a big potential there. And in projecting various scenarios into the future as to what impact different policy measures might have, we have taken that into account. So to that extent, yes, we have identified the potential. It is far more difficult, as I think was clear from the earlier discussion, actually to identify policy measures. You can think of them, for example exhortation, extra taxation, mandatory energy surveys if you are a poor performer. They are much more difficult issues to turn into a real practical policy, and the role of the Market Transformation Programme in terms of policy is to say, “If you did this, this is what we think the results will be.” It is for the government to make policy of course.
Q491 Chairman: Just following on from that, do you do any work or do you commission any work to measure how much energy is actually used by people, the behavioural side of this, as opposed to what is predicted by the manufacturer or the builder or whatever?

Mr Hitchin: Yes. This is mostly work which is outside the Market Transformation Programme, I would say, but feeds into the programme. The programme basically will take any information that is available, draw it together, produce a projection and then put it out in the public domain and say, “Does this seem reasonable or not?” On the air conditioning side I was involved with a project that finished about a year ago, which was a combination between a university, some funding from the Carbon Trust and some funding and effort from National Grid, who all had different reasons for being interested in how the energy demand from air conditioning was actually changing, and what was actually happening in buildings rather than what we calculate. We monitored the consumption in a lot of detail in 34 office buildings, especially in the air conditioning consumption, and showed that, as the calculations had already suggested, there is an awful lot of wastage there and the way systems are operated in particular is typically very wasteful.

Mr White: I would like to add to that by saying that currently we are doing quite a bit of work analysing consumers’ behaviour with things like IT and refrigeration equipment, with data logging equipment so that we have a good way of analysing the day to day use of the equipment, and therefore will build those assumptions into our scenarios for our products. Equally, we do testing as well on products, actual product performance, so that we have a good gauge of the spectrum of performance of products in the market. Do you want to add anything to that, Bob?

Mr Harrison: When we are looking at the testing of product energy efficiency performance we try to encourage the use of and access to data bases produced by consumer testing organisations—not because I am associated with them necessarily, but at an international level as well as a UK level, so that we have a much better idea of how the device is used by the consumer rather than how the device performs under a test standard, and the two are very different.

Q492 Chairman: Indeed.

Mr Harrison: Going back to the general point of how in other ways we assess consumer habits and use of the equipment, when we see the opportunity we encourage projects, which are not necessarily directly involving us, by bringing parties together. For example, we suspected that many set top boxes that had a standby mode—digital sets—were never put into standby, because once the TV went off a different remote control would have to be used to switch off the set top box. Incidentally, this applies to DVD players, VCRs and so on. Powergen were interested because they have a commitment to generally reduce or at least to understand where electricity is used in the home, and they, with BSkyB, prompted a very large survey of all of BSkyB users—I think some two million homes—and confirmed that some 60 per cent of these devices were never switched off. So we were the catalyst to say, “Yes, go ahead, you must do that, there is a vacuum of information here and that will be very valuable for our projections, and so on.” So in any way we can we try to act as a catalyst for that sort of external study that gives us a better insight into consumer habits.

Q493 Chairman: Do any of you look at the practice in other countries? Do you find any useful lessons for us in your contacts with people from other countries?

Mr White: First of all, we are very much involved, as you have heard, in international activity, particularly at the European Commission level. We are aware and we are informed by different approaches to policy and different environments, but they do depend very much upon the commercial arrangements within those countries. I think the main point that we see is that the direction of policy has to be such that it has to have a large international context because that is the way that the manufacturing organisations are arranged, and therefore collaboration internationally is extremely important.

Q494 Lord Broers: In summary here, what do you see as the main threats in terms of domestic energy usage, to meeting the Government’s targets for energy efficiency? We have heard from both the IT and refrigeration industries this afternoon, but what do you expect to be the impact of the likely expansion in these sectors and how are these issues being addressed?

Mr White: First of all, these are two key areas and both of these represent areas that are emerging and currently not saturated markets and therefore the potential for growth and the impact of that growth is significant. Secondly, there are the growing economies outside of the UK where products are manufactured, particularly places like China, where there needs to be some influence over the direction and growth of the product as it is produced in those countries as there is likely to be significant growth in imports to UK in the future. I would like both my colleagues individually to introduce points in connection with the question.

Mr Hitchin: You heard quite a lot about the air conditioning sector from the Institute earlier, so I will try not to repeat what they said, except to say that I would underline perhaps that we are talking about a situation where efficient technology already exists. In
North America or the Far East there are minimum mandatory efficiency standards for air conditioning, and probably something like 30 per cent of the equipment that is sold in Europe would fail to meet them. So it is not a question that we need new technologies so much as motivating the purchasers actually to want to use them. I think the manufacturers actually would not be particularly resistant to mandatory requirements. I talk to manufacturers quite a lot and it seems to me that they have two worries about mandatory minimum standards. One is that they may not apply to everybody—if they apply to everyone it is a level playing field. Secondly, that they would need some time to adjust their product lines to meet them. Interestingly—and referring back to the last question really—for most air conditioning products we are talking about a European market—the UK is 10 per cent of the market, so most worthwhile manufacturers are not selling to the UK specifically.

There is a European-wide trade association called Eurovent, which already has a voluntary independent performance testing process, mainly to deal with issues like imported goods making claims that they cannot fulfil, so they (Eurovent members) are able to say, “Buy from our members, you are going to get what we say.” They have introduced voluntary—it is not exactly labelling but the equivalent of labelling for air conditioning chillers, and they have announced that from next year no product which falls below a certain level will be eligible for certification. Since they insist that manufacturers do not pick and choose which products to have certified it means that Eurovent members will in effect be prohibited from making products of a lower than specified standard. It ties together a number of issues really, about where we are going and what can be done. Just to finish off the point about growth, the driver, as you have heard already, for air conditioning energy use in the UK is certainly in non-domestic buildings in the commercial market—the floor areas are so large and increasing at such a large rate that this overwhelms the domestic sector. There are measures in place which will improve the efficiency. Our projection was that in 20 years if there were no measures in place the carbon emissions would increase by a factor of about two and a half of what they are now.

Q495 Chairman: Really?
Mr Hitchin: The measures which are in place, are partly through building regulations, European directives and things that I have just talked about, will reduce that to a growth factor of about two, and we could see what we thought were plausible technical requirements, mostly mandatory standards, which could reduce that to a factor of about 1.6. Beyond that you are in this difficult area of getting people to use the systems sensibly, which is probably the biggest potential but the most difficult one to hit.

Q496 Chairman: You are still talking increase rather than decrease?
Mr Hitchin: Yes, it is almost impossible to see how the increase can be completely flattened. You can always think of a way you might do it but it becomes ever more difficult to believe that it is possible.

Mr Harrison: Briefly, the main threat is definitely the convergence of entertainment equipment with IT equipment. You hear the BBC every day asking people to listen to radio programmes again, using their PC, through the Web and so on. The implications for this, as PC equipment becomes multi-media, great. However, there are a lot of mitigating factors which we want to encourage and flag. That is that the PC has one great advantage over a simple television or a simple radio, and that is that it has power management, and I think the term you will hear much more about is power management, where complex devices which have multi functions—PC and multi-media devices converged—can actually reduce their power to the minimal level for the function required at the time. This kind of intelligent power management is something that we are actively promoting and in which we are involving ourselves in the Market Transformation Programme, and will be the one thing that contains what could be a very dramatic and uncontrollable escalation in domestic electronic product energy consumption.

Q497 Chairman: Do such products already exist or are they still at the design stage?
Mr Harrison: You will be seeing—and certainly in Germany I know they have seen them already—merged LCD televisions with very full specification PCs at the same price as the same size LCD television. So it will be coming very soon. It is very important that we catch and are proactive with this kind of technology, and I know that the manufacturing base through Intellect and certainly through EICTA, the umbrella manufacturing organisation in Europe, are very keen to look into this and help with it.

Q498 Lord Broers: There is an unfortunate circumstance with PCs though, is there not, that desk tops are the cheap PCs, the highest performance PCs, but of course they consume very much more power than the laptops, which are more expensive, so it works the wrong way around, does it not, to a certain extent?
Mr Harrison: It is quite interesting, in talking to procurers for office equipment, that if a desktop PC of middle to high performance is required the combination of its cost with the cost of an LCD screen is rather more than a laptop of similar
performance now. In fact, if you look at the way that office equipment procuring is going the trend is that there are more laptop devices being procured, which are docked at the desk in the office and then taken home or whatever. So I think the trend is away from that. And we have also seen, again really through studying innovation and identifying energy efficiency trends in PCs, a move of the type of processor technology and architecture that is in a laptop to desktop PCs, and I think one can see in the not too distant future the two actually being identical in terms of energy efficiency performance.

Q499 Lord Patel: The cost is the LCD screen, the higher cost is the LCD screen?
Mr Harrison: Except that industry now, because of the production volumes, is driving those down drastically.
Chairman: That is all very fascinating. Thank you very much indeed. I am very grateful to you for coming to talk to us. Obviously the work you are doing is very central to our inquiry, so it is very good, particularly to understand exactly what MTP is and what it is doing, and we wish you very well.
WEDNESDAY 9 FEBRUARY 2005

Present
Broers, L
Lindsay, E
Patel, L
Paul, L

Perry of Southwark, B
(Chairman)
Platt of Writtle, B
Wade of Chorlton, L

Examination of Witnesses

Witnesses: Dr Martin Wyatt, Chief Executive Officer, Building Research Establishment, and Professor David Strong, Managing Director, BRE Environment, examined.

Q500 Chairman: We welcome from the Building Research Establishment Dr Martin Wyatt and Professor David Strong. Thank you for coming along to talk to us today. This is an opportunity to put on the record our thanks to you for having welcomed us on our visit to the Building Research Establishment, which has been one of the finer areas of our visits. We are very grateful to you for coming. For the record, because we are being broadcast, will you identify yourselves?

Dr Wyatt: I am Dr Martin Wyatt, Chief Executive of the BRE.

Professor Strong: I am Professor David Strong, Managing Director of BRE Environment.

Q501 Chairman: When we visited your establishment late last year you told us that you had some concerns about the funding of applied construction research. Can you tell us what is the current position with regard to government funding of research, and what are the implications of the fall in funding by the DTI for the future of the Building Research Establishment, and more generally construction research in the UK?

Dr Wyatt: If I may, I would like to go back in history a little bit, because not all of you will have come to the BRE, and it is useful to set the scene. We go right back, I am afraid, to the Great War and immediately after the Great War when BRE was set up in order to find solutions to the lack of basic materials, and homes for heroes and all that sort of thing. It formed a model which was actually copied around the world, and in almost every country in the world you will find an equivalent of BRE, and I will come back to that. The reason we exist, and these other institutes exist is really that governments around the world accept that construction is an industry that is rather different from other industries. The key issues are fragmentation of the industry, with 3 million employees spread across 350,000 businesses—so a very small average size of business. There are very low barriers to entry; anybody can set up in construction; you do not need much capital. There is a lack of major players. The largest company in construction has less than 2 per cent of the market. We have no Rolls Royces, no Airbus Industries. The life of the asset is unique. If we build something and it does not last, then generations to come have to look at the consequences of that failure. It is improving, but buildings are often purchased on a lowest-priced basis alone, and thus whole life issues often are not considered. Also, government is our largest customer; it buys 40 per cent of the output of the industry, and around 40 per cent of government expenditure currently is spent on building assets.

Q502 Chairman: You include local government as well as national government.

Dr Wyatt: Yes, all aspects of government. Currently they purchase around £36 billion worth of construction assets per annum. Construction is essentially organised around projects, not around product and manufacturing. So it has great difficulty in improving its product and in organising itself in a way in which research can be funded and carried out. Governments around the world provide applied research support, usually through a levy or direct grant, in partnership with industry so that the construction industry can improve its basic technologies on an ongoing basis. Also, from the self-interest point of view, government can get best value out of that huge amount of money it is spending with industry, to help the industry develop research capability and careers of researchers and all this sort of thing as well; so there is a research infrastructure which otherwise would not be there. In the UK, this has mostly been done through what is called the research and technology organisations, the RTOs, of which BRE is the largest but not the only one—there are perhaps six in our industry. We basically sit between the industry at one end and the universities at the other end, and we translate basic research knowledge generated by universities into applied tools and methods of improvement and techniques and processes, and then we interface with the industry, which is generally quite low technology, on the other side. That, if you like, is the knowledge chain we work in, and that is the context of government support. This method of working continued right through from 1925 until 2001. Obviously, government would want to review
periodically how it is giving money in grant aid, et cetera—first, that the need continues, and secondly that it is getting value for money. In 2001 the then DTLR asked Sir John Fairclough, who was a previous Chief Scientist under Mrs Thatcher, to look at both of these issues. In 2002 he reported. Unfortunately, there had been an intervening election in June 2002. Immediately after that election it had been decided to move the department in government that carried out this sponsorship role from what is now ODPM to the DTI, on the basis that construction was an industry like any other industry, and why was it not in the DTI. We ended up under the sponsorship of the DTI. The DTI was going through its own travails at the time, in terms of the criticism that it ran too many disparate applied-science research support schemes. The DTI has basically come down with a view of the world that says “we will have one programme of research and all industries may benefit from that programme”. The problem with that is that the programme of research they have chosen is very much at the hi-tech end, so we are talking nanobots, advanced brain drugs, and all sorts of things which are at the break-through science level, which the DTI assess, probably quite rightly, will lead to step-changes in the way technology is deployed. The problem is that all of that is pretty irrelevant to the construction industry. The construction industry improves really through incremental steps and through the translation of best practice into actual practice, and at a quite a slow pace. That may not be good enough, but that is how it works in practice. Sir John Fairclough’s report came to the conclusion that the funding level should not be any lower than it was, and taking the size of the industry in comparison with other industries, it was at a very low level already—at the time about £25 million per annum. He recommended that perhaps three or four major centres of excellence be set up, multi-disciplinary, funded for five-years, on the basis of “as long as you do not screw up, you get refunded at the end of five years”. You cannot invent capabilities out of thin air; you need to train people and offer them careers, et cetera, so some form of stability had to be offered if we were going to bring good scientists into these important areas. Finally, he said that the research agenda should no longer be led by government; it should be led by industry. In other words, the research being done should be that which the industry considered was important, not what some civil servants decided was important for the industry. I have to say that none of these things have happened, or are planned to happen, or are likely to happen, as far as I can see. Broadly, the Fairclough report has been kicked into the long grass, because it was simply diametrically opposed to the then thinking in the DTI. The DTI are pretty determined to treat the construction industry as though it were any other industrial sector, so we are simply told we are as welcome as the aerospace industry to bid in to the nano-technology programme, and if that is unsuitable, that is hard luck. I do not particularly want that to sound like a criticism of the DTI though. In the context of what the DTI is doing, that may be right. The issue for government in the wider context is, who is going to pick up the other 85 per cent of the issues which are now excluded? We found ourselves in a position where the construction industry is regulated, leant upon, involved with, by 13 departments across government now. There is no focal point at all for a relationship between the wider interests of government, be it the improvement of the industry or producing more energy efficient schools or hospitals, or anything like that, and industry. That sort of focal point has gone. I have to say that we are now really the only country in Europe—with 21 equivalents across Europe—and there are equivalents in Canada, Australia, New Zealand or wherever—we are the only country in the world where there is no co-ordination of an applied research programme working with the construction industry to improve the industry. As far as I am aware, there has been no policy decision, no policy announcement, and no consultation with the industry. All that has happened is that the portfolio has moved from one department to another, and 85 per cent of it fell down the crack in the process. Nobody is rushing and putting their hand up and saying, “we want to own that”. You then asked about the implications. Shall I pause there and take questions on the history?

Q503 Baroness Platt of Writtle: I do not want to stop you in full flow, because I am just as worried as you are, but I just wondered whether you had seen the report of the House of Commons Environmental Audit Committee which came out on 19 January this year, where they are saying “we need joined-up government”.

Dr Wyatt: Yes.

Q504 Baroness Platt of Writtle: There is John Prescott saying he is going to build all these houses, and unless there is somebody like you who is really going to look at the energy savings and energy efficiency of those houses, particularly affordable housing—and we were given evidence that affordable housing is the least well served in terms of saving money—it seems to me very important. It does strike me that this report might help you, and also possibly Margaret Beckett might help you. You do need it to be co-ordinated and joined-up, and they say that. I thought that might help you.
Dr Wyatt: Thank you very much.

Q505 Lord Patel: Why do you think there is such a vacuum of policy? What is your perception?
Dr Wyatt: My perception is that it is probably a very simple one, and that is that the ODPM had this bit taken off it, and put into the DTI—not at its behest as far as I know; it just happened. The ODPM takes the view that the money went with it, and it is now the DTI’s responsibility to do these things, not the responsibility of the ODPM. Other departments—and Defra is a major player in this potentially—we have never been their responsibility, and we are simply off the map, off their agenda. I do not think it is just a mistake.

Q506 Chairman: A key moment from the story that you told so cogently was when somebody decided that the construction industry was exactly like every other industry and could go into the DTI’s industry programme. As you say, they really neglected to observe that the nature of the industry was very different from many others—not all but many others—and that you were providing that link between the academic and the practical, so to speak—the industry’s own needs for applied research.
Dr Wyatt: Yes.

Q507 Chairman: The Building Research Establishment did fund research in universities, did it not, or fund research posts in universities?
Dr Wyatt: Half of the answer to the question is that we were privatised in 1997 on the eve of the election, in fact the last privatisation. We are owned by an educational research charity now and we are run as a business and make profits, and they gift-aid it to the charity. The charity then spends money on research. Part of that is that it currently pays for some 22 postgraduate students to study at various universities around the country along with BRE, so we pay for an awful lot of the doctoral work going on.

Q508 Baroness Platt of Writtle: Does your industry pay in, because obviously that was part of Fairclough, was it not?
Dr Wyatt: Yes. We receive—does the industry pay in? Only in quite a small way.

Q509 Baroness Platt of Writtle: Could they not pay more in order to make sure that you are better funded?
Dr Wyatt: In a sense that is not a question for them, but the problem fundamentally is that protecting IPR in the construction industry is extremely difficult, so no one company is likely to spend a lot of money in developing a new product or a new technique if it can just be copied next day.

Q510 Chairman: You have had some problems with a lot of tiny industries.
Dr Wyatt: Yes. There are not many big players anyway.

Q511 Baroness Platt of Writtle: I meant as a sort of subscription, because they might be just as anxious to get the research done, surely?
Dr Wyatt: Indeed.
Chairman: Not if there are so many thousands of tiny companies, which—

Q512 Baroness Platt of Writtle: Well, they need it to keep up to date, do they not?
Dr Wyatt: A company is unlikely to spend money on research unless it gives that company some particular advantage in the market place, and that mechanism does not work in our arena. It is not quite as bad as that. Several of the RTOs are membership based: BSRIA, CIRIA, TRADA and several of the smaller ones are membership based, and they do have limited funds, a few million pounds perhaps in aggregate, which is gifted from industry to address common issues. There is a degree of that. It is never going to be, in my view, a significant sum of money. Industry in the past has in general provided 50 per cent of the funding. Basically, unless it is in pursuit of government policy, government cannot give 100 per cent of the funding research anyway; it is limited to 50 per cent under state-aid rules. Industry in general will be very generous with its time, with materials, knowledge and expertise, and we have never had any difficulty getting that 50 per cent out of industry; but cash is very difficult to get out of industry in that context. The question then is: what are the implications? There is now no programme of applied research being undertaken in the UK in order to keep our construction industry up to date. It is as simple as that: there is not one. That means that UK designers and constructors no longer have access to independent advice to enable them to take up new technologies or to understand and implement them, including obviously in energy-efficiency areas, which is very technology-driven in that sense. We should not forget that the UK design industry is renowned world-wide for its capabilities; it is the second largest invisible exporter after finance. We, as designers, generate £3.8 billion of export income in a year—or that was in 2000. We do that from a position of a strong education system, and in the past a strong technology transfer route for university information and into the market place. That support has been withdrawn from a major exporting sector of the industry as well. At the end
of the day, if we are going to prosper in a world where we are not going to be great manufacturers, then we have to support those industries which are basically exporting IPR knowledge and skills. To give you a very straightforward example of what is not happening, we see that some of the new schools that are being built are not very good; in fact we are already investigating ones that are failing. The reason, at least in part, is that we have not built a lot of schools for a generation, and now we are going back to the industry and saying, “build us lots of schools and hospitals very quickly”. Because we are a project-based industry, knowledge goes into the system and is lost from the system quite quickly. If we are not publishing a steady stream of guidance, advice, et cetera, out to the industry, then that knowledge is rapidly lost from the market place. We are seeing schools with very poor acoustics. Acoustics are very important in schools—children smell, and so you have to have good ventilation; and then you have problems with making the acoustics work simultaneously. Areas like that—the sort of advice which traditionally would have come out of us into the industry, I am afraid, no longer is going to happen.

Q513 Lord Paul: Are some of these construction issues budget constrained rather than design constrained—they know what to do but on the other hand they cannot afford the cost? Dr Wyatt: We are not convinced of that. I think even within a budget constraint there are good ways of doing things, and there are poor ways of doing things. Very often, you can get 80 per cent for no more money. It is not a matter of money; it is often a matter of knowledge and skills.

Q514 Lord Paul: As you mentioned, you were privatised in 1997, and we understand that your funding had fallen from 95 per cent to 40 per cent as far as the Government is concerned. Dr Wyatt: Yes.

Q515 Lord Paul: What alternative resources have you found, and can you give some idea of the amounts? Dr Wyatt: The balance really arises from two main sources. The larger chunk, which I think is probably 60 per cent of the gap, is from private industry. We have been very successful in growing business based on our knowledge base and research history, and our researchers, in the area of advice, testing, certification, and some research. We still do some contract research for industry, although it is probably only 5 per cent of that. The remainder comes from quasi government bodies such as the Carbon Trust, the Energy Saving Trust, and the regional development authorities, which are becoming quite significant. That is not programme research to increase the knowledge base; it is basically short-term, technically related programme support at a professional level.

Q516 Lord Wade of Chorlton: You have talked a lot about percentages but can you turn them into figures? How much are you claiming now; how much did you get before; and what is the drop in figures? Dr Wyatt: The drop in research figures is about £16 million.

Q517 Lord Wade of Chorlton: £16 million a year. Can you tell me how that compares with the amount of money that the Government is putting into the new Energy Research Centre? Professor Strong: The funding for energy-related research of course goes through a number of routes, so it is difficult to be specific. The Carbon Trust has its own research programme for instance: the Energy Research Centre does, and so on. The principal issue here is that much of that funding finds its way through the EPSRC into universities, and it funds some degree of advanced science pure research. The missing bit of the jigsaw is applied research, as Martin was saying—the transfer of best practice.

Q518 Lord Wade of Chorlton: We have taken evidence from the Energy Research Centre that they are now a virtual centre that is being funded directly. Do you happen to know how much they are being funded by and how that might compare with what you have dropped? Professor Strong: I do not have that. Dr Wyatt: Nor do I think they are related in any sense. David and I were discussing this in the taxi coming here. We are unaware of any applied technology guidance to the industry, to architects and engineers et cetera, which has ever emanated from a university. So even if the money is now going to universities—

Q519 Lord Wade of Chorlton: I was not asking the question because I was worried about what you were doing with the money; I was worried about what the other people are doing with the money. I wanted you to identify what the actual amount of money is that has swung from you to alternative energy research which might not be as effective. If you could find the answer, I would be grateful. Professor Strong: I am not sure there is an easy answer to that, simply because the funding for the Energy Research Centre has in essence re-packaged existing funding, which would not traditionally have funded construction-related research. It is funding that would have gone through EPSRC, and through
the other research councils; but it is presented in a new way. We cannot quantify that, and there is no direct parallel.

**Q520 Chairman:** When we had evidence from the Energy Research Centre we did ask them about their sources of finance, and the answer you have given very much matches with what they have said. They were not exactly getting new flows of funding but because they had been designated they were able to go with that flag, so to speak, to EPSRC and other sources.

**Q521 Baroness Platt of Writtle:** Can you describe the main characteristics of the Building Research Establishment Environmental Assessment Method and its domestic equivalent EcoHomes? What part does energy efficiency play in those two, and in assessing energy efficiency do you look at building design or performance, or both perhaps?

**Professor Strong:** BREEAM, the Building Research Establishment Environmental Assessment Method, and its sister method for housing, EcoHomes, is an environment assessment method for buildings. They focus on nine key environmental factors affecting a broad range of sustainability issues in the build environment. A key factor is operational energy, in other words how energy efficient buildings have been designed to be, but they include transport, health and well-being, water, materials—the embodied energy within materials, which is a key issue; land use, ecology, pollution, and in the case of non-domestic buildings, building management—power, and how easy the building might be to maintain. BREEAM and EcoHomes have been developed over a period of about 15 years, with very significant funding not from government but from a very broad range of key stakeholders. For instance EcoHomes was funded by NHBC. We have worked with a broad range of organisations to provide what is in essence a consensual tool, which is intended to drive standards beyond Building Regulations. It has been very widely adopted. Initially, the scheme was launched just for offices, BREEAM for offices, in 1998, and it is now estimated that about 80 per cent of all new office environments have a BREEAM assessment. This is greatly assisted by the Office of Government Commerce, which now requires all government procurement to have a BREEAM “excellent” rating. But for housing, it has been adopted by English Partnerships, by the Housing Corporation and so on, and as a consequence in the social housing sector about 40 per cent of developments have an EcoHomes rating. It is also interesting to reflect that BREEAM and EcoHomes have been adopted in essence world-wide. The experience we have built up in the UK has been copied, and they have learned from our experience.

There are variations in Hong Kong, Australia, New Zealand, America and Canada. They are all modelled on work that was done here. As far as energy efficiency is concerned, the way the credits are built up within EcoHomes and BREEAM at the moment, the single largest component of the rating is the energy efficiency of the building. The housing is assessed using the standard assessment procedure, which is part of the regulations, and there is an equivalent approach for non-domestic buildings. One of the key issues and key points of contention since BREEAM and EcoHomes were developed was that in theory it is possible to get a BREEAM or EcoHomes rating of “excellent” by doing no better than Building Regulations demand on energy. I have to say that it would be extremely expensive in terms of investments you would have to make in the other measures for that to be possible. But we have recognised that one of the key recommendations from the Sustainable Buildings Task Group last year was that for energy, water and waste, there should in essence be non-tradable credits within EcoHomes and BREEAM, which would guarantee standards for achieving an “excellent” rating, better than Building Regulations would achieve.

**Q522 Lord Broers:** This question relates to what were you getting at there. We want to ask you what your response is to the Sustainable Buildings Task Force recommendation that the Government should establish sustainability that goes beyond BREEAM in setting minimum standards. Those of us who went to Sweden were favourably impressed when we went to see a house that was so well insulated, and with heat-exchange ventilation that it required no heating system whatever, even in the Swedish environment. Is there a thought of going beyond BREEAM here?

**Dr Wyatt:** Firstly, we welcome the recommendation for the adoption of BREEAM and EcoHomes. We are now engaged in dialogue with officials at the ODPM on this and have made a proposal to them about how BREEAM and EcoHomes might be adapted to meet their objectives. The exact level that they intend pitching this at, i.e., where up the BREEAM scale—pass, good, very good, excellent, or beyond—I do not think we know. We would say that the cost is obviously an important issue, and one that the Treasury is interested in as well as house-builders. This is a very difficult area. I am sure the officials are juggling many difficult issues simultaneously here, particularly as at the end of the day they want a standard which consumers drive by wanting it, and they are not, I think, thinking in terms of regulation, in terms of imposing it. I suppose that if we have a concern, it would be that in order to meet all of those different pressures, the
whole thing gets watered down, but I think it is too early to come to that conclusion, and time will tell.

**Q523 Lord Broers:** Basically, your standards extend over a very large range, so they would extend into what you are hinting may be an uneconomic regime.

*Dr Wyatt:* No. One of the issues here is that we have spent 10 years working in a consensual way with industry and on pricing so that nothing up to “excellent” is unaffordable, and you are not talking about lots and lots and lots of money to get an “excellent” because it would be impracticable to come up with a standard that was essentially unachievable on an economic basis. What the Government has to be careful about is that if it has any intention of re-inventing the wheel, which we think would be rather silly, then it would be very easy to come up with what on the face of it looks like sensible performance criteria, but which translate into very, very expensive answers. If you take, for instance, the forthcoming Part L in terms of insulating a house we are probably moving now to the realms of diminishing returns. To go much above the forthcoming Part L in terms of insulation would need a step-change in technology and a step-change in costs. When you look at these factors you have to thoroughly understand what the technology that is waiting in the wings, which is readily available, can do, instead of just plucking a number out of the air and then challenging everybody to achieve it. If you do that, you are stuffed really, because they may well not be able to achieve it except at high cost.

**Q524 Lord Wade of Chorlton:** Do you not think it rather odd that government creates a situation where the price of land to build a house is now more expensive than the cost of the house that you put on it; and yet it is not prepared to create a situation where, for the sake of £5,000 or £10,000—a fraction of the price of the land—that it is likely to come in and stop the building? It seems to me quite odd. If you really wanted to do it, there is an awful lot of money that is now being used because we keep such a strict planning regime that the price of a piece of land to build a house on is more expensive than the house.

*Dr Wyatt:* We are into government policy areas. The Government could undoubtedly choose to recycle or hypothecate taxes from one part of the house-building chain into another bit, but that is really for the Government.

**Q525 Lord Wade of Chorlton:** I am asking your opinion; you are at the forefront of all this. I am not asking you to put recommendation—we can make recommendations, but what is your opinion?

*Dr Wyatt:* If the objective here through energy efficiency is to save a tonnage of carbon, then you have to look at the most cost-effective way of doing that, not what is the most sexy way or most macho way; the issue should be based on a sound understanding of the economics of the technologies—where do you apply regulation, where do you apply pricing mechanisms, and where do you apply rationing in order to get the optimum amount of tonnage of carbon in the most price-efficient way. Doubling insulation in housing may well not be the most cost-efficient way and give you the most bangs for buck, so these trade-offs are quite subtle.

**Q526 Lord Patel:** My question is related to energy efficiency standards as set out in Building Regulations. You accept that they are set at a pretty low level compared to many countries such as Sweden, so two questions arise: who is going to set, and when, alternative standards to change it to a higher level? What calculations are made on the effect of carbon emission if standards are not set at a higher level, and they are not complied with?

*Professor Strong:* This is a hugely important issue. Standards are low in the UK relative to other northern European countries, and there are a number of reasons for that. First, the way that Part L is currently—

**Q527 Lord Patel:** Are these justifiable low standards or—

*Professor Strong:* No, not at all.

**Q528 Lord Patel:** Or reasons for being foolish?

*Professor Strong:* I think that is more to the point. First of all, the low standards that are currently being achieved are the result of very effective lobbying in the UK from organisations with vested interests that have no desire really to change working practices or the quality of buildings they are constructing. They see that as an additional imposition and additional cost burden, and it is something that if they can avoid being responsible for they will do so. They have managed to persuade Government to allow design flexibility as part of the Building Regulations compliance process so that it is possible to demonstrate compliance in a number of different ways. As a consequence, that is the reason why we are still getting fully glazed buildings built in the centre of London, because the compliance enforcement regime is incredibly weak in this country. The other thing is that Government has been slightly hoodwinked into the belief that what are called “robust standard details” will necessarily deliver better quality buildings, and that it is not necessary to undertake on-site testing of buildings to check that they are achieving higher
standards. It is interesting to reflect for a moment that there was an OECD report a year or so ago which came to the conclusion that the average energy requirement for new buildings being constructed in the UK was about twice the level of the requirement for buildings elsewhere in northern Europe, and that is despite the fact that in the UK there is a more temperate climate. The other really fundamental issue here is the one that Dr Wyatt alluded to earlier. As far as the standards specified in Part L are concerned, and the minimum requirements on the insulation of buildings, we are getting to a point of diminishing returns in terms of fixed insulation and how much energy it will save. The most dominant factor in terms of achieving energy-efficient buildings is to make them airtight—it is called “build tight, ventilate right” so that you can provide a controlled, healthy internal environment from the health, productivity and safety perspective, but you do not waste energy in so doing. Indeed, there are systems on the market that recover energy that achieve this. Air-tightness of new buildings is absolutely fundamental if energy efficient buildings are to be built. For about 10 years now there have been calls for the introduction of mandatory pressure testing of buildings upon completion. At the last two revisions of Building Regulations these have been proposed in a consultation document, widely supported by industry, and then at the last moment they have been dropped by various governments because of lobbying from the various vested interest groups. Air-pressure testing buildings is the single best proxy we have got for construction quality. The standards that are demanded in the UK are woeful in comparison to the rest of Europe. There are recommended max air-tightness standards—unfortunately in rather strange units, but a value of 10 cubic metres per hour per metre squared at a test pressure of 50 Pascals. It is interesting to reflect that in Germany the test pressure standard is 1.8 to 3.6, depending on the building size. Our requirement in the UK, which builders in this country complain bitterly about as being overly rigorous and over demanding and so on, is an incredibly poor standard relative to the rest of Europe, particularly Scandinavia and Germany. The important thing here is that the regime we have in terms of delivering energy-efficient buildings is a consequence of poor inspection and compliance, no simple pass/fail tests in terms of whether a building complies or not; and reliance on things like “robust details” as proof of compliance, where all the evidence is that that does not provide the satisfactory outcome.

Q529 Lord Patel: Who will make the changes, and when will we see them?

Professor Strong: In terms of driving hard standards? ODPM consulted last summer regarding the proposed changes to Part L, which they plan to introduce this year. The intention is to deliver 25 per cent reduction in carbon dioxide emissions over the 2002 provisions, and to implement the Energy-Efficient Buildings Directive. Without an effective compliance regime, and verification of compliance, I simply cannot see this happening. This is hugely important because Defra’s climate change plan, which suggests that to be on target we should be achieving over 15 million tonnes of carbon saving per annum by 2010—25 per cent of that in the climate change plan comes from better Building Regulations.

Q530 Lord Patel: Are you saying the target would be met?

Professor Strong: If we carry on with the current very poor enforcement regime, I would put money on the target not being met.

Dr Wyatt: But the target is achievable.

Q531 Lord Patel: By compliance.

Professor Strong: It is an achievable target. The standards that have been set are realistic and cost-effective. All that it requires is a step-change in the rigour with which building regulation enforcement is undertaken.

Q532 Chairman: Do you think that as a country we are going to be ready to meet the European Directive by next January? Are the arrangements in place for inspection and regulations and issuing of certificates?

Professor Strong: The short answer to that is “no”—or not in all respects. I chair an industry advisory group for ODPM on this, and we submitted our recommendations to ODPM last week, which in due course will be submitted to ministers. The proposal in that is that there should be a phased introduction of the requirements of the Directive, starting off with the requirements for new buildings and then progressively introducing the requirements for different building types during the three year period of grace that is allowed. The UK can apply for an extension of up to three years in the event that there are an insufficient number of qualified and trained accredited assessors to undertake building certification and plant inspection requirements. That is rapidly becoming a self-fulfilling prophesy simply because no training has started. In the case of the methodologies to be applied for rating buildings, with the exception of domestic buildings, which have been in the UK for some years in the standard assessment procedure, there is no method yet agreed for assessing non-domestic buildings to be compliant, and no training has started. There are no
Q533 Earl of Lindsay: Why is the enforcement and compliance so bad with Part L of the Building Regulations, and do you think in order to improve compliance there is any role for an increased use of self-certification within the industry?

Professor Strong: As I have just said, the current regime for enforcement is woeful in the UK. All the evidence is that building regulations are honoured more in the breach than in the observance.

Q534 Earl of Lindsay: Why?

Professor Strong: I think the reason for it is that there is competition now in provision of building control services. For some years now you have not had to use your local building control officer through your local authority to inspect buildings; you can go to any approved inspector to get your building checked for Building Regulations compliance. So this is now a competitive market with building control officers competing one with another on commercial grounds, and no building control officer wants to be seen as a stickler or somebody who demands a robust attention to standards. Unless we get the introduction of some simple but mandatory pass/fail tests, one of which would be air-pressure testing for all buildings, which building control officers always demanded—at the moment it is advisory that building control offices ask for air-pressure tests, but it is not a mandatory requirement, so very, very few building control officers do it. If they do demand a pressure test, the probability is that that contractor will never use that building control officer again. We have a real dilemma here in having created a competitive market for provision of building control services. We have created a situation where it is not like having your car MOT’d, where if it fails on the emissions test, tough—there is nothing you can do about it. Most of the judgments at the moment on Part L compliance are purely subjective and they are down to the Approved Inspector. If he happens to pick up the fact that something is missing, then that is more through good fortune than anything else. That is what has led to the problem we have at the moment. It is interesting that since the 2002 revision of Building Regulations there have been three studies done to look at compliance with the 2002 requirements. The first of those was undertaken by National Energy Services and De Montfort University to look at the new requirement that came in in 2002 to display an energy performance certificate; and 98 per cent of builders were not displaying the required energy performance certificate. It is an absolutely trivial issue, something that any building control officer should have been able to spot immediately. If they had spotted it, they did not ask the builder to display the certificate, and they simply turned a blind eye. We and another organisation then subsequently took a large-scale test of the air permeability standards, these air tightness standards being achieved in domestic and non-domestic buildings. In two-thirds of the domestic buildings the houses were failing and were not achieving even the woefully poor standard of 10 cubic metres per hour per metre squared at a test pressure of 50 Pascals, which is, as I stated earlier, three or four times higher in the standards required in Germany. In commercial buildings, even where they knew they were going to be tested, over a third of them failed on the air-pressure test. As I say, the air-tightness is now the dominant factor in terms of energy loss from buildings. More recently, we published for the Energy Efficiency Partnerships Homes, a review of Building Regulations compliance in 100 homes. This showed that in roughly 50 per cent of cases there was evidence of non-compliance. In many cases this was related to this issue of air-tightness. But we also found issues of non-compliance, for instance where the original design had been submitted for building control purposes with a condensing boiler being installed, but in quite a large number of cases we found that for cost-saving reasons the developer had put in a conventional boiler during construction. Building control had not picked it up. Some members yesterday visited a development in Kensington, and it was interesting to observe that the hot water cylinders in that development had only the most rudimentary hot-water jacket on—certainly non-compliant; and yet those flats are now being occupied.

Q535 Earl of Lindsay: Is the Government aware of this analysis; does it agree with it, and does it intend to address the problems which have been identified?

Professor Strong: You would hope so. It is interesting that the Government itself has not funded much of this research. We have to reserve judgment to see what comes out as a result of the Part L consultation that took place last summer. If Government’s intent, as detailed in the consultation document, is delivered through to actual recommendations and practice, then I think there will be a significant improvement, except the issue of self-certification that you mentioned, which ODPM are very keen on. It can be made to work, but only if it is done within a proper
competent person framework, with appropriate quality assurance checks, with random checking, so that if self-certification does take place it is being done in a reliable and effective way. At the moment, for many aspects of Building Regulations which rely on self-certification and Part L in particular, all the evidence is that because there is not an effective quality assurance framework, the Regulations are not being delivered on the ground.

Q536 Earl of Lindsay: If properly accredited in order to underpin the rigour of the self-certification system, that is a possibility.

Professor Strong: That is a possibility.

Dr Wyatt: I think that is right. To go back to your question, the ODPM is aware of the issues, and I think they are concerned about them, though what conclusions they will come to in order to toughen up the scheme, I do not know.

Q537 Lord Wade of Chorlton: What is your assessment of the skills that are available in the UK construction industry? Is the construction industry capable of implementing these higher building standards; and, if not, what measures might be put in place to try and improve them?

Dr Wyatt: Nobody within the construction industry would claim that they are happy with the level of skills in the industry, and that would range from trades right through to employers. For many, many years in this country training in a trade has been pretty much the bottom of the heap of the aspirations across society, and the consequences of that are what we see today. There is a significant training levy in place in the industry, and a lot of money is spent—well over £140 million a year in helping apprentices and putting training in place, but a lot of people join the industry and then leave the industry, and it evaporates out at the far end. It would be absolutely fair to say that I do not think anybody thinks the skills level is good enough, and that is witnessed simply by the amount of faults usually which are found—snags at the end of the project when the builder has to come back and put this right and that right, and he hopes you will not notice he has bodged that and so on—which is endemic. Part of that is management and part of it is skills, but skills certainly have a part to play—and pride. If you have pride in your skills and your job, you are less likely to do those things. If we do not respect people’s standing as skilled artisans in society, then we cannot be surprised when we do not in return get a high level of skills. You are right that if we make the fences higher and we do not have the skills, then there is a possibility or even probability that the industry will have difficulty in complying. Indeed, some of the lobbying and pressure from house-builders is not so much about money, it is that they are really worried that they will not be able to meet the standards literally, figuratively, on the ground. Thus, if they are pressure-tested, they are in a mess, because they know this is going to be very difficult for them. There is a sector skills council being set up for construction. DFE is now directly involved with the Construction Training Board with these issues, and the Government will be putting additional money into those areas. There are also technical ways that you can do this. This perhaps comes on to the question later on, but the more of a building that can be prefabricated under factory conditions, and then erected on the site, and the less we are involved in wet trades on sites, then the higher the likelihood that the resulting product will be to a high standard. That is just logical and commonsense. There is a lot of talk in the industry and some activity now around this proposal, that we need to shift many of these skills off site, because we are never going to get it right on site. It will always be difficult—up to your knees in mud and rain and so forth. The more we can build in factories and the less on site the better. That is one of the major possibilities for the future in improving tolerances. The main thing with air-tightness is tolerances. If everything is made to factory tolerances rather than built on site, it is much more likely it will pass air-tightness tests than something which is fabricated from bricks, mortar and bits of timber on site.

Q538 Lord Paul: Can I just ask a supplementary on this? Have you done much research as to why in this country building costs are amongst the highest in Europe? Some countries in Europe are higher than others, but why are we always behind, in your estimation?

Dr Wyatt: I think research is very mixed on this, and I do not necessarily agree with your conclusions. We are very good nationally, are we not, at running ourselves down? Certainly German building costs are more expensive than in the UK, and the Americans are not terribly good either. One of the big problems is comparing these costs on a level playing field. You cannot compare oranges and apples. One reason American costs are lower is because they build to a much lower specification for a much lower life cycle than we do. Most air conditioning in the States is put in for a much shorter expected life than it is here. So naturally, the first cost, which is the simple comparator to make, makes it cheaper. I think the answer is that we do not have definitive answers, and I have not seen any detailed economic studies which come to other than rather grand and simplified conclusions about the relative costs of these things. So I do not know the answer to your question.

Lord Paul: I would like to discuss that for longer another time. I would love to agree with you, but I cannot, unfortunately.
Q530 Lord Patel: Is it a statement of fact that German building costs are higher than in the UK?
Dr Wyatt: The only study I have seen says that German costs are higher than in the UK.

Q540 Lord Patel: I am not so sure about that, because I recently heard about the British Army building barracks, and the costs were much lower in Germany.
Dr Wyatt: It may be, but the only study I have seen has it the other way round. Perhaps therein lies the problem.

Q541 Chairman: There are a lot of variables, such as land costs.
Dr Wyatt: Certainly in Germany they do make a lot more use of prefabrication, and it may be that barracks is an ideal example of where you can produce things much more cheaply through a prefabricated solution than otherwise. So yes, in that area they may well be better than us.

Q542 Lord Paul: That is perhaps a subject for another time. Moving on to my next question, we have heard both of the importance of modern methods of construction and of the conservatism of the UK construction industry, as well as of consumers. On the other hand, the Government wish to encourage modern methods of construction. Are the UK’s builders and consumers likely to embrace such methods, and what are the main barriers to that?
Dr Wyatt: Firstly, I think, in broad terms, the Government is right to require higher standards and to encourage the industry to look at alternative methods of product delivery, such as MMC. The reason I say that is because what is very clear from how we currently do things is that waste and defects are high—and we have touched on that; on-site is inherently inferior to factory-made—that is just common sense really—and new technologies are coming along: the home hub, radio in the home rather than wired-in networks. There are all sorts of issues in technological terms about how we are going to live in the future, best addressed probably through pre-manufacturing than through wet skills on site. Finally, I think the Government is right, because MMC requires a substantial investment by a manufacturer somewhere in a factory to produce it, and unless you create the environment in which there is going to be demand for the product, then manufacturers are unlikely to invest in manufacturing that product, and we have to get past that tipping point where the demand is sufficiently strong and continuous that manufacturers will invest in the facilities to produce the product.

Q543 Lord Paul: This is really a supplementary question to the previous question. Industry in this country has to get to a situation where they can get it right first time and reduce their costs. Why is the building industry not getting to that stage? What is lacking in the research? They are looking to that advice, but it is not happening in the building industry.
Dr Wyatt: Let me try and address this to you through three parties, if I may—and I think this comes back to your original question—the builders, the lenders—because they are very important to this—and the pull from the customer: is the customer asking for this or are they going to reject it? Builders are inherently conservative. Lenders are conservative, but customers, based on our research, are actually ambivalent: if the cost is right, if it feels right, looks right, is in the right location, etc, they do not care how it is built. That is not an issue. It is a myth that customers will back away from new methods, and we have done quite a lot of research on that. Builders need, frankly, to look beyond first cost. They very often do not look beyond the first cost of the materials, let alone anything else in this, and perhaps what we need to do alongside the environmental standard is to produce some form of whole life index so that we can say to a customer “Buy this house and its cost of maintenance over 20 years will be 50 per cent less than that house.” Customers at the moment cannot make those decisions. They are not offered a choice that they can understand in order to specify their preference, so I think some mechanism like that, where we could, as I say, give the whole life maintenance cost to the customer and allow the customer to choose, would allow the builder to put in things that lasted longer because the customer may well then buy them. Finally, the lenders. I think that conservatism can be overcome, and in fact, we are jointly developing a standard for this form of housing with the Council of Mortgage Lenders. It has just been launched and any system which can be shown by a third party certified to comply with the standards we have written the lenders will lend against, so I think that barrier has been removed.

Q544 Lord Wade of Chorlton: Could I comment? On this point, frankly, I think Lord Paul is absolutely right, that the issue is that the only competition in the building industry is the purchase of the land. It has nothing to do with the property or the house. Once somebody is able to buy the land, he can build a house on it and sell it, because there is a shortage of houses relative to the land available. The key to your problems is much more based upon the availability of land for building than it is about trying to play at the end of it by putting more regulation into that aspect, because if it were a competitive business, and there were actually more houses available that people wanted to buy, which is exactly the same in every other industry in this country, then you would find...
that people would be motivated to do something about it.

Dr Wyatt: I would certainly agree that the price of land can dominate the economic thinking of builders, and that some builders are more interested in trading land than they are in building houses, but not all.

Professor Strong: All the more reason for robustly enforcing minimum performance standards for the houses that they do build, because if the principal focus is on maximising the land value and minimising the build cost . . .

QS45 Lord Wade of Chorlton: I realise that, but you will not solve the one problem unless you solve the other.

Dr Wyatt: They are certainly interrelated. I agree.

Chairman: I am afraid we have run out of time. In fact, we have run a couple of minutes over our time. We were going to ask you a last question about your involvement in the European Directive that the Government is negotiating. Perhaps you could let us have a note in writing about that, and indeed, anything else that you think after you get back we did not ask you or you wish you had said. We will be delighted to receive evidence in writing from you, and of course, that will be published along with the proceedings today. Can I again thank you both, Dr Wyatt and Professor Strong, for coming along to talk to us and giving us such a very interesting and full answer to our questions.

Memorandum by Leonard G Brookes BA, PhD, Fellow of the Energy Institute

ENERGY EFFICIENCY FALLACIES

1. PREAMBLE

1. There are two reasons why the Government might be interested in influencing the level of consumption of fuel and electrical energy:
   1. in an effort to meet international obligations on emission of greenhouse gases;
   2. in an attempt to bring the predicted supply and demand for fuel and electrical energy into balance.

2. Neither of these goals has much if anything to do with fuel efficiency, however defined, because, even if we could bring about a genuine rise in overall fuel productivity, a tall order in itself, it does not follow that this would automatically deliver a reduction in fuel consumption at the macroeconomic level. Support for this contention in the published literature first appeared in 1865 in “The Coal Question” by the great nineteenth century economist W. Stanley Jevons. Other economists, including the author of this evidence and Professor Daniel Khazzoom of San Jose State University, have developed the idea more recently.4

3. Jevons’ thesis may be summarized briefly as saying that—at the level of the economy as a whole—for a resource (fuel in this case) to offer greater utility per unit is for it to enjoy a reduction in its implicit price with all that that implies for demand. This not to say that such an outcome is necessarily bad, provided the action is economically justified, only that it is associated with higher, not lower, levels of energy consumption over the economy as a whole. It has been the experience of developed countries since the dawn of the industrial revolution for economic growth to be stimulated first by absolute substitutions of energy for other factors of production followed in due course by relative substitution of fuel for other factors with—for most of the time—rising energy productivity outstripped by rising total factor productivity, hence rising total energy consumption alongside rising energy productivity (see Section 4.2). Appendix A illustrates the process for any

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1 Before his retirement from full time work in 1980 Leonard Brookes was responsible for Economics, Forecasting and Energy Policy at the London HQ of the United Kingdom Atomic Energy Authority. He subsequently worked as a consultant to public and private bodies including the UKAEA, the CEGB, the Electricity Council, the ODA (with Maxwell Stamp Associates), the International Atomic Energy Agency, the US Electric Power Research Institute, the Commonwealth Scientific Office, and as an attached specialist on projects with a number of economic and engineering private consultancies. He is the author of many papers published in learned and specialist journals on the subject of energy economics and policy (most recently in Energy Policy for June 2004) and was editor/compiler and part author in partnership with Dr Homa Motamen—then of Imperial College—of “The Economics of Nuclear Energy” published by Associated Book Publishers in 1981. He was also, by invitation, the author of the Open University’s course unit on Energy that formed part of their course on Statistical Sources.

2 The author prefers to talk in terms of fuel where possible. “Energy” is primarily an engineer’s term. The resource that causes us concern when physical supply is constrained or price is raised is fuel in its various forms. One does not ordinarily buy energy except in such forms as electrical energy, a secondary resource.

3 Some confusion is created by the fact that government agencies seems unclear on how they define energy efficiency—see Section 2.

4 See for example “Energy Efficiency Fallacies Revisited” published in Energy Policy Vol 28 Nos 6 and 7, June 2000. Dr Harry Saunders, who directs an economic consultancy in California, has published papers claiming that for what he calls “the Khazzoom-Brookes Postulate” there are tenable conditions when the postulate is consistent with neo-classical growth theory (see again Energy Policy Nos 6 and 7, June 2004).
economic resource experiencing a rise in productivity. The lesson is that the result is not reduced resource consumption: it is raised economic output accompanied by increased resource consumption. But beware of the pitfalls explained in Section 3 of concentrating productivity improvement on one resource in isolation from other relevant resources—fuel efficiency is simply part of general economic efficiency not legitimately pursuable as an independent goal.

2. TWO DEFINITIONS OF EFFICIENCY

4. There is more than one definition of fuel efficiency. We need concern ourselves here with only two of the possible definitions. These are (1) engineering efficiency (the ratio between the output of a system in terms of useful heat and work and the energy originally stored in the fuel consumed) and (2) economic efficiency (which peaks when the total cost of fuel and all the other resources employed to deliver a given benefit is at a minimum). Both energy conservationists and Government bodies frequently confuse the two—seeming to treat them as synonymous or jumping from one definition to the other without seeming to realise that they have done so. The most common failing is to seek to reduce fuel input for a given output—an engineering approach—and then claim cost effectiveness as if the exercise had been conducted on economic principles.

5. High levels of engineering efficiency are frequently only bought at high economic cost. Yet it is a cost that is often forced upon us by planning and building regulations. Builders of new dwellings are required to incur substantial costs—adding significantly to the price of the house—to meet the high levels of insulation demanded; and, where fitting an additional room into the roof space was once a fairly simple and inexpensive operation, it now almost invariably means a new roof to accommodate the insulation blocks between rafters that are now required as soon as even modest structural changes are proposed. In many instances it may be a better economic proposition to continue to incur familiar fuel costs and keep the old standards of insulation yet we continue to be told that measures to raise energy efficiency in general more than pay for themselves whilst at the same time serving environmental ends.

6. Those who tell us that such advocated or enforced measures to save fuel yield an economic return (an improvement in the economic efficiency of an energy service) are jumping from one definition to the other. They are claiming that there exists an alternative allocation of the economic resources currently deployed by us that enables us to produce all the goods and services that we now enjoy but at lower total cost and with a lower level of consumption of fuel.

7. There is clearly a conflict here. Maximum engineering efficiency does not at the same time deliver improved economic efficiency (lower total cost) unless by sheer chance. One would at least expect that before putting forward a fuel-saving measure as an economic proposition its advocates would have established that its costs are likely to be lower than the costs of the fuel saved. The author has argued elsewhere (see footnote 4) that even this criterion is insufficient if yet another—even lower cost—allocation of relevant resources exists that serves all the same purposes, for this would imply that a total cost over and above the minimum possible total cost may have been incurred in order to yield a fuel saving. Let us examine the possible criteria that might be adopted to determine whether a measure that sets out to save fuel is cost effective.

3. TWO CRITERIA OF COST EFFECTIVENESS OF A MEASURE TO SAVE ENERGY

8. Figure 1 below illustrates the difference between the partial criterion and the fully sufficient criterion for maximum economic efficiency of allocation of resources that include fuel. The first simply compares totals (total cost of the fuel saving measure v. total cost of fuel saved) while the second is based on full incremental optimisation (with the fuel-saving measure not pursued beyond the point where marginal cost is equal to marginal saving).

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5 To demand improvements in engineering efficiency without regard to economic efficiency would be to show disregard for the value of non-energy resources and almost certainly to damage economic performance by misallocating national economic resources. High levels of the engineering efficiency of energy use are of interest to engineers in individual cases—for example to achieve high speeds or high levels of endurance in military applications—but such characteristics are often only achieved at great cost in the use of other resources and thus have no relevance to national energy policies.

6 The analysis here was first published by the author in Energy Policy. Vol 32, No: 8, June 2004, under the title “Energy Efficiency Fallacies—a Postscript”.

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9. Let us assume that we are adding successive layers of fibreglass wool insulation between the joists of a house in order to reduce fuel cost. Take the curve ADC as representing a family of combinations of annual fuel cost and annuitised insulation expenditure that yield the result of keeping a house at a minimum temperature of 70°F throughout the year. The dotted line AB is the locus of a point such that the sum of the annual cost of fuel and insulation is a constant, equal to the expenditure on fuel when no insulation is employed. It follows that it is at 45° to both axes. D is the point on the curve where the tangent to it has a slope of 1. (This tangent is also at 45° to both axes.)

10. All points on the curve to the left of AB meet the simple criterion—in insulation cost is lower than the cost of fuel saved, with C—when the costs are equal—yielding the maximum saving. But all points other than D are uneconomic because a solution above D fails to take full advantage of the cost savings that insulation makes possible, whilst below D the incremental expenditure on insulation exceeds the incremental saving on fuel cost. Most importantly, solution D is indifferent as between the roles of fuel and insulation. It is the point at which both resources are used to maximum economic efficiency. The illustration can be extended to more than two resources with the optimum solution at the point where a tangential hyperplane touching the solution surface has a slope of 1 in relation to all pairs of axes.

11. It follows that fuel or any other source of energy—and indeed any other economic resource—cannot be used with greater economic efficiency than in a system in which all the resources involved are used with maximum economic efficiency. This makes fuel efficiency simply part of general economic efficiency not pursuable as an independent goal. Any attempt to go beyond the optimum solution or to stop short of it results in a hidden cost due to sub optimal employment of one or more of the resources involved. Thus energy saving campaigns are destined to be uneconomic operations leading—in the absence of optimal allocation of all relevant resources by sheer luck—to biased sub-optimal allocations of resources with consequent sacrifice of economic output.

12. It further follows that optimal allocation of the economic resources available to us—fuel included—and measures to reduce consumption of any given resource—fuel, for example—are two quite different exercises. Neither one implies the other. If one’s object is to serve, for example, some environmental end, fallacious ideas about the economics of activities that involve fuel do not help. Putting the economic spotlight on such activities is as likely to throw up cases where economic optimality calls for the substitution of fuel for other resources as cases where substitution in the other direction is indicated. The right course, given the object, is to bear down on energy use directly, outlawing it (if it is of a particularly damaging kind), rationing it (if you

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7 The author first heard this contention enunciated orally (though without proof offered) by Professor Nathan Rosenberg, Professor of Economics at Stanford University, California, at a workshop held by the US Electric Power Research Institute at Palo Alto, California in January 1981.

8 This is an important proviso. An unbiased analysis might conclude that the optimum solution in a particular case involves raising fuel input at the expense of some other input. To fail to make the necessary adjustment would mean accepting an economic cost in the shape of sub-optimal use of other resources in order to produce a lower than economically justified level of fuel input. Whatever the justification for such action, it has no place in a programme devoted to raising fuel efficiency.
have in mind a total that you are not prepared to exceed) or taxing it (if you believe you can reflect in the tax the environmental damage that concerns you).

13. Similar considerations apply, mutatis mutandis, if the object is to force future fuel demand to fit predictions of future fuel supply. But one is deluding oneself and/or those at the receiving end of such action if one attempts to justify it or represent it as having economic merit. Limiting the availability of fuel, whatever the purpose or the means chosen, involves an economic cost unless by sheer chance the action taken happens to coincide with the action necessary to achieve general economic optimization.

4. Misleading Indicators and Disinformation

14. There are two macroeconomic parameters that are frequently used to illustrate trends in the relationship between fuel consumption and economic output. They can both be misleading as indicators of trends in fuel efficiency. They are:
   1. The energy coefficient, namely the energy growth rate divided by the economic growth rate; and
   2. The energy ratio, namely energy consumption per unit of economic output.

4.1 The energy coefficient

15. In the late nineteen seventies energy conservationists pointed with satisfaction to a fall in the energy coefficient as indicating that the OPEC oil price rises had engendered an overdue respect for energy, resulting in improvements in the efficiency of energy use. However close analysis revealed that the energy/output ratio had maintained its long term secular fall of 1 per cent per annum throughout the period of the OPEC price rises. Given an economic growth rate of 2.5 per cent per annum before the first OPEC price rise combined with a secular fall of 1 per cent per annum in energy intensity of output, we can express the energy coefficient at the beginning of the period as:

   \[
   \frac{2.5 - 1}{2.5} \text{ namely } 0.6^{10}
   \]

16. It follows that it only needs the economic growth rate to fall to 1 per cent for the energy coefficient to fall all the way to zero without anyone having done anything to improve the efficiency of energy use above its long term trend. It was in fact damaged economic performance, not raised energy efficiency, that was responsible for the decline in the energy coefficient during the 70s.

4.2 The energy/output ratio

17. Movements of this parameter can also be misleading. With only fairly rare exceptions multifactor productivity growth has routinely exceeded energy productivity growth.\(^{11}\) This means (1) that, in normal times, falls in energy consumption per unit of output owe more to rising output (the denominator) under the influence of rising productivity of non-energy factors of production than they do to rising energy productivity itself, with the risk of claiming undue credit for improved energy productivity; and (2) that energy consumption will continue to rise with economic growth notwithstanding continuing energy productivity growth.

4.3 Disinformation

18. The Government’s Energy White Paper justifies its bullish views on what energy efficiency measures can do for our international obligations and our own energy future by claiming that energy consumption has increased by only 10 per cent in the last 30 years while economic output has doubled. The White Paper goes on to say that it is proposed to accelerate this trend.

19. One can “prove” almost anything one likes by carefully choosing one’s end points and ignoring structural changes like the decline in manufacturing and the rise in services.\(^{12}\) Energy consumption rose by 10 per cent in the 80s alone despite the decline in manufacturing during that decade. In the last few years economic growth

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9 Economists refer to this as “the output elasticity of energy consumption”.
10 It is mathematically proper to treat exponential rates by simple addition and subtraction in this way. Low nominal rates are very close to the corresponding exponential rates and may be similarly treated.
11 Schurr, one time Deputy Director of Energy Studies at the US Electric Power Research Institute, put this down to the beneficial effect of the use of energy upon the productivity of capital and labour.
12 1973 was a peak year for UK energy consumption with a higher level of consumption than in the early 80s. Consumption in the 70s after 1973 was depressed by economic damage arising from the OPEC oil price hikes. 1973 is consequently much loved by “disinformers” as a starting point for statistics “proving” that energy efficiency has delivered the goods.
has been maintained by retail sales supported by dissaving. Such economic activity does not call for much energy consumption to support it but it is clearly unsustainable for very long.

CONCLUSIONS

20. It would be rash indeed to base policy on the White Paper’s highly questionable figuring and misconceptions about energy efficiency as an economic alternative to fuel supply. As we have seen from earlier sections of this evidence the claims made for what can be achieved by energy efficiency measures are generally muddled and do not stand up to reasoned economic analysis.

23 September 2004

APPENDIX A

A SIMPLE MODEL OF CONSUMPTION RESPONSE TO PRODUCTIVITY CHANGE13

Figure 1 illustrates the economic mechanism by which a resource (any resource, not necessarily fuel) may find its consumption raised as a result of an increase in its productivity.

It has been assumed in figure 1 that the marginal productivity of the resource declines exponentially with increasing consumption while a broad interpretation of marginal cost to consumers rises exponentially. These conditions are met in the model by adopting straight lines combined with a vertical log scale and providing for the cost to consumers being the greater of price and opportunity cost. The exponential assumptions are not essential: the diagram is intended to be no more than illustrative: any curves exhibiting diminishing marginal resource productivity and increasing marginal resource cost would suffice. Equilibrium is at the point where the benefit from the last resource unit consumed equals the broadly defined cost of that unit.

Now assume that productivity is raised by 10 per cent throughout. This shifts the marginal benefit curve upward a distance of log 1.1 parallel to itself. The new marginal benefit curve intersects the price curve at a higher level of consumption than before. This is a rational result. The marginal benefit from use of the resource has been raised uniformly so it calls for a higher level of consumption (and price/opportunity-cost) before equilibrium (where marginal benefit equals marginal cost) is re-achieved.

To pursue these possibilities let us put some arbitrary values on the elements in the diagram. Let us adopt a “half life” for marginal benefit and a “doubling time” for fuel price of 100 large arbitrary resource units and starting values for marginal benefit and price/opportunity cost of 100 and 25 monetary units respectively. With the original conditions—before efficiency is raised—these figures result in equilibrium at consumption of 100 units and marginal benefit and price/opportunity cost at 50. With productivity raised by 10 per cent it can be shown that the original total benefit can be obtained with consumption of only 87.5 resource units—a saving of 12.5 per cent. But at this point marginal benefit is 54.5 against price/opportunity-cost of only 45.8 calling

for considerable self denial on the part of the population in forgoing consumer surplus if the full saving is to be achieved. The sacrifice is considerable. The new equilibrium level of consumption is 106.9 units at which level total benefit is 15 per cent higher than before the productivity increase.\textsuperscript{14}

What needs to happen for resource saving to take place? There is a number of possibilities, ranging from a rather crude assumption of unchanged demand—with consumers rejecting the opportunity to enjoy the consumer surplus offered by the raised level of productivity—to more sophisticated assumptions about the shape and disposition of the new marginal benefit curve.

Would consumers behave in this way? It depends on whether we see the diagram as modelling long run or short run behaviour. In the short run it is very possibly true that consumers would not expand their demand for an important resource to any great extent following a rise in productivity (or fall in implicit price) But how—reverting to the case of energy—do we explain the very large differences between countries as regards energy consumption per capita or per unit of output? Large differences are to be found contemporarily between individual developed countries and even larger differences between developed and undeveloped countries. Such differences often provide a clue to the direction of longer-term changes in patterns of consumption of countries not so far along the road as those in the vanguard.

The author would argue that the time scale should be seen as long enough for producers and consumers not to act as if suddenly presented with unfamiliar situations, strongly influenced in their responses by recent experience of patterns of consumption. Arguments about saturation of demand lack force in such a time frame. The model at figure 1 is also a very simple model. It says nothing about the source of the wherewithal to improve energy efficiency or whether the improvement follows from secular technical progress or deliberate measures to raise efficiency involving substitutions between factors.

\textsuperscript{14} Note that the model shows the resource’s contribution to total benefit as substantially greater than the total sum spent on it (total consumption multiplied by its price). The explanation for this is, of course, that price reflects marginal, not average, benefit. Note also that with the example offered here, when equilibrium is re-established it is with consumption nearly 7 per cent higher but energy intensity 7 per cent lower.
**Examination of Witness**

**Witness: Dr Leonard Brookes, examined.**

**Q546** Chairman: Dr Brookes, thank you very much indeed for coming to talk to us. I see you have been listening with great interest to our previous witnesses. Thank you very much as well for the written evidence that you have put in in advance, which was very interesting and very relevant to us. I am afraid the acoustics in this room are very poor and it is very difficult to hear.

Dr Brookes: Yes. I was going to apologise to the Committee that I am somewhat deaf due to war service as a pilot in the RAF. I thought I was going to be able to hear better than I can. I found it difficult to follow the proceedings up to now, so I hope you will forgive me if I seem to be struggling to hear what you have to say.

**Q547** Chairman: Some of us struggle with hearing as well, so we all have to talk very loudly. Can I begin, Dr Brookes, by asking you this. It appeared from your written evidence as if you were arguing that attempts at the macroeconomic level to reduce energy consumption by means of energy efficiency are misguided, and that since the Industrial Revolution, rising total energy consumption has in fact occurred alongside rising energy productivity. Could you explain your views on this and what is delightfully called the “Khazzoom-Brookes postulate”?

Dr Brookes: Actually, I formed this conclusion independently in connection with the OPEC oil price hikes, when I managed to persuade myself that reacting to the higher prices by trying to save energy in fact accommodated the price rise, and so the balance at the macroeconomic level between supply and demand was struck at a higher price, so in fact, attempts to deal with the OPEC oil price hikes by a natural reaction, trying to make the oil go further, actually resulted in more of it being consumed than otherwise. That is how I first came to form this conclusion, and I discovered afterwards that I was 100 years too late. Stanley Jevons, the great 19th century economist, enunciated this principle in 1865, when he wrote a book called “The Coal Question; Can Britain Survive?” He pointed out there that what he called “economy” and what we would call “efficiency” had the effect of making fuel more productive, and thus it became a more attractive item on everyone’s shopping list; it had the effect in other words of reducing the implicit price. Professor Daniel Khazzoom of San Jose State University came to a similar conclusion in relation to mandated standards for domestic appliances. This is how we come to have the Khazzoom-Brookes postulate. It was coined by Dr Harry Saunders, an eminent mathematical economist, who claimed to show that the Khazzoom-Brookes postulate was consistent with Solow’s neoclassical growth theory. So I am afraid we were immortalised by Harry Saunders and we have always been referred to since then as “members of the KB postulate.”

**Q548** Lord Wade of Chorlton: First, I must say, Dr Brookes, that I liked your paper because it supports my prejudices. I have always found that a very helpful thing, because I rather suspected this was the situation that you define. Could we just take it a bit further? From what you say, it would appear that no country has yet succeeded in achieving a sustained reduction in energy consumption combined with economic growth. Given that the Government has committed the UK to decoupling economic growth from environmental degradation, and that such degradation appears to be implicit in increased energy use, do you believe that there are any circumstances in which long-term reductions in energy consumption can be combined with economic growth?

Dr Brookes: I would be arrogant if I said that there was never any possibility of this happening. The only instance I can think of would be one where a country that was heavily into heavy manufacturing, say steel making and so on, moved out of it, perhaps because of competition from far eastern countries, and moved into a service economy over a short period. Then I can concede that it is conceivable. I think it is very unlikely. One reason is that services are a lot more energy-intensive than they are given credit for. In the 1970s a chap named Gershuny wrote a good book called “The Myth of the Service Economy”—he came from the Science Policy Research Unit at the University of Sussex—in which he showed how in fact most services are quite heavily energy-intensive. I would not expect them to be as energy-intensive as, say, steel making. There is thus some element of duality about whether this is a general proposition that energy consumption must continue to rise. But it did continue to rise in the UK during the Thatcher government, when there was a substantial move away from heavy industry towards services. World energy consumption has increased by 50 per cent since 1980, so it does seem to be fairly general that countries are going to continue pushing up energy consumption. You can produce an economic argument, a theoretical one, and it goes like this. Incomes reflect marginal productivity. The part of the economy that produces and distributes energy is a minority. It probably accounts for less than 10 per cent of total economic activity. One would expect Adam Smith’s invisible hand to step in and prevent a situation where the incomes of this minority grew more rapidly than the incomes of the rest of the population, so I suspect that is these underlying elements that tend to keep energy productivity growing more slowly than productivity of the
economy as a whole, because that is what happens in practice. With capital and labour productivity increasing faster than energy productivity, total energy demand continues to go up even though energy productivity is increasing.

**Q549 Lord Patel:** This relationship between energy consumption and economic growth may well halt, but what you are really talking about is consumption of carbon-emitting energy.

**Dr Brookes:** I am sorry. I did not quite follow that. Are we on to global warming with the carbon?

**Q550 Lord Patel:** Does it matter that we consume more energy for economic growth as long as the energy that we consume is not carbon-emitting?

**Dr Brookes:** Yes. I am still not quite following.

**Q551 Chairman:** If I can help, I think what Lord Patel is saying is that if we could find an energy source which was not emitting carbon, would it matter if we went on using more and more energy?

**Dr Brookes:** No, of course, it would not. I should make my position clear. I do not see any intrinsic advantage in just reducing energy consumption. One would have to have a good reason for trying to reduce energy consumption per se. I would put my own position as saying that we have treaty obligations to reduce carbon emissions, so one would start from saying let us encourage non-carbon sources of energy and discourage carbon sources of energy. What I would like to see then is the discouragement put in some form such as a tax, with individual consumers left to find their own best solutions. What we seem to have at the moment is solutions being forced on them. To go on one stage from there and say let us reduce energy consumption in general, is to deploy a blunderbuss. We would be saying that we will fire the grapeshot at energy in general and hope it hits some of the carbon producers. That is another stage down. A further stage down is to say let us try and produce genuine improvements in energy efficiency. If they are genuine—this brings us back to the Stanley Jevons point—the chances are that that will result in demand for energy going up. If you go the next stage down from there, you have what in fact the Government has been doing, and that is forcing higher standards of insulation on people through building regulations and so on, and some of these do not look economic at all; in other words, they are hardly improvements in efficiency. My friend William Orchard, who is a member of Orchard Partners, that produces combined heat and power systems, produced a paper in which he showed that insulating a house to the nth degree was like investing £2,000 per kilowatt of heat saved, and that double glazing was like investing £3,000 per kilowatt of heat saved. He pointed out that this was more costly than investing in nuclear energy, which does not produce kilowatts of heat but kilowatts of electricity, which are more valuable. So you come to the conclusion that you are spending more money per kilowatt of heat in investing in double glazing and insulation than you would be prepared to spend on investing in nuclear energy, which in fact would give you carbon-free electricity.

**Q552 Lord Paul:** Like Lord Wade, Dr Brookes, I enjoyed reading your paper, and I do agree with a lot of it. As a matter of fact, I want to read it again. You talk of cost-effectiveness. I want to understand these curves a bit more. What constitutes a cost-effective investment in energy efficiency? Is it possible to take account of externalities such as environmental impacts, which may ultimately have serious cost implications, within an analysis of cost-effectiveness?

**Dr Brookes:** That little diagram that I drew was really intended to show that if it is economic efficiency you are seeking, you must not ignore the other resources. It is totally cavalier to say it does not matter how you waste other resources provided you do not waste energy. It was only intended to show that, and to show that true economic optimisation requires that you pay just as much attention to these other resources as you do to fuel. When you come down to the externalities, which is what you are saying, then the economist Pigou is the expert in this field. He argued that if there are benign externalities, you are justified in subsidising that activity, and if there are malign externalities, you should tax it. I would not disagree with that; I think that is probably right. In practice, it tends to be done by exhortation. In other words, when there are malign influences, you tend to get a lot of exhortation to avoid these activities, and if they are benign you are told you should encourage them, but you do not often get very much encouragement to do so. We are not really encouraged to use public transport at its present prices, but it would probably be a benign thing to do.

**Q553 Lord Broers:** I compliment you on your curve. I am an engineer, and we like data best, and formulae, but curves are even better. This was useful, but, as you have just said yourself, it is a relatively simple case that you have taken. Have you attempted to elaborate your ideas, taking into account more of the variables, such as people’s inclination to buy more or less energy, perhaps the climate, etc?

**Dr Brookes:** No, I have not done that actually. That thing was simply intended to show that you should really give as much attention to the non-energy resources as to the energy resources. I am quite sure that there is a very large, what you might call personal or social element in energy consumption. There is certainly quite a lot of evidence that expenditure on energy tends to be a fairly constant...
fraction of total income; in other words, the richer you are, the more you tend to spend on energy. These are factors which cut across any efforts to use scientific methods of discouraging fuel use. You have all these non-scientific reactions of people, for example, who use floodlighting or garden lighting as an architectural feature. Some people would regard that as legitimate expenditure of their income, but it is not the sort of thing which the Government would encourage if it wanted to discourage energy consumption. I do not think it is very easy to carry the analysis into these rather more abstruse areas. My position is very clear. I would say let us stick as closely as we can, given our obligations, to discourage carbon-rich sources of energy and encourage non-carbon-rich sources of energy. Nuclear energy is the obvious case of a non-carbon source. It saves 60 million tonnes of CO₂ a year in this country, and it saves billions of tonnes of CO₂ a year over the world as a whole, which has 450 gigawatts of nuclear energy. We have a situation where the Government is not in fact encouraging nuclear energy; if anything, it is discouraging it. We have the rather comic opera situation that British Energy, the nuclear company, actually has to subsidise windmills through the Renewables Obligation Orders. So although nuclear energy is a much bigger saver of carbon, it has to subsidise a source which is a much smaller saver of carbon.

Q554 Earl of Lindsay: Dr Brookes, there is a lot of straightforward waste in UK energy consumption. How does waste figure in your analysis of energy efficiency?

Dr Brookes: I have had to think hard about this, because it seems to me that waste is a subjective term, a pejorative term. I could not see any answer to it really, because of the sort of thing I just mentioned. People use lighting as an architectural feature. These would be said to be wasting energy, but to their mind, they are getting some satisfaction from it. I am sure this is an element in energy use but you cannot do much about it. There are other sources of waste which are just sheer carelessness. I do not see what you can do about that either. I take the position that I do not see any intrinsic merit in discouraging fuel consumption. In general my position is that I would like to discourage the malign sources of fuel and encourage the benign ones.

Q555 Earl of Lindsay: So it would be sensible to prioritise the discouragement of careless waste because it would not have the unintended consequence on overall consumption that some of the energy efficiency strategies can unwittingly have?

Dr Brookes: Yes. As I say, I have to confess that I am not an energy efficiency enthusiast, as you must have guessed. I am very dubious about, first of all, what true energy efficiency can offer, and I think a lot of what is sold to us as energy efficiency is not very efficient at all.

Q556 Lord Patel: I hope I can make this question more readily understood. It is a simple question in terms of, we have now a widespread agreement that we must reduce consumption of fossil fuels. What effect do you think this will have on energy markets?

Dr Brookes: Obviously, the fossil fuels are carboniferous, are they not? If you discourage them, this would mean presumably by taxing them in some way. I would hope that it would lead to discouragement in the use of those fuels, but I would not be too sanguine about it. People seem to be so hooked on using energy. It is almost like being an alcoholic. I would not be entirely sanguine about the measures to discourage it having a great deal of effect in the end. As long as these products are offered on the market, I am sure you will find a very healthy demand for them, whatever you do. Look at the use of fuel for motoring. In my lifetime the cost of motor fuel has gone up by orders of magnitude, but it has not discouraged people from using their cars.

Q557 Lord Patel: So you think the oil companies would make even bigger profits?

Dr Brookes: For the oil companies and the government taken together, it could be, yes. The tax is what we economists call an economic rent, and it tends to go to governments. The OPEC price hikes were brought about by the OPEC countries saying “The consuming governments are enjoying all the rent. Let us have some.” It was such a large amount that they demanded, that the 1970s are notorious for reversal of everything. Some of the relationship between energy consumption and other forms of resource consumption did change in the seventies. 1979 was an exception, when energy productivity growth actually outstripped the general productivity. But what we did see in the Seventies, certainly in America and in Britain, which are the countries I have looked at, was a very sharp drop in economic performance when those prices went up, so obviously, if you go far enough, you can produce some rather drastic results. I would guess though that the sort of taxation that might be used in fact to discourage fossil fuels would not go that far, because governments would shrink from discouraging economic activity.

Chairman: Indeed.

Q558 Lord Wade of Chorlton: From an economic point of view, assuming that what you say is correct and that if, as a result of Kyoto, western governments go for an energy reduction which results in lack of growth in the economy, who will bear the brunt of that problem? Where will that economic problem lie
in terms of those in society? Who will suffer the most if our economy ceases to grow or actually goes backwards?

Dr Brookes: That is a good question. I would expect that you would get the usual effect, that if everyone scaled down, the people at the bottom end are the ones that suffer the most. I remember doing a study some years ago, when we were looking at this business of energy and jobs and it was being argued that we should use labour-intensive forms of energy, coal rather than nuclear for example. I tried to produce graphs of this but came to a stop at the point where one was requiring people to work at below the subsistence level in order to accommodate more labour-intensive forms of energy. The process chops off there, so my guess is that if you went around the world and reduced energy consumption and thus reduced the levels of economic activity, it would inevitably be the poor people at the bottom who would tend to suffer most.

Q559 Lady Platt of Writtle: What is your view of economic instruments such as the EU Emissions Trading Scheme, which are designed to force industry to find economically optimal ways to reduce carbon emissions?

Dr Brookes: In principle, I find myself attracted to the idea of something like emissions trading, but because what it means is that those people who have most to gain from the use of the fuel will get more fuel, and those people who have least to gain will burn less, so in fact we finish up with a movement into a more profitable economic regime. The trouble with the European Union scheme is that it is in fact quite small. Indeed one wonders whether, when you look at the possible savings that might result from this, whether it is worth all the effort. In the UK we have decided that we would apply it principally to the electricity sector. As a supporter of nuclear energy, I would be very happy about that, because the nuclear companies, not needing permission to emit carbon because they do not do it, would profit and the effect would be to increase the relative profitability of nuclear energy. I am sure that is not what the Government intended, but, I think that would be one of the effects. What I am saying is that I like the idea in principle of emissions trading but I do not think that the European Union scheme has very much to offer.

Q560 Lady Platt of Writtle: You talk about taxation to prevent people using more energy, but what about incentivising the things you really want to see—obviously, from your point of view, nuclear as well, but other things too?

Dr Brookes: I have to confess that I think it is only the nuclear one that will make any very large contribution towards non-carbon emitting energy. There is one thing you could do which would encourage it, of course, and that is to excuse it from the Climate Change Levy. At the moment windmills are excluded from the Climate Change Levy but nuclear energy is not, although it produces no effect on climate change. So that is one thing you could do, I suppose.

Q561 Lord Broers: What do you think the impact on the long-term restructuring of developed economies, including the UK is of, for instance, the decline in manufacturing and the growth of service industries? How will this affect the energy market?

Dr Brookes: I think I said earlier that what signs there are tend to suggest that you still get this phenomenon of total factor productivity growth exceeding energy productivity growth, and I suspect there are underlying economic reasons for this. My guess is that that would still continue to be the case, even if you had more of a service element in the economy. It would mean, of course, that there would be more international to-ing and fro-ing. You would be looking to countries like China to produce steel and other manufactured goods but, as I have said, what studies have been made suggest that services are not quite as non-energy-dependent as they are cracked up to be.

Q562 Earl of Lindsay: As UK domestic users now consume more energy in total than industry, what is your view about the contention that policy makers claim that significant net reductions in energy consumption can be achieved in the domestic sector, by insulation or whatever?

Dr Brookes: What we are talking about really is using more capital and less fuel. Houses become more expensive if you have to have a lot of double glazing and a high level of insulation. We have been getting that over quite a long period now. It does not seem to have made a lot of difference to domestic energy consumption, and indeed, your question points out that domestic energy consumption is greater than industrial energy consumption at the moment, so despite all these efforts that have been made to reduce the energy requirements of houses, the domestic sector still consumes more than the industrial sector. Again, I am giving my colours away when I say I do not much like forcing people to do things; in other

1 The real problem with nuclear energy is finding a source of funds for investment in new and replacement stations. The Government has excused itself for the absence of any role for nuclear power in its energy policy statements by saying that no one seems interested in investing in it. The recent reconstruction leaves the company with very little money to play with after they have met the Government’s swinging demands for future regular contributions to the Nuclear Liabilities Fund. However if nuclear power could be given, in addition to excusal from the CCL, the same privileges as renewables—a guaranteed market, prices for their output well above market prices and a fair wind on planning applications—foreign investors (Electricite de France) might be forthcoming.
words, I would rather not have a lot of building regulations requiring people to have very high standards of insulation and so on. I would rather get the prices of the fuels right and leave it to the consumers to optimise their own positions in relation to all the various constraints under which they are operating.

**Q563 Earl of Lindsay:** So price is the only solution that you would offer in terms of a signal to the domestic sector that would prompt a significant net reduction in energy usage?

**Dr Brookes:** Not entirely my position is that I would like to see the carboniferous sources of energy discouraged and the non-carboniferous sources of energy encouraged, and then if this policy delivered the goods and consumers in the domestic sector wanted to be a bit prodigal with their use of energy, the money would come out of their own pockets but they would not be doing anybody any harm.

**Q564 Lord Wade of Chorlton:** If that is your view, how would you deal with the issue of fuel poverty?

**Dr Brookes:** I have a lot of sympathy with the action to reduce fuel poverty, because I am a beneficiary of this wonderful scheme under which you pay a fixed rate and use as much as you like. I forget what it is called now, but I know I pay a fixed amount which is only about half what I used to pay in direct debits for my gas and electricity. This is coming now to social policy rather than economic policy, and I think one would have to argue that if people are at risk from hypothermia or whatever because they are fuel-poor, something should be done to help them.

**Q565 Chairman:** Dr Brookes, thank you very much indeed for answering our questions so well and giving us so much to think about. As the Committee has indicated, you gave us a very interesting paper first of all, which has stimulated us to ask you a lot of questions, and we are very grateful to you for coming quite a long way to talk to us this afternoon. Thank you very much indeed. It has been very interesting to talk to you and we have enjoyed it very much.

**Dr Brookes:** Thank you very much, Lord Chairman, for your kind words.
WEDNESDAY 2 MARCH 2005

Present
Broers, L
Paul, L (Chairman)
Taverne, L

Platt of Whittle, B
Wade of Chorlton, L

Examination of Witnesses
Witnesses: Dr David Welsh, Chair of the Energy Efficiency Working Group, and Mr Matthew Farrow, CBI, examined.

Q566 Chairman: A very warm welcome to you, Mr Welsh and Mr Farrow, and also members of the public. As you know, we are conducting an inquiry into energy efficiency, and this will be our first meeting today with people who are major users of energy. We are looking forward to hearing your evidence. We in the information note you have the Members’ declarations of interest. We are looking at the issue today from the industry point of view, because one of the Government’s stated objectives is to “decouple” economic growth from environmental degradation—by implication, to combine growth with reduced energy consumption by the industrial and business sectors. Do you really think this is economically feasible? Is there any precedent for such decoupling? Industry in the United Kingdom has seen a significant fall in energy consumption since 1990. How much of this has been due to energy efficiency, or is it because we have seen restructuring, including declining production in energy-intensive industries such as the steel industry, along with the exporting of heavy industry overseas, to underdeveloped countries? What scope is there in the future for achieving reductions in energy consumption by means of energy efficiency, rather than restructuring and the export of heavy industry?

Dr Welsh: I am Chair of the CBI Working Group on Energy Efficiency. My principal job is Director of HSE for the Rolls Royce Group. My colleague, Matthew Farrow, is from the CBI, and I propose that Matthew leads on these initial questions. I will support him where I can, and then I will take over on those points particularly germane to the working group.

Mr Farrow: On the question about decoupling economic growth and environmental degradation, you asked if there was any precedent for this, and one can point to areas where it has happened in particular environmental issues. If you look at industrial emissions of nitrous oxides and so on, there have been huge falls since the 1970s, even as sectors have continued to grow. There are particular cases where it has happened. If you look at construction and demolition waste, the graph goes down very steadily through better recycling and better practice and so on, so one can point to where it has happened. Your interest this afternoon is in energy and decoupling economic growth. I suppose it is worth making the point that in terms of degradation energy use, we are really talking about emissions from power generation, and there are obviously large questions if we changed the fuel mix—renewables and nuclear and so on—one could separate energy use from the degradation it causes. I will focus specifically for a moment on energy use and economic growth. We do not have data on it. The DTI has a range of statistics which would give you some help in this area. Our sense is that there are periods where there has been some decoupling, and if you look at individual companies there are examples of those that have made huge gains in energy efficiency, particularly in the energy-intensive sector where there is a huge commercial incentive to do that. The problems that start to occur are that as economic growth continues you find diminishing returns may begin to set in in some of those sectors, and energy growth by the commercial sector, the SME sector, starts to become more significant and more important. The reason why the CBI set up the working group that David chairs was to look particularly at those areas because we felt there was a gap between the Government’s aspirations for energy efficiency and some policy measures that affected those particular sectors.

Q567 Lord Wade of Chorlton: The issue in relation to the evidence we have heard to date that has not persuaded me is that if the Government bring into force their energy efficiency policy, they have actually got to do what they say they want it to do, which is to reduce carbon emissions. If a company makes efficiencies in one level of use of energy, what does it do with what it saves? It might expand the company, or it might develop it somewhere else, or it might start a new process. I wondered what your reaction to that is in a general industrial sense. What is likely to be the impact if Government does create a big change in people’s attitudes and we are more efficient: does that mean that that efficiency would drive itself in terms of less carbon development, or will it mean that the energy and efficiency benefits will go to somewhere else, which is what has happened over the development of our industrial strength? As people
have improved methods of production, all it has meant is that the improved investment opportunities have made money available to develop businesses elsewhere and the economy has grown. What is the reason for thinking that that process would stop?

Mr Farrow: The answer to the question is that it will vary a lot between particular companies, and it is quite hard to generalise across the economy as a whole. What may happen is that as companies improve their energy intensity, so there is less energy use per units of output. There is a question about whether that company is growing or not, and is the energy intensity falling quicker than the growth of the company. My sense is that that will vary a lot depending on the different companies involved. What is happening in the UK is that the industrial sector has cut energy consumption significantly, partly due to energy efficiency and partly due to structural change; but we are now seeing that as the commercial sector economy grows a lot, its energy use is starting to increase. You could say that is because of a shift between different sectors, although business energy use as a whole has fallen, if you combine the two sectors. It seems to us that you need different government policies to affect energy use in the commercial sector, where there is perhaps less direct or less obvious commercial incentives to make progress than in the energy-intensive sector.

Dr Welsh: If a company has got more cash, what is it going to do with it? Stating the obvious, that would depend on the individual company. It may wish to reduce debt, but I think most forward-looking companies will want to invest in additional business. My own observation would be that it would be better for a forward-looking company that is managing these things well to grow, rather than for economic development to stop or for business to move overseas with fewer controls. Everyone round this table knows the very strong historical link between the provision of affordable energy, economic growth and social development which we have to accept and try to get the right balance.

Q568 Chairman: That answers the question we have been dealing with, but we are struggling at the moment with how it will reduce carbon emissions. It is right to say that if you are using less energy you will expand, and that is when economic growth will come, but we are dealing with the Government's White Paper on reducing carbon emissions. Do you have any thoughts on how we can achieve that?

Dr Welsh: One of the issues here is not the provision of energy but how the energy is generated, because I believe, with respect to climate change, we are talking about carbon emissions or greenhouse gas emissions. That means exploring new options, and we should be thinking again about nuclear power and how economically feasible is carbon sequestration from fossil fuels, and how much further can we go in switching fuels—such as from coal to gas—and how much scope there really is for renewables. There are some other questions of expanding the use of combined heating power and other technologies such as fuel cells et cetera. Looking ahead we do have options.

Q569 Lord Taverne: Looking at the overall picture, it may well be that manufacturing industry or industry as such can reduce carbon emissions as a ratio to GDP, but in the light of what has been said about expansion of the commercial sector there seems to be no developed country that has achieved an actual reduction of the ratio. If you look at the tables for the European Union or the US or Japan, they all show a picture where it is coming down per GDP but still overall rising when you look at the total. There would have to be pretty dramatic savings by industry to bring that ratio down. Can you see any prospect of that?

Mr Farrow: I think that goes to the point about leading a different exit policy. In the past, as you say, a lot of countries—and the UK is one—the energy-intensive sectors have had first of all a commercial incentive to do better, and increasingly government policy, the climate change levy and so on to try and push that along. We have seen steady progress in the climate change agreements being delivered in those parts of the economy. Alongside that, we have a commercial sector, perhaps an SME sector, where energy efficiency has not had the same focus. If you look at the graph for business energy consumption as a whole, you do not see the decoupling that you are looking for and which we are talking about. Our sense in the CBI is that there is a lot of scope to increase energy efficiency in the commercial/SME sector, and the Government talks about very ambitious targets for that, but their policy mix is all focused very much on the manufacturing sector. I am sure there is always more that can be done in those sectors, but with the same sort of technology set, diminishing returns set in, and we may see that in the next round of climate change agreements companies may struggle to deliver the same sort of rating improvement. The answer to us is that if the Government is serious about reducing UK emissions in the post Kyoto period and they expect business to deliver its share—which I am sure they do, and which we accept is right—they need to think a lot more about what sort of policy tools to use to push energy efficiency issues in the commercial/SME sector. We recognise that we have a contribution to make to that, which is why the work that David has chaired is aimed specifically at that. It is a question about developing a new set of policies or extending policies for the challenges we have if we are going to get that shift in trend you are looking for.
**Dr Welsh:** I hope we can pick up some of the points of detail when we go to other questions.

**Q570 Lord Broers:** Are there sectors within UK industry that you can see there is now potential for energy efficiency savings?

**Mr Farrow:** If you look at the core commercial sectors like business services and retail, for example, they are not only energy-intensive in that their energy budgets as a proportion of turnover are fairly small, but obviously given their scale and the size of their share of the economy, if they could make gains in that area it would contribute to an overall reduction. There is more scope to make reductions in the energy-intensive sector, but there is a diminishing returns issue. There is probably more scope to look for reductions in the commercial sector and the SME sector.

**Dr Welsh:** One of the points raised by the Powergen survey last year was that around half the SMEs were totally unaware of initiatives on the carbon reduction side, and that seems to be one area that needs to be looked at quite seriously.

**Q571 Lord Broers:** What is it within the retail sector that is currently inefficient! Do shops leave their lights on too long, or have they over-heated? I am struggling a little to see where you would get these savings in the retail sector.

**Mr Farrow:** Perhaps I can give a practical example. One well-known UK retailer that takes these issues very seriously in its stores of various sizes across the UK, found that they have installed half-hourly monitoring of energy use in those stores. That has enabled them to track across the stores that have this technology every half hour what the energy use is, and a lot of that is lighting. They can then work out whether, once the store is closed and the maintenance people are restocking and so on, they are leaving on lights and machinery all night, and they can identify stores where that is happening. They can then put in measures to address that. They have delivered savings through doing that. However, they find that when looking at their smaller stores this sort of monitoring technology costs about £3,000 per store to put in, and some of those very small stores only have an annual energy budget of £3,000, so the payback would be very, very long. In the retail sector, which is very competitive and very fast-moving, it is very difficult for them to justify investment with a pay-back of more than 18 months. There are some things which seem very straightforward and obvious, but in large companies with many thousands of staff operating equipment all over the UK, it is quite difficult for companies to make savings across the piece where they want to. There is an issue about investment and payback.

**Q572 Lord Taverne:** When you talk about energy savings and cost-effective energy investment, is this a conscious result? Is it a deliberate policy to improve energy efficiency, or is this something that really is a by-product of the normal process of replacing outdated plant?

**Mr Farrow:** It is a mixture of both. Often, modern generations of kit tend to be more energy-efficient, or there is less waste in the process. Increasingly, companies with significant energy bills, even if they are a small proportion of turnover, will be looking for investment specifically to reduce energy use. What strikes me in talking to those companies is that it is a competitive world out there, as we all know, and the proposal for investment has to be compared against whatever else it can be used for in the business; so you get into this question of having some investment that could reduce energy use and deliver payback but over six years, and then the market department or process department may say, “we can get payback on investment in three years”. Those are the sorts of issues that companies have to grapple with.

**Dr Welsh:** In many companies the energy bill is a relatively small percentage, and therefore it is a question of how much attention the key decision-makers are going to pay to such matters. My view is that in most businesses, in simple economic terms, if the payback of an energy efficiency project is not within two years, then it will probably not be supported. I think there is some scope there to improve things, simply by emphasising the actual cost reductions that are achievable. In other words, there really are economically attractive investments to be had in many cases, and increasingly now more and more companies are aware of the corporate responsibility issues and big challenges such as climate change. They are more conscious of setting energy reduction targets anyway, and then looking for the most economic way of achieving them.

**Q573 Chairman:** One of the points arising from previous evidence was that if energy prices were raised, that would make the pay-back on investment quicker. Would industry share that view, or would you look at it as something that sounded dreadful?

**Mr Farrow:** Energy prices have risen a lot in the last year or 18 months, in many cases very rapidly without a lot of obvious market warning, and that has caused a lot of energy-intensive companies in particular, but also a broader range of companies, some major problems. It is difficult to generalise. There will be individual companies where an increase in the price may push particular investments across a trigger point, but against that our big concern would be you would have particularly energy-intensive companies that have already made investments because it already made sense for them to do that when energy prices were lower, which cannot make...
much more gains with plant they have; and for them it is just an added cost in very competitive markets. While we would accept there may be individual cases where a shift in energy prices pushes some projects past the trigger point, overall we are very concerned—and the evidence we have had from members through the last round of energy prices—is that for some companies it is very difficult to absorb those increases, which can obviously lead to threats of their competitive position.

Dr Welsh: Some businesses have found that once they start to look at this, there is a lot of zero investment opportunity just through good housekeeping. My own experience is that very significant reductions have been made by just looking at how a company operates and looking at how we deal with energy during the night-time periods and that sort of thing. On top of that there seems to be in many cases investment opportunities with relatively short paybacks. I think there is scope for further improvements but perhaps it is just a question of getting the attention of some of the businesses that have noticeable energy bills but are not necessarily classified as energy-intensive.

Mr Farrow: Our preference would be for emissions trading as the best policy tool to try and drive down emissions across the economy. Why is that? The main reason is that emissions trading has the advantage that you can make a policy decision about the sort of reductions you want to see across Europe or in the UK, and then the trading system should use the market to drive those reductions out at the cheapest cost. That is the principle. The difficulty with a carbon tax is that you have to make a judgment about what level to set the tax, and then everyone will have an expectation about how different companies and individuals might react, but you would not know in advance. If a carbon tax were introduced in the UK at a high level and there was no comparable fiscal measures in other countries that are trading with them, there would be a competitiveness issue. Our concern would be that the carbon tax does not have some of the advantages that emissions trading has, and that is why the CBI has always promoted emissions trading. In fact, we helped to create the UK emissions trading scheme that was a precursor to the European one.

Dr Welsh: I support the view that emissions trading gives you a guaranteed reduction and then by allowing the market to operate you achieve a specific reduction in the most economic way. That seems to make sense. It also avoids a lot of double and multiple regulations to get people to do this, but I would have thought that arguably there is some sense of logic behind a carbon tax. Perhaps the issue is not whether it is a carbon tax or an energy tax, but the level of tax, and that being appropriate and balanced, so that business can successfully operate within a competitive global environment.

Q574 Lord Wade of Chorlton: You have in a sense responded to this already in your previous comment, but clearly much industrial equipment in the past has been designed without much regard to energy consumption because it was not such a major issue in the past. How do you see these new technologies and opportunities for using much more energy-efficient production equipment? If there is a change in attitude in companies, what effect will it have on energy consumption? Do you see the possibilities of changing in this? Do you agree that from the Government’s point of view there ought to be a more effective scheme to encourage people to update the equipment that is being used?

Dr Welsh: To a certain extent that is already happening, in the sense of regulations such as pollution prevention and control, where new plant has to meet certain criteria in terms of energy efficiency and BAT type concepts. That is happening anyway. Perhaps I could reiterate that people are becoming increasingly switched on to the fact that there are good investment opportunities to reduce costs in these areas; and that is further supported by this increasing societal concern over climate change and the fact that companies should be doing something about it. I certainly detect myself a change in attitude, particularly over the last few years.

Q575 Baroness Platt of Writtle: You mentioned nuclear power earlier. How would you feel about the idea of a carbon tax?

Q576 Lord Wade of Chorlton: Supposing there were a carbon tax and the Government decided that it was appropriate and could find there was a balancing-out for the poorer elements in society and so on—what would be the impact of that, in your view, through the economy? If you tax one person, they want to pass it on to somebody else. How would you see that might affect the economy if the Government did impose a carbon tax?

Dr Welsh: My view on that is that it would start to shape the way electricity is generated, and that quite clearly could have cost implications that would affect all users. I think it would clearly favour the low carbon end of the spectrum.

Q577 Lord Wade of Chorlton: It would create a bit of a driver towards nuclear or some other solution to the generation of energy.

Dr Welsh: It could operate in that way. One of the key things we are interested in—and we will cover it in one of the later questions—is the multitude of regulation so that you can end up with all sorts of
bureaucracy and complications that can have a detrimental effect rather than the initial intent; and therefore it is quite important to have some very clear and limited but significant policy instruments to work with.

Q578 Lord Wade of Chorlton: Has the CBI given any consideration to a proposal that we heard from a research organisation attached to Manchester University, where every individual would have a carbon valuation that they controlled, and that that would be distributed equally across all the population; and those who wanted to use carbon could buy it off those who did not use it? That was a proposal presented to us here. I will not tell you my views on it, but I would be interested in your view.

Mr Farrow: It might depend, I suppose, on how you decide the individual allocations. We would all be taking legal advice on revising our plans and so on. We have come across that suggestion, which has been around in the climate change debate, and we have had some discussions with members about it as one of a number of climate-change policies. The view from members has been that it is an interesting idea, obviously, that emissions trading is a good policy tool, and one should not dismiss it. I think, however, a lot of members felt that they could not see it being practically implemented for the foreseeable future. Therefore, until there was some practicable proposal, it was not something the CBI should take a strong view on, for or against. It is interesting, but when you think about the practicalities of it, some people say we would have a swipe card and it would be no different from loyalty cards and that sort of thing, and a lot of our members could not see it being practically implemented in the next ten years, so not something that we should focus on.

Q579 Lord Broers: What are the main barriers in terms of business culture—accounting practices and so on—to increasing the priority afforded to energy efficiency within industry, and what is the CBI doing to overcome them?

Dr Welsh: One of the concerns we should be aware of is the limited number of funds in which businesses could invest, and the great competition for those funds. Associated with this is the limitation on resources in relation to these investment opportunities, and understanding the various initiatives that are going on, and what can be done. On top of that, there is just the challenge of people working close to the coalface on some of these issues being able to present some of these investments in a sensible fashion, which may get the attention of key decision-makers. I guess I am stating the obvious, but then I would also reiterate that things are changing. My own experience in my own company is that we have an energy manager and energy champions. We have a utility strategy group and we are looking for every single way of reducing energy that we can, including setting targets. That still means that you still have to compete with those funds that are available, and there are always challenges.

Mr Farrow: Particularly as you move away from the energy-intensive sector where it is about investment and so on in particular pieces of capital investments, there are issues around employee involvement. In the services sector and retail sector a lot of low cost issues can be made depending on individuals doing obvious things like turning the lights off and operating machinery correctly and so on; and again one of our big retailer members was saying they had a warehouse where they felt they could make real gains in terms of more efficient heating and lighting systems so they did a cost/benefit analysis and installed a piece of equipment which would monitor this and allow the warehouse operators to set the system in particular ways; but then they found when they went back to check some time later how it was working that the person operating it had not been sufficiently trained in it and they thought it was just too complicated and they would leave it on all the time. As you move into the commercial SME sector, there are some quite difficult issues for companies about how you buy it. Boots are doing energy efficiency drives within the company, and they sometimes send commercial information about it to employees’ home addresses to try to make the point that this is not just another edict from management but that it is about lifestyle issues and broad climate change issues and that everyone can play their part. It is just a small thing, but they are trying to look at getting employees to think it is not just one more thing they are being told to do at work, but that it is something that is important.

Q580 Lord Broers: Do you think there are business opportunities in this area? You said it costs £3,000 for an energy monitoring system for a small business. That strikes me as very high and is probably related to the effect of the market, which at the moment at least, is relatively small. If that market expanded, and one included home energy efficiency, I would have thought that that cost could have been brought down by a factor of five.

Mr Farrow: I do not know about the specific case and there may be many different spokes as to particular reasons, but you are absolutely right: there are commercial opportunities in this sort of equipment. One would hope that UK companies would be taking up a chunk of that, and economies of scale might well drive down the cost.

Q581 Lord Wade of Chorlton: In your view, how effective has the Carbon Trust been in promoting and improving energy efficiency and giving it more
energy efficiency: evidence

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awareness within the business and commercial world?

Dr Welsh: For some companies, and probably the larger companies, it has been extremely helpful, particularly access to the £20,000 or so funds per annum (£60,000 over 3 years). Companies that are struggling with resource limitations it can get expert consultants to visit their site. It can provide both the expertise and that critical amount of resource to complement your own internal resource to do something, and then come up with some very useful opportunities. I feel that the Carbon Trust is a very good initiative. There are clearly some areas where we think it would be better if things could be changed. I understand, because of State Aid rules there is a cap of £20,000 per annum. For some companies with multiple sites, £20,000 does not go very far. I just wonder if it is possible to find a means of trying to increase that amount of money because it is a fantastic catalyst to get things moving. That is all on the positive side. On the more negative side, when it comes to the SMEs and small businesses, as I briefly mentioned earlier on, many of these are totally unaware of the advice that is available and some of these opportunities. Therefore, it would appear that one of the recommendations could be to get pertinent information into smaller businesses and SMEs. Some of them can be relatively energy-intensive.

Mr Farrow: As David says, the climate change agreements have been successful overall. The figures are pretty impressive for the carbon savings they have delivered, but it does frustrate us the way that originally eligibility was tied to PPC, which created anomalies and distortions around the edges. We started off this afternoon talking about how difficult it was to decouple energy efficiency growth economic growth conditions and energy use, but we just need a bold approach here. In principle, any sector that is prepared to sign up to quite tough energy reductions ought to be able to develop a climate change agreement; whereas in practice, as David says, the Treasury is, pretty grudgingly to be honest, very gradually, after several years of CBI lobbying, inched open the door a bit; but every time they open it a bit there is a huge amount of red tape if you want to get through that door, and a lot of the companies ask whether it is really worth it. The issue is as important as Government say it is, but we just need to be a bit braver with the policy approach.

Q582 Lord Taverne: In your working group, what, if any, has been the effect of climate change agreements since 2001? What is your assessment of that?

Dr Welsh: Climate change agreements, in combination with the climate change levy, have been a positive step because the 80 per cent rebate has provided the catalyst to do things. Matthew may want to help you further, but my understanding is that the climate change levy itself has been probably quite a blunt instrument and not necessarily very effective, particularly for those companies where energy is a relatively low percentage of their operating costs. Where you combine it with the climate change agreement, it really gives businesses the opportunity to go out and make some real savings. They make financial saving and tax saving but they also make some real energy savings. Combining those two measures is a big point. There are obviously lots of difficulties. Clearly, recent changes in government policy have tried to expand the types of businesses that could go into the climate change agreements on the so-called 12 per cent rule and 3 per cent rule, but our own experience in that area is that we found it extremely bureaucratic to the point that even competent energy managers are saying “I just do not think we can do this. By the time we put in metering and everything else, it is not worth doing.” There are certainly areas for improvement, in particular reducing red tape and allowing more companies to participate.

Mr Farrow: Overall, the impact of the trading scheme will vary a lot, depending on the sector and installation. There are a lot of issues about particular sectors; installations and how their allocations are being developed. In terms of the dispute between the Government and the Commission, we feel strongly that the Government was right to apply for a revised national allocation plan with the increased cap. The reason we feel that is because, as the Government itself admitted, they got the projections wrong. They had a desire, which we can understand, to get the UK plan submitted early, to show a lead to other Member States; and so they were using projections and making a judgment about the cut which business would have to make against its energy projections. They then found out that the projections were flawed quite significantly, and they under-estimated the trend in emissions. In broad terms they split the pain of reconciling the original emissions with the cap, pretty much half and half—half in business having to make a much sharper cut in its trend, 5 per cent against trend compared to 2.7 per cent against trend; and the other half in going to the Commission and saying the figures were wrong and could they have an increased cap. So we felt the Government was absolutely right to apply for the revised allocation plan. Obviously, at the moment it is a difficult position because there is uncertainty about the status of the UK and the outcome of that resolution; but we
felt the Government was right to apply for the revision.

**Q584 Lord Wade of Chorlton:** This comes to the point that Mr Welsh made earlier about a whole confusion of different policies with the climate change levy, climate change agreements, UK and EU emission trading schemes. Is there a danger that with these various schemes overlapping that there is economically a division between what is carbon saving and what is energy saving? Clearly, from your earlier comments it is a matter that your group will look at.

**Dr Welsh:** There are probably several issues here. One is just the bureaucracy and complexity of the entire thing, and then often the resources issues associated with that, and also the deterrent it may have. Looking at the PP&C regulations in isolation, they are quite a difficult thing to work through anyway. In the case of my company, even though we have some good people, we have still had to recruit consultants to complete the permit process. Hence, we have a cost associated with those sets of regulations; we have further cost related to the climate change levy and climate change agreements, because we have to make agreements and investments; we are then also subjected to the emissions trading scheme, where there are also some anomalies. I did not mention the last one. If I understand the figures correctly, in terms of my own company, where we have been in climate change agreements there is probably a relatively modest reduction of emissions required of around 5 per cent, but those sites that have been included in the emissions trading scheme but have not been in a climate change agreement, then we might be looking for reductions in the order of 51 per cent, which appears to be totally disproportionate. So there are even further costs there. Also, this allocation does not seem to take into account several years of programmes to reduce energy consumption in non CCA sites. On top of that, we will end up paying higher electricity prices anyway, because it will clearly affect the power generators. We are really seeing here a mix of double and probably multiple regulation. This is where we come back to the favoured CBI position; if you want to reduce carbon, go for carbon trading, but really try to simplify this entire system because if not it will slow the whole process down.

**Q585 Lord Wade of Chorlton:** Can I follow that up with a slightly more general question? The purpose of the Committee studying this is to look at how effective the Government’s energy efficiency systems will be on reducing what it says it wants to do, which is to reduce carbon emissions. Obviously, governments have political matters to take into consideration, which the CBI does not to quite the same extent; but if you were faced with the same issue, how would you tackle it? If you had to take a view that we have to find ways of reducing our carbon emissions, do you think that the Government’s policy in the general sense of looking at renewable energy and energy efficiency coupled with the other things that will take place anyway, is the right way to do it; or would you think there are more straightforward and sensible, or more business-like or industrial ways of dealing with it that might be slightly different?

**Mr Farrow:** It is a topical issue because the climate change programme is being reviewed, and it is very much around that. Our view would be that they have to look at the fuel mix issue. There is the question of how easy it would be to meet the 2050 target, which is very ambitious, without something like more nuclear generation, carbon capturing storage use issues; so the Government must look carefully at all these types of issues as part of it. Our other frustration is that the focus has been far too much on the business sector. The figures we have looked at suggest that it is the business sector that has pretty much delivered the Kyoto targets—if you look at business-derived emissions both through use of energy and power generation through zone transport and industrial emissions. The decrease since 1990 has pretty much been to meet the Kyoto targets, whereas if you look at the household sector and household emissions and private transport, there has barely been any change at all, like a small drop. If we say the Government is right to set these ambitious targets, if one assumes we have to have—they have to look at the fuel mix and at ways of having much more direct policies that affect the non-business parts of the economy. It is not enough to say—of course business has more to do but the idea that business can deliver all the targets and keep on tightening—it will not deliver the sort of targets they are looking for.

**Dr Welsh:** I wondered if I could summarise a few specific points on SMEs and the commercial sector. On the SME side, from the evidence we have seen, we need better promotion of government schemes and we need some form of specific awareness-raising. There is some opportunity to expand the interest-free loan scheme for SMEs in installing energy efficiency measures. I understand that this has been successful in Scotland but it is cash-limited in England and Wales. In terms of product standards, particularly in small businesses, is there any way there could be some wider energy labelling, just to make those choices easier? It might be a practical step. Could there be further fiscal incentives such as reduced VAT or selected energy efficiency goods and services. Making the point that energy conservation products carrying levels of VAT on them which would act as a deterrent. On the commercial sector, we think that Government policy of operating within buildings in the upper quartile of energy efficiency is a very good
leadership step, and that could help influence the market. Perhaps they could go even further with their procurement policies on energy products and energy services. We think there could be some further movement in terms of the new requirement for public sector buildings to display an energy performance certificate, being also applied to the commercial sector. That should help improve the energy efficiency of buildings in rental markets. In addition, consideration should be given to widening the scope of the processes and products eligible for enhanced capital allowances, which could include things like the building fabric, lighting and energy services. What can be done to encourage people in this area? We have already mentioned the idea of trying to widen accessibility to climate change agreements, and the fact that the climate change levy is in itself a rather blunt instrument. There is at least some suggestion that the enforcement regime on current regulations is not where it should be, and perhaps that could be looked at in more detail to ensure effective enforcement of existing building regulations. There is also the possibility of stamp duty relief on commercial leases. A further point could be that where there are good leadership examples in industry, wherever they may be, then an organisation like the Carbon Trust could help use these as examples or case studies to help encourage other businesses to participate.

Q586 Chairman: What is the confidence level of energy efficiency of buildings in rental markets. In addition, industry that they would be able to meet their portion of the Kyoto commitment?

Mr Farrow: The Kyoto target is for a 12.5 percent cut in all greenhouse gas emissions, and our figures are that it depends exactly how you define business and how you cut the cake, as it were.

Chairman: I am sorry for the interruption, we will have to finish now. Can you send us in writing any points that you might have? Thank you very much for coming.

The Committee suspended from 4.35 pm to 4.44 pm for a division in the House

Memorandum by the British Cement Association

INTRODUCTION

1. As the manufacturer of the major component of one of the world’s most used materials—concrete, whose global usage is second only to that of water—the cement industry has a number of direct and indirect impacts on the use of energy:

1.1 The energy efficiency of its manufacturing operations, and the replacement of fossil fuels by waste-derived materials from other industry sectors;

1.2 The use of waste-derived materials from other industry sectors as replacement raw materials;

1.3 The design and use of cementitious products in relation to the energy efficiency of buildings; and

1.4 The use of cement and lime products for the remediation of brownfield land.

2. The evidence in this response of the British Cement Association reflects the energy efficiency issues specific to each of these areas.

ENERGY EFFICIENCY AND CLIMATE CHANGE MEASURES

3. The manufacture of cement is an energy intensive process, and within the United Kingdom the cement sector is responsible for approximately 2 per cent of the anthropogenic emissions of carbon dioxide.

4. Energy represents approximately 35 per cent of the variable costs of cement manufacture, and therefore it is a primary concern of the industry to take all cost effective measures to improve energy efficiency and thereby reduce its emissions of carbon dioxide.

5. There is a lower level of cement usage in the UK (~225 kg/person/annum), compared with that in mainland Europe (400–500 kg/person/annum), which suggests that domestic buildings regulations do not reflect the benefits that may be achieved by utilising the high thermal efficiency of concrete structures.

6. Within cement manufacture, there are direct emissions of CO₂ resulting from the calcination of limestone (~525 kg/tonne cement clinker¹) and from the kiln fuel (~375 kg/tonne cement clinker¹). In addition, the indirect emissions associated with the energy consumption in the process are ~ 70 kg/tonne cement clinker.

7. Large CO₂ reductions may be achieved through:

— Investment in new plant;

¹ Data from Castle Cement.
— Replace fossil fuel with waste-derived fuels;
— Shifting production to large, modern efficient kilns; and
— Reducing air ingress into kilns.

8. Smaller reduction in CO₂ emissions are possible through:
— Electrical efficiency improvements;
— Control of compressed air;
— Improvement of control systems; and
— Optimization of raw material chemistry.

9. Cement companies in the United Kingdom are engaged in a number of voluntary and mandatory measures relating to the improvement of energy efficiency and the reduction of carbon emissions.

9.1 UK Climate Change Levy Scheme, (UK CCLA);
9.2 Trading of Emissions within the UK, (UK ETS);
9.3 EU Emissions Trading Scheme, (EU ETS);
9.4 World Business Council for Sustainable Development—Cement Sustainability Initiative; and
9.5 Member company schemes.

10. Details of these are given in Annex I.

11. The major objective of all of these schemes is the reduction of greenhouse gas emissions, and as such their treatment of other issues, such as the use of waste-derived materials, is secondary. Whereas the use of waste-derived fuels is regarded as a beneficial component in reducing CO₂ emissions in the UK CCLA, this is not the case in the EU ETS, except in the case of biomass.

12. Furthermore, GHG emissions arising from the generation of electricity are treated differently in each of these schemes. Inclusion of electricity in the UK Climate Change Levy scheme gives consumers/users a direct incentive to use and source their electrical power efficiently, whilst its exclusion, such as in the EU ETS, makes the generators responsible for all their point source emissions.

13. Compared with other materials, cement has the highest CO₂ emissions per unit of profit, and along with lime, cement has the highest CO₂ emissions per unit of turnover. An EU emission trading allowance price of €15/tonne CO₂ will approximately double the variable cost of production. [€15/tonne equates to about the cost of transport per tonne of cement from the Far East].

**Resource Optimization**

14. Increasingly, waste-derived materials are used by the cement industry, either as a replacement for fossil fuels or as a substitute for more conventional raw materials.

15. In 2001, 4,370,000 tonnes of waste were recovered in European cement kilns through their use as fuels, saving 3.5 million tonnes of coal and resulting in significant reduction in stack emissions. In addition, the cement industry achieved a direct saving of 11.5 per cent of its natural mineral raw materials usage, equivalent to almost 35 million tonnes of these materials.

16. Such replacements have demonstrable environmental benefits, and it is therefore important that legislative measures relating to energy efficiency take an holistic approach, and do not discourage their application. Moreover, alternative fuel use in the UK cement kilns should be actively encouraged by policy measures in order to realize the waste hierarchy benefits achieved in other European countries.

**Buildings Efficiency**

17. There is good potential for technological improvements to the energy efficiency of new and existing buildings, especially in the field of thermal mass. However, this would benefit from substantially more information and guidance in order to help overcome key barriers to its uptake. In addition, the use of thermal mass must feature strongly in the Building Regulations, and government initiatives such as the Code for Sustainable Building.

18. Key barriers to the uptake of many technological improvements in the construction industry include design risk, cost and a lack of awareness and information.

19. Legislation is a crucial driver in the application of technical innovation to achieve greater energy efficiency in building design. The proposed changes to Part L of the Building Regulations are an important step forward in the use of thermal mass, but the industry is slow to adapt, and much more will need to be done to realize
the full potential of this technology. It must therefore continue to feature strongly in future revisions to Part L, along with other initiatives such as the Code for Sustainable Building, recommended by the Government’s Sustainable Buildings Task Group and currently being drafted by ODPM. These must in turn, be backed up by adequate design guidance and information.

Remediation of Brownfield Sites

20. Stabilization/solidification (S/S) is a civil engineering-based remediation technique in which contaminated soil is mixed with cementitious materials to improve its engineering properties and immobilize contaminants.

21. This is an increasingly important contribution to sustainable construction. The use of stabilization/solidification means that disposal of contaminated materials to landfill is minimized, which may in turn obviate the need for imported granular fill.

22. This has a number of benefits. The implementation of the Landfill Directive and the modifications to the hazardous waste regulations are diverting waste from landfill sites, the traditional recipient of “dig and dump” material. In addition to providing a treatment option higher up the waste hierarchy, stabilization/solidification has the added benefits of reducing in-vehicle movements and the associated noise and dust.

23. Where landfill disposal is the only disposal option, stabilization/solidification can reduce the volume as well as render the material more inert and so present a considerable reduction in long term environmental risk.

BCA Response to Specific Questions Raised by the Committee

Q1. The most appropriate measure of energy efficiency and the relationship between improvements in energy efficiency and overall energy use and carbon emissions

24. The BCA believes that the “most appropriate measure of energy efficiency” will depend upon the use and context of such a measure—legislative, commercial, production, design. This differs in each the applications of cement listed in sections 1.1 to 1.4 and these are discussed below.

Energy efficiency of cement manufacture

25. Whilst for policy issues, the emission of greenhouse gases is the obvious measure, this is not the case in manufacturing industry. For cement production, specific energy consumption (kWh/unit of output, ie tonnes of clinker) is more relevant since the thermal input to the process is of primary concern (rather than the emissions of carbon dioxide). For the replacement of fossil fuels by waste-derived fuels, the calorific value and chemical composition of the fuel are major considerations.

26. However, the advent of the EU Emissions Trading Scheme has raised the importance of the emissions of CO₂ from replacement fuels relative to that from conventional fuels. Likewise, the association of a finite cost with carbon emissions has also increased the significance of actual CO₂ emissions.

27. The lower energy consumption, whether through the use of fuels (thermal energy) or electrical consumption (electrical energy) gives a lower emission of carbon on a like-for-like basis assuming the fuels used per kWh contain equivalent amounts of carbon.

28. Where the thermal energy is generated from carbon-containing fuels or from electrical energy generated by the use of carbon-containing fuels there is a direct relationship between the fuel/electricity usage and the carbon emitted as CO₂.

29. Paragraph 15 indicates the levels of benefits that are being achieved through the use of waste-derived fuels within the European cement industry.

30. As with the replacement of raw materials, below, the industry’s primary concern is with the use of the waste-derived substitute within the process, rather than the full life cycle impacts of its use, which would generate further environmental benefits.
Use of replacement raw materials

31. The use of waste-derived raw materials in the cement making process has a minimal effect on the specific energy consumption, but some substances such as blast furnace slag added post-processing can result in an overall reduction in CO₂ emissions.

32. Paragraph 15 indicates the level of benefits that is being achieved through the use of replacement raw materials within the European cement industry.

Building design

33. The cement and concrete sector has recently responded to the ODPM consultation on the proposed revisions to Part L of the Building Regulations, in which it suggested that to ensure that the benefits of thermal mass are properly represented in the compliance methodology. This would ensure the energy saving potential associated with this technology is fully included in the building performance calculations.

34. Included in the Government’s proposed changes to the Building Regulations is a suggestion that greater reliance could be made on design guidance produced across the industry which, subject to peer review, could be endorsed by the ODPM as an appropriate source of information. Education and guidance are essential for raising awareness and encouraging the uptake of new technologies. The cement and concrete sector support this proposal and have indicated their desire to participate in the scheme.

35. The proposed changes to Part L are an important step forward in the use of thermal mass, see section 56, but the industry is slow to adapt, and much more will need to be done if the full potential of this technology is going to be reached. It should feature strongly in future revisions to Part L, along with other initiatives such as the Code for Sustainable Building currently being drafted. These must in turn be backed up adequate design guidance and information.

Contaminated land

36. Stabilization/Solidification is an accepted technique in the United States, accounting for over 25 per cent of the US Superfund remediation of contaminated site, and being regarded as the “best available demonstrative technique”.

37. Within the UK there are 20,000 contaminated sites that require to be recovered. A substantial number of the more readily treatable sites have been “cherry picked” and a total of £0.5 billion has been spent on remediation. The remaining sites account for 66,000 ha, and stabilization/solidification using a cement-based product can result in a 75 per cent cost saving compared with that of landfilling [prior to July 2004 and introduction of Waste Acceptance criteria].

38. A single 400 ha site in the UK, with contamination 4–5m deep, was treated with a cement-based product within seven days, with a saving £0.6 million. The total of 28 delivery lorries of the treatment material “saved” up to 2,500 lorry loads of waste to landfill under a “dig and dump” regime.

Q2. The behavioural Aspects of energy efficiency scheme—the quantity and quality of information

39. In view of the high energy usage in the cement industry, an awareness of all related aspects—current and future costs, energy sources, stockpiles, specific consumption—is paramount.

40. As a consequence, the reduction of energy costs is a major driver for business, in addition to any environmental considerations, and the industry has a long history in the reduction of costs in this area. A corollary of this is a requirement for reliable monitoring and reporting data.

41. The introduction of the UK Climate Change Levy introduced further demands on monitoring and reporting in relation to the verification of the base-line data for the scheme (1990 in the case of cement), the achievement of improved energy efficiencies in each of the target years (2002 and 2004 to date), and the accreditation of carbon credits for trading as the consequence of the overachievement of these targets.

42. CCLA-related data have been audited by government-appointed consultants, and where trading has taken place within this scheme of the UK ETS, the data have been further verified by external auditors.

43. The EU Emissions Trading Scheme places further demands on its participants, and the monitoring and reporting data are subject to specific provisions.

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1 Data presented by a number of authors at a workshop on “The remediation of Brownfield Land using cement and lime”, on 26 October 2004, organized by the British Cement Association, the British Lime Association, and the Cornet Centre.

2 Halton, Cheshire.

Q3. The scope and incentives for improving energy efficiency, and reducing waste, across the economy, in both private and public sectors

44. The UK Climate Change Levy Scheme uses an 80 per cent reduction on the levy on a range of fuels as a means of ensuring that the targets within the Agreement are met and maintained. Furthermore, the inclusion of waste-derived fuels at zero rate encourages the wider use of these materials.

45. In the 2004 review of CCLA targets, the over-achievement of companies in earlier target periods was viewed by government as a reflection of undemanding (first period) targets rather than of good performance. This approach did not facilitate the rewarding of high achievement, and was regarded by industry as a substantial disincentive.

46. In addition, the poor science behind the establishment of the regulations associated with the “dual fuels” provisions of the UK CCLA, was the basis of discrimination between industry sectors.

47. With regard to the UK Emissions Trading Scheme, the industry was concerned at Defra’s suggested interference with this market-based regulatory instrument which would compromise contractual agreements it has made with UK ETS participants.

48. BCA believes such a late intervention during the UK ETS would undermine government credibility in not only this scheme, but any future market mechanism. The intention of environmental regulation using economic instruments is to deliver environmental improvement at the lowest cost. The market should decide the price and supply of allowances and this allows industry to choose between abatement and trading.

49. Whilst accepting that some participants may have significantly overachieved, this has been to the benefit of the environment. The effects of this possibility on emissions trading should have been addressed by a more careful consideration of the scheme during its genesis.

Q4. The potential for technological improvements to the energy of new and existing buildings, and how these should be implemented

50. Significant potential exists for greater energy efficiency in new and existing buildings driven by technological improvements. However, the construction industry is historically wary of change and is often slow to embrace technological improvements, especially within mainstream building design. Specific barriers to uptake centre largely on the inter-related issues of design risk (real or perceived), cost and a lack of awareness by designers, constructors and purchasers.

51. The ratio of design and construction costs compared to the costs of operating a building is \(1:5\). Hence whole life costs must be taken into consideration. In addition there are potential savings offered by new and innovative methods of construction.

52. Much can be done to tackle issues relating to risk and awareness though the provision of practical application and design guidance. Construction clients also need to be educated, so they are made aware of the savings that that technological improvements can bring to their operating costs. A knowledgeable client can ensure that the application of relevant technologies is adequately addressed at the design briefing stage of a new construction project.

53. Anecdotal evidence shows that often, the house-buying public has little interest in modern methods of construction and energy saving technologies, preferring traditional approaches to house building. Some developers that use modern methods of construction do not actively draw the buyers’ attention to this fact.

54. A house with a very good Standard Assessments Procedure (SAP) rating tends to be no more desirable than one with a lesser rating. To counter this, the developers need to place more emphasis on energy efficiency in their marketing strategy, and help raise awareness among their customers.

55. However, once the public grasp the concept of SAP, as they have with the energy labelling of white goods, their preference is likely to be for houses with a good rating, incorporating the latest technological improvements.

56. Thermal mass is a term used to describe the ability of a material to absorb and retain heat. It can be used to good effect in the fabric of a building by allowing it to absorb heat gains during the day and subsequently releasing them at night with the aid of natural or mechanical ventilation. This process has the effect of moderating the temperature swing within the building and lowering the peak temperature experienced during the occupied period by approximately 3\(^\circ\)C.\(^6\)

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57. “Heavyweight buildings” such as those with concrete frames and floor slabs provide a high a level of thermal mass and perform very well. The energy consumption of well-designed, high thermal mass buildings is typically about half that associated with a modern, good practice air conditioned office such as Building Type Three described in Econ 19. 6

58. Thermal mass can be applied to many types of new and existing buildings, which is particularly important when it is considered that ‘new build’ represents only about 2–3 per cent of the UK building stock.

59. Recently completed research undertaken by Arup and commissioned by DTI, highlights the key role that thermal mass is set to play in limiting overheating and helping avoid air conditioning as climate change drives up temperatures. Predicted changes in the UK climate, indicate that average annual temperatures are likely to increase by 2°C to 3.5°C this century. 7 This will result in warmer summers and milder winters, effectively increasing the energy demand for cooling and reducing that required for heating. It is therefore vital that this does not lead to a greater uptake of energy intensive air conditioning.

60. To counter this, the exploitation of thermal mass in building design can provide a major enhancement in energy efficiency, enabling air conditioning to be avoided in many new buildings, and minimising its use in others. This could make a significant contribution in helping cut CO₂ emissions associated with the operation of buildings, which account for approximately 50 per cent of the total energy used in the UK. A small improvement in energy efficiency within this sector will translate into a large reduction in the release of CO₂ into the atmosphere.

61. The application of thermal mass is not limited to new building projects; many existing buildings can be refitted to take advantage of their inherent thermal mass, which will extend their useful life and avoid the need for retrofitting air conditioning. This can be achieved through the removal of wall and floor coverings such as suspended ceilings, which effectively block the thermal mass contained in the floor slab. The relevance of this design solution can be gauged by a recent article in Building journal stating that experts are predicting 70 per cent of Britain’s office buildings will be unusable by the summer of 2030 due to climate change. 8 It should also be remembered that new build only represents a around 2–3 per cent of the UK building stock.

62. As the largest procurer of construction industry services, government is in a privileged position for setting the benchmark for sustainable construction projects for schools, hospitals, other public buildings, as well as transport infrastructure projects. These too should not be short term solutions, but look to the longer term and be based on whole life performance not just initial or lowest cost. The same principles should be extended to local government.

Q5. The development and promotion of energy-efficient consumer goods

Q6. Innovative schemes for district heating or combined heat and power in order to reduce overall energy demand

63. These questions are not applicable to the cement industry.

Q7. The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications

64. Energy policy, building regulations, waste and climate change policies and environmental taxation currently each reside in a different government department. In order that further steps towards a more sustainable future can be made it is imperative that public policy is overseen, co-ordinated and guided from one point, rather than been scattered through a variety of government departments, each with differing agendas and priorities.

October 2004

Annex I

UK CEMENT INDUSTRY AND CLIMATE CHANGE

1. UK Climate Change Levy Scheme BCA and its members have Climate Change Agreements (CCA) with government, signed in 2000, which will deliver a 25.6 per cent improvement in energy efficiency over the period from the baseline year 1990 to 2010. At the first milestone reporting in 2002 it was on course to deliver the target with a 13.2 per cent improvement.

2. Ahead of the reporting of the second milestone phase of the Agreement at the end of this year, the targets for 2006, 2008 and 2010 have been reviewed by Government and industry, and revisions agreed. A further review is to be undertaken in 2008.

3. Trading of Emissions within the UK Lafarge Cement UK, is a direct participant in the UK Emissions Trading scheme, and other BCA members have experience of trading carbon through their membership of the Climate Change Levy Scheme.

4. EU Emissions Trading Scheme, (EU ETS) The industry is one of the sectors prescribed for mandatory inclusion in the EU ETS, either from its initial implementation in January 2005, or from January 2008 under the “opt out” provisions.

5. BCA and its member companies have been working with Defra, DTI, and their consultants in relation to the development of the EU ETS and its implementation within the United Kingdom. These discussions have taken place with government and the sector or member company, as appropriate, and have been supplemented by the discussions of the Emissions Trading Group, ETG, with Government. BCA is an active participant of the ETS.

6. At the European level, BCA has been working with other European cement manufacturers, through CEMBUREAU. In addition to the development of common issues, CEMBUREAU is in direct communication with the European Commission.

7. World Business Council for Sustainable Development—Cement Sustainability Initiative, (WBCSD CSI). With the commitment of over 2/3 of the world’s cement manufacturers, this programme has formulated an agreed a global protocol for the reporting of greenhouse gas emissions.

7.1 Through their parent companies, Lafarge Cement UK, Castle Cement, and Rugby Cement are committed to carbon reductions through the World Business Council for Sustainable Development Cement Sustainability Initiative, (WBCSD CSI). In addition, Buxton Lime Industries has undertaken to adopt the commitments within the WBCSD CSI.

8. Other Voluntary Measures Under the WWF Climate Savers Programme, Lafarge Cement has made the commitment to 10 per cent reduction in absolute level of CO₂ in Annex I countries, 1990 to 2010. Internally, there is also a company commitment to 20 per cent reduction of unit based emissions worldwide, 1990 to 2010.

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Examination of Witnesses

Witnesses: Dr DAVID HARRIS, Secretary General and Mr MARK ASKEW, Technical Manager, Aluminium Federation, Mr MIKE GILBERT, Chief Executive Officer, British Cement Association, and Mr RICHARD BOARDER, Fuels Manager, Castle Cement, examined.

Q587 Chairman: Gentlemen, thank you very much for coming. Can you start by introducing yourselves, and if there is anything you want to say in the way of an opening statement, you are welcome to do so. Mr Gilbert: Thank you for the opportunity to present oral evidence in this matter. I should like to introduce Dick Boarder; he is the General Manager Energy of Castle Cement, and he also chairs the cement industry’s committee on climate change and energy matters. I am the Chief Executive of British Cement Association, and I have a background in architecture and environmental management as well. Our original submission was based on two key aspects of energy efficiency. One is the efficiency in the energy-intensive cement production process, the actual making of cement, and energy is 35 per cent of our costs. The industry is committed to a 26 per cent reduction in energy use as part of our climate change levy agreement. It is related to a £400 million investment programme in new plant and growth in alternative fuels use. Second is the energy efficiency in building design, 80 per cent of cement that we make goes into buildings of some kind or another, and the appropriate use of cement in concrete products in land remediation, basements and long-life, low-energy buildings can contribute significantly to sustainable construction and communities. Since our submissions there have been a number of changes on the positive side. The climate change levy agreement milestone for 2004 for the industry has been met—we have had assessment and audit done. A chart has been circulated to the Committee which indicates where we are meant to be going, down the red line, and where we actually are going, down the green line. We are well ahead on delivering our energy improvements as an industry sector, and it is a significant delivery that we are on track for. Equally, the Substitute Fuels Protocol, which governs the uptake of alternative fuels in the industry, has been revised by the Environment Agency, and again that is going to be beneficial to enable the industry to gain environmental energy and CO₂ from using alternative fuel. On the other hand, the EU sector allocation for the emissions trading scheme is still incorrect two months into the scheme; we still do not have agreement on what is happening in our
companies. We still have problems on the Customs and Excise decision on dual fuels allocation; and energy prices, as you have already heard this afternoon, are showing significant increases and are very important to the industry. On product use equally we have some good news: in January one of our partner bodies in the industry sponsored a basement conference, and that was strongly supported by a Government Minister, and there has been good progress on the Code for Sustainable Buildings, which is performance-based. We support that. Unfortunately, we still see some tensions in Government between the ODPM looking for short-life buildings, whereas the DTI-sponsored research, which we strongly support, shows the benefits of constructing and using thermal mass to provide long-life, low-energy buildings.

Dr Harris: Thank you, my Lord, for the opportunity to give evidence to the Committee. We represent the UK aluminium industry. I am the Secretary General and my colleague, Mark Askew, is the Technical Manager of the Aluminium Federation. I have just quickly calculated that between us we have 70 years in the aluminium industry, but I have to say I have more than he has. The aluminium industry in the UK represents primary aluminium production, fabrication, rolling, extrusion, forging, casting, aluminium finishing processes, all of the end uses of aluminium in transport, building and construction, and packaging; and finally, at the end of the life of the aluminium articles we also represent the aluminium recycling industry. Energy efficiency has always been a priority for the aluminium industry in order to stay competitive, not only against competitive materials but against the aluminium industries in other parts of the world. The primary aluminium production could be said to be energy intensive, but I do have to point out that the use of aluminium, where it replaces heavier materials, such as cast iron and, dare I say it, steel even, saves more energy than is required to produce that aluminium in the first place. Finally, we save appreciable amounts of energy with aluminium recycling. If we recycle aluminium, per tonne of product we only need five per cent of the energy required through the primary route. When we maximise recycling we have considerable energy saving. If there is a view that an increase in energy price leads to a reduction in energy consumption, you have to accept the view that primary aluminium production will inevitably move out of the UK; it will move out of Europe and it will move to those parts of the world where energy is available at a lower cost and perhaps with a more reliable long-term future. I then have to point out that if we do close efficient primary production in the UK, that aluminium will still be used in the UK, but it will be produced in primary smelters in other parts of the world that are less energy-efficient. Effectively, if we are looking at global warming, the position will have got worse. Before the introduction of the climate change levy, our Association was in discussion with Government for a voluntary agreement to improve energy efficiency from 1990 base levels by 20 per cent, but we really did not need the climate change levy to do what the industry was volunteering to do. Our performance to date with the climate change levy is that our emissions since 1990 levels of carbon dioxide equivalent have reduced by 30 per cent, and at the same time we have increased our production by 30 per cent. I have to say that we find the climate change levy bureaucratic. It was costly to administer. Most of those costs fell on Trade Associations such as ours, where we had to take on extra staff to do the number-crunching. The choice of IPPC as an entry into negotiated agreement was controversial, and in our opinion a poor decision. To charge a 20 per cent rate of the levy even to those companies that achieve their agreement in a negotiated agreement, I think was a poor decision. I would have much rather the Government encouraged that money to have been spent on improving energy efficiency in companies rather than take it as a tax. The relationship between the climate change levy and the EU Emissions Trading Directive has I think been poorly planned, and to say, as the Government has done, that climate change levy was fiscally neutral completely understates the position for the aluminium industry, which is a high-energy user and yet has low employment numbers. If you are in a situation where you have small energy consumption and employ a large number of people, then the reduction in the NIC contribution that was awarded means you are actually paid money under the climate change levy, while industries such as the aluminium industry were net payers. Fiscally neutral? Not for the aluminium industry.

Q588 Chairman: Thank you very much for that information. I should declare an interest in that one of my group of companies is in the business of aluminium casting. You have given the trends in your industry, but can you give us some figures on energy consumption and greenhouse gas emissions for both industries? What proportion of UK industrial and business greenhouse gas emissions is represented by your industries? Has that proportion changed and what changes are predicted between now and 2020? Mr Gilbert: The cement industry with plant in the UK—the four companies generated something around 1.8 per cent of UK CO₂. In terms of what has been actually happening in greater detail, Dick will talk you through some numbers.
Mr Boarder: My Lord Chairman, the cement industry has shown a reduction in carbon dioxide emissions since 1990, and that comes from a number of sources. Firstly, there has been a slight decline in production of cement since 1990. In 1990 we produced 13.7 million tonnes and in 2002, which I will use as a base if I may, it is 11.54, which is a reduction of some 16 per cent. We expect to see a reduction in emissions greater than that, and in fact the CO₂ in 1990 was 13.2 million tonnes and in 2002 it was 10.1 million tonnes, and that is a reduction of 23 per cent since 1990 to 2002. If we divide one number by the other, we come up with the tonnes of CO₂ per tonne of product, namely in 1990 0.96 per cent tonnes of CO₂ per tonne of cement, and 0.88 per cent in 2002; so we have seen a net reduction of 8.5 per cent per tonne of cement. When we make cement we have two sources of CO₂ in our plants; we have processed CO₂ which comes from the de-carbonation of limestone. This is something that is governed by the rules of thermodynamics and chemistry, something we cannot do anything about; and we have CO₂ from the fuel we use, which we can make a difference to. If we subtract the CO₂ from the process, from the CO₂ per tonne of product, we end up with CO₂ from fuel per tonne of cement of 0.43 tonnes of CO₂ per tonne of product in 1990, and 0.355 tonnes of CO₂ per tonne of product in 2002; and that is an 18 per cent reduction which we in our industry are very proud of. It has been achieved by investment, by improvements to existing plants, and to some small extent by the introduction of fuels that contain biomass. I should make quite clear that the figures we present for our climate change agreement are slightly different in that the climate change agreement treats all waste-derived fuels as zero CO₂ and I have included within these figures CO₂ from waste-derived fuels except biomass. We would be happy to submit a table containing this information.

Dr Harris: For the aluminium industry, you have to remember that under the climate change levy we have five different agreements because each of the sectors are quite different. We are looking at primary production, recycling, rolling, extrusion and finishing. If we strung all of those together, our base year carbon dioxide equivalent emission is 7.3 per million tonnes, and the figure for 2004 and yet to be audited was 5.1 per million tonnes; so since our base year of 1990 we have reduced our CO₂ equivalent emissions from 7.3 to 5.1 per million. We are on line to achieve the target, which will run up to 2012.

Mr Boarder: In the cement industry we have traditionally used what we call the World Business Council for Sustainable Development protocol in measuring our CO₂ emissions, and the world-wide cement industry got together and developed a sustainability protocol; and part of that protocol is to set targets, and another part is to accurately monitor; and we all monitor in the same way. We also have the EU Commission’s guidance notes, which are to a large extent comparable with the World Business Council for Sustainable Development, although they have certain bureaucratic aspects which we do not like. Overall, we have a system which derives an accurate figure. Whether we are using the World Business Council Protocol or the guidance, they are both subject to independent audit, and they are audited and we are very confident that our figures that we present are correct.

Mr Askew: For the aluminium sector we have two basic sources of emissions, those from fuels and those from the process, particularly from the primary extraction process. The conversion factors for the fuels are developed by Future Energy Solutions, consultants to the Carbon Trust, the Action Energy Programme, so we just use industry-standard conversion factors for our fuels. The electricity consumption particularly includes transmission losses so we have to multiply essentially by about three times what we get delivered to what has been produced. The process emissions for our sector come from perfluorocarbons in the primary process, and there are internationally agreed carbon equivalents that we use. The only other one is SF₆, which is used in the magnesium sector, one of the small sectors in our agreement, and again there are internationally-agreed CO₂ equivalence figures. We collect those every year and submit them every two years to Defra at the milestone, and those are verified and monitored by FES and Defra. We too think our figures are pretty accurate.

Q590 Lord Wade of Chorlton: It would be interesting to learn a little more about how these changes are brought about. Both of you have declared that CO₂ emissions and energy use have dropped and the cement industry made the point that the quantity of product has also dropped. Has that dropped because use in the UK has dropped or because imports have increased or exports have decreased? I would just like to get a bit more feel about how these things have come about. Have they come about from technology changes or from production, or has it come about from energy efficiency changes that have been incorporated? Perhaps both of you could explain in a bit more detail how these changes might have happened.

Q589 Baroness Platt of Writtle: How do you monitor and calculate the greenhouse gas emissions produced in your industry, and what is the process of verification?
Mr Gilbert: If I can talk about the big picture, the answer to your question is “all of the above”. We have seen reducing demand in the UK for cement, and that has been driven partly by movements in the construction industry. After a period of flat, there is no doubt the construction industry is growing significantly, but the use of cement in construction these days is a significantly smaller part of the construction process, so there is less demand. The UK now is one of the lowest per capita users of cement product across Europe—or the second lowest. That is a significant factor.

Q591 Lord Wade of Chorlton: It is not just the UK but it is a European position.
Mr Gilbert: Within Europe itself it is still going like a train, particularly around the Mediterranean.

Q592 Lord Wade of Chorlton: It is particularly in the UK.
Mr Gilbert: Particularly in the UK. We have seen imports rise from almost nothing to almost 10 per cent. We have always been quite proud of the fact that we supply 90 per cent of the UK’s cement industry needs, locally, nationally, from our own resources, and it is something we would like to maintain and sustain. Each of the four companies has invested hugely in new plant. Tarmac and Rugby have built new plant; Castle Cement are building a new plant. Bear in mind that each of these plants costs something of the order of £100 million and take many years in terms of planning and capital investment, planning consents, construction and obviously maintenance. So these are not quick decisions that we can make as an industry, to make these changes. Underlying all of that is the movement from wet or semi-wet processes to modern dry processes with much better energy efficiency, which Dick can talk about, but also the whole issue of alternative fuels. There is one other factor that we have to take into account in terms of restructuring and capacity and so on. Each of the UK manufacturers is part of an international group and each of those international groups does intensive comparisons between cement plant here and in Europe, China, America and Thailand, and you can imagine that they are very intensively benchmarking each other in their performances, so it becomes extremely important that UK cement plants have a level playing field to support those issues.

Mr Boarder: The major change is investment in new large cement kilns. I have been in the industry a long time—almost as long as the aluminium guys—and we typically had kilns that made 700 tonnes a day in the late sixties when I joined the industry, and now typically it is 3,000–3,500; so we get the effect of scale, which reduces energy consumption. We have also moved from the wet process to the dry process but we have moved significantly beyond that. Our latest kiln that we are building in North Wales is a five-stage pre-calcining unit, which is totally different to the sort of kit it is replacing. That one single kiln will replace five units elsewhere within the UK, so we get that effective scale. The other thing that has happened is development of use of alternative fuels. It is the modern efficient plants which are designed for use of alternative fuels which will be reaping the benefit of fuel changes, which is the other method of reducing CO₂. So we will see more and more biomass coming into the processes.

Q593 Baroness Platt of Writtle: You mentioned Rugby Cement, and I have to declare an interest as a former president of the Pipeline Industries’ Guild; but I remember George Adler, who was an engineer, in a public speech, possibly at Cambridge University, saying that Rugby Cement sent their limestone through a pipeline on treated sewage, and that saved 90 lorries a day in both directions. Does that still happen, and does it happen elsewhere?
Mr Boarder: Rugby still has a remote limestone chalk quarry and they do pump it long distances.

Q594 Baroness Platt of Writtle: I was terribly impressed.
Mr Boarder: The industry these days very heavily uses rail transport for many bulk supplies and deliveries.
Baroness Platt of Writtle: The pipeline means that it is underground and nobody sees it.

Q595 Chairman: What about the aluminium industry?
Dr Harris: I have already commented that over the last ten years our production, since 1990, has increased by 30 per cent. The use of aluminium in the UK has increased by more than that in percentage terms, and therefore we have to rely more and more on imported aluminium. In the quest for weight savings, when one is producing an aluminium beverage can or an all-aluminium car, the aluminium industry has to produce thinner and stronger products, which require higher energy consumption.

The Committee suspended from 5.10 pm to 5.18 pm for a division in the House

Q596 Baroness Platt of Writtle: What is the scope for further reductions in both energy consumption and greenhouse gas emissions within your industry? What are the main difficulties and the main opportunities you face? Just hanging a hook on the last paragraph of the cement industry submission, you say passionately that you want one ministry
instead of different government departments—and the word “bureaucracy” has reoccurred several times today, so perhaps you would like to talk about one ministry.

Dr Harris: The processes that we operate in the aluminium industry in primary production, secondary refining and fabrication, with the present technology, are coming to probably their optimum efficiency. In a primary smelter, without a complete re-think of the technology, it would be difficult to improve the energy consumption very much further. Primary production in aluminium relies on having a consumable anode which is made of carbon, and that is consumed during the process and produces carbon dioxide. If we want to improve the process radically in terms of greenhouse gas emissions, we would have to look for a non-consumable anode, which is in fact exactly what the aluminium industry is doing. Accept for a moment that our processes are coming towards an optimum efficiency, there are other ways of making energy savings in the aluminium industry such as improving our recycling rates. I did say earlier that if we make aluminium through the recycling route, it has an energy consumption that is very significantly lower than primary production. When you look at the numbers for the UK aluminium industry, you will see that generally production has increased over the last ten years, and primary production has increased by about 100,000 tonnes; but one sector for which that is not true is the aluminium recycling industry. That is not because we are less efficient at collecting aluminium, but it is because of the effect of the Chinese aluminium industry, which, short of energy and realising the advantages of recycling, have more and more come into Europe, and particularly into the UK to buy aluminium scrap. It is taken back to China for their own recycling processes and their own energy advantage. That advantage is being lost to the UK because of the effect of the Chinese. For example, in 2003 250,000 tonnes of aluminium scrap that would have been recycled in the UK has been bought up by Chinese merchants, taken off to China and recycled back into aluminium for their own use. That is acting to the detriment of the UK aluminium industry and is actually preventing us from making one of the energy savings that would be possible, even with the technology that we have.

Q597 Lord Wade of Chorlton: They must be paying more money for it then, otherwise they would not get it.

Mr Harris: They do indeed, but I have to say—

Q598 Lord Wade of Chorlton: Why can we not afford to pay what they pay?

Mr Harris: I have to explain that the Chinese Government subsidises the cost of that material. It is cheaper, as we understand it, to move one tonne of aluminium scrap from London to Beijing than it is to move one tonne of aluminium scrap by road from London to Edinburgh.
regimes, and that permit acquisition issue delays us quite considerably. My company at the moment has two projects to switch to biomass usage. We believe that animal meal as a fuel, which is currently going to landfill and producing methane, is a very strong project, yet it can take three to four years to get these projects through. We have scope to make changes but we have difficulties and delays.

**Chairman:** I am very concerned about time, so I am going to take the view of just one industry. Any additional information you can provide to us in writing would be most helpful and will be used in our report.

**Q600 Lord Taverne:** How important is emissions trading to you?  
**Mr Boarder:** My company is a big international company and we support emissions trading as the best method for reducing carbon emissions. It is the most cost-effective method. I personally have been a member of ETG, the Emissions Trading Group, since it was founded, and an enthusiast. Having said that, the allocation system we have in the UK is not what we wanted; we wanted a simpler, more straightforward system. We are desperately disappointed that early action has not been recognised in that allocation plan, and I simply highlight the fact that our most efficient plant has the lowest allocation, and on that basis I am very disappointed to say that my company applied yesterday to the Government to be put forward for the opt-out for the first phase. It is a disappointment to an enthusiast that we have to do that. For the second phase we believe strongly that we should begin to bring in benchmarking as a base for future allocations so that we can get this recognition of early action, and the most efficient can be encouraged. The best national allocation plan should encourage the most carbon-efficient and discourage the least carbon efficient, something that the current allocation plan just does not do.

**Q601 Baroness Platt of Writtle:** It is widely argued that the most effective way to reduce energy consumption is to increase prices, either across the board or, if the object is to reduce carbon emissions, through targeted “eco-taxes”. What would be the impact of either approach on your industry?  
**Mr Boarder:** In the cement industry it is very clear that increasing taxes will undoubtedly put the UK industry at a disadvantage. We have seen imports progressing. We are already very, very conscious of energy. As Mike said, our companies are international companies and we benchmark ourselves. We benchmark ourselves internationally and if we do not perform, then our companies will no longer invest in the UK; they will invest in profitable businesses in China, Indonesia—where we already operate and with growth markets there it is easy to get good investment there—so we genuinely are very, very conscious of energy and subsequently very conscious of CO2. We do not believe that taxes will in any way help us and in fact they will hinder us.

**Dr Harris:** I have to agree with my learned friend on the right! If we increase the price of energy, bear in mind that the aluminium industry is a global industry and it could move production to any part of the world that it wishes to. We will tax ourselves out of existence in primary aluminium production, and that will have a domino effect across the aluminium industry on fabrication and eventually on recycling. As I explained earlier, if you close efficient primary production in the UK and you make that aluminium, for example, the CIS, whose aluminium smelters are less energy efficient, and if you are concerned about global warming you have just made the situation worse, and at the expense of the jobs of the 2,000 people employed in the primary aluminium industry in the Scottish Highlands, the North-East of England and North Wales, where there are very few other job opportunities. The Government really does have to realise that you cannot keep taxing industry and expect it to stay in the UK.

**Q602 Chairman:** Thank you very much. As you can see, we are very keen to hear industry’s viewpoints and you have been a great help. Because of constraints of time, and interruptions by votes, you may not have answered some questions in as much detail as you would have liked, but please write to us because we will be able to use that information in our report.

**Mr Gilbert:** Thank you for the opportunity.
Supplementary memorandum by The Aluminium Federation

The UK Aluminium Industry and Climate Change Levy

Introduction

The Aluminium Federation represents the interests of the UK aluminium industry. The 200 member companies cover primary production, fabrication, finishing, stockholding, end users and recycling. The aluminium industry in UK employs some 20,000 people and has an annual turnover of £3 billion. The major markets in UK for aluminium are in transport, building and construction and packaging.

The annual consumption of aluminium in UK exceeds production in primary smelters and secondary refiners and the UK relies on imports of aluminium ingot and fabricated products.

The aluminium industry is very aware of its energy consumption and has a successful record over many years in reducing energy consumption for both economic and environmental reasons. On a global basis, about 60 per cent of the world’s primary aluminium is produced using hydroelectric power, which has minimal emissions of global warming gases.

Primary aluminium production is energy-intensive but, once produced, because of its high strength and low weight, the use of aluminium saves more energy than is required to produce it. For example, in an all-aluminium car, over the life of the vehicle, the energy saved by replacing steel and cast iron is four times greater than the energy required to produce the aluminium originally. Finally after use, aluminium has high recycling rates and aluminium can be recycled for an energy content of only 5 per cent of that required in the primary production route.

Our view of Climate Change Levy is coloured by the fact that, before the introduction of CCL, representatives of the UK aluminium industry were in discussions with government to introduce a voluntary agreement to reduce energy consumption or improve energy efficiency by 20 per cent from 1990 to 2010.

The Aluminium Federation has a Negotiated Agreement under CCL which includes sectors for primary aluminium production, rolling, extrusion, finishing and recycling and also magnesium and titanium fabrication. Thus far in the Negotiated Agreement, the aluminium industry has reduced its CO₂ equivalent emissions by 30 per cent, while at the same time increasing production of aluminium products by 30 per cent.

In general terms, the CCL has done little more than the voluntary agreement that the aluminium industry was intending to introduce. On the other hand the CCL has been bureaucratic and costly to administer, much of these costs falling on Trade Associations such as Aluminium Federation. The use of IPPC (Integrated Pollution Prevention and Control) as an entry into Negotiated Agreements was badly chosen. Any company willing to enter an Agreement to save energy should have been allowed to do so. Once in an Agreement a company achieving the target should pay a zero rate of the levy or should be allowed to invest the money in energy-saving measures that otherwise would go to government in the levy. The early introduction into UK of a climate change levy, before other EU countries, has made UK industry increasingly uncompetitive, compounded by the recent, very large increases in energy prices, up to 50 per cent increase in the last year for gas, for example. Now that CCL will run alongside the EU Emissions Trading Scheme the Government must take care to ensure that CCL should run its full legally agreed term.

Supplementary answers to evidence session

Q13. Can you summarise trends in your industry since 1990, both as regards total energy consumption and greenhouse gas emissions?

A. From 1990 to the present day, the aluminium industry has reduced its CO₂ equivalent emissions by 30 per cent, while at the same time increasing production of aluminium products by 30 per cent.

Q14. What proportion of total UK industrial and business greenhouse gas emissions is represented by your industries? How has this changed since 1990 and what changes are predicted between now and 2020? (If hard data are available on these points, it may be helpful if these could be tabled in written form.)

A. In the base year of 1990, the aluminium industry’s total CO₂ equivalent emission was 7.3 million tonnes. In 2004 the figure was 5.1 million tonnes, subject to Defra audit. These numbers should be looked at in relation to the UK Government’s request for a National Allocation of 756 million tonnes of carbon, which equates to an aluminium industry contribution of about 0.2 per cent.
Q15. How do you monitor and calculate the greenhouse gas emissions produced in your industry? What is the process of verification?

A. All of the higher energy consuming sectors of the industry are in Negotiated Agreements under CCL. Therefore, energy consumption and greenhouse gas emissions for each member company are monitored by Aluminium Federation for each milestone. The results are then presented to Defra for each milestone period. Verification is carried out by Defra.

Q16. How far have such changes since 1990 been as a result of restructuring, changes in output, export of capacity overseas, and so on, and how far as a result of technical developments in energy efficiency?

A. The improvements made in energy consumption have been due to technical improvements and not to structural change. Since 1990 production across the industry has increased by 30 per cent. There have been some company closures, particularly in the secondary refining sector, but capacity usage in other companies has increased.

Q17. What is the scope for further reductions in both energy and consumption and greenhouse gas emissions within your industry? What are the main difficulties and the main opportunities you face?

A. With the current best technology in all sectors of the industry, there is little scope for extensive further improvements, although the industry continues towards achieving the final target under CCL by 2012 of an overall 32 per cent improvement on the 1990 values. The main difficulty in the primary aluminium sector, the sector with the largest energy consumption, is that with current technology, the primary cells in use are approaching their optimum efficiency. Drastic improvements are not possible without a radical re-design of the process, for which huge investments would be required. Because primary aluminium production globally tends to concentrate on areas of the world where energy is cheaper and future supplies more certain, there remains a question mark over the long-term viability of primary aluminium smelting in Europe. Further increases in energy prices will undermine the position of the primary aluminium smelters.

Although the production processes themselves are approaching their optimum energy efficiency, there are opportunities for improving energy efficiency by taking a life cycle analysis approach. Because energy is saved by recycling aluminium, only 5 per cent of the energy needed through the primary route is required for recycling, increasing the amount of recycled aluminium is a saving in energy. In the foundry industry, if founders took delivery of molten aluminium from the refiner, instead of taking ingot and remelting it, large amounts of energy would be saved.

Q18. In assessing the opportunities for reducing energy consumption within your industry, how do you interpret the term “cost-effective”? How far are energy efficiency gains just a by-product of normal investment in improved equipment, and how much of conscious investment?

A. Under the CCL Negotiated Agreement, the UK aluminium industry estimated that it would have a capital expenditure from 2001 to 2010 of £600 million. Not all of that has been, or will be, directly attributed to improving energy efficiency. Where energy efficiency is the main driver, pay-back periods of 2–5 years would be expected. The conflicting requirement is that the market demands more sophisticated aluminium products with higher energy requirements, eg rolling or extruding thinner sections with higher strengths, so that less aluminium is used in the final product. New technology in fabrication then means more sophisticated products, which may need more energy in production.

Q19. How has the burden of environmental regulation on your industry changed since 1990?

A. Since 1990 the burden of environmental legislation has increased immeasurably, largely as a result of European Directives and Regulations introduced into UK law. This has covered the way that companies operate, under IPPC, with regard to gaseous, liquid and solid emissions, the raw materials that they use, for example insisting that aluminium for recycling is covered by waste legislation, and the way in which final wastes can be treated and disposed of.

It is usually the case that the extra burden of environmental legislation results in increased energy consumption in the processes controlled. Take the recycling of aluminium swarf from machining processes. This can be contaminated with machining oil and lubricants and these have to be dried off before melting. In a swarf drier, there is a possibility of the production of very small amounts of dioxin which can be destroyed in an after-burner. This increases the energy consumption. The irony is that the secondary aluminium industry has to cope with a problem made by other people, those who formulate machining lubricants. Unrealistically low levels of emissions, with no risk analysis, result in higher energy consumption.
Q20. How high a priority is energy efficiency within your industry? Do individual companies have energy efficiency representation at Board level? How are investments in energy efficiency measures handled and budgeted?

A. Energy efficiency has always had the highest profile in the aluminium industry, initially for economic reasons and more recently also for environmental and social reasons. In a primary aluminium smelter, electricity to run the potlines accounts for 40 per cent of the total production costs. In 1950 one kg of aluminium could be produced with an energy consumption of 21 kWh/kg. Today, typically, the figure is 13 kWh/kg.

Because of the very large energy savings in recycling, only 5 per cent of the energy used in the primary smelter route is required for recycling, the aluminium industry relies more and more on recycled metal in its supply chain. In transport and building applications, recycling rates of 95 per cent are achieved. Currently in Europe, 40 per cent of all aluminium beverage cans are recycled.

In UK in 2003, the primary aluminium industry produced 340,000 tonnes of aluminium ingot. The secondary smelters produced 206,000 tonnes from predominantly old scrap while the wrought remelts produced 557,000 tonnes from recycled scrap from fabrication. More than twice as much aluminium ingot is being produced from recycled metal as from a primary smelter route.

All companies in the CCL Negotiated Agreements have dedicated energy managers and a Board member is usually specifically nominated to be responsible for energy efficiency and consumption.

Q21. How effective have the Climate Change Levy and Climate Change Agreements been in your industry? What progress has been made towards achieving your 2010 targets?

A. Before the introduction of the CCL, the aluminium industry was in negotiation with government for a 20 per cent voluntary improvement in energy efficiency from 1990 to 2010. The CCL will give a 32 per cent improvement in reducing global warming gas emissions over the same period.

As it was first proposed, the CCL would have led to the closure of the UK primary aluminium industry. The extra tax bill facing the industry initially was about £40 million per year. Aluminium would still be used in the UK but production would have switched to less efficient primary smelters in other parts of the world. In global terms, that would mean that the situation for global warming would have been worse.

Eventually an exemption was obtained for the electricity used in a primary aluminium potline, since that energy was driving an electrolytic process rather than being used as a fuel. This then left recycled aluminium, a comparable product with that produced in a primary smelter, paying a higher CCL per tonne than primary metal. It has taken the industry three further years of lobbying to have this anomaly rectified and an exemption from CCL obtained for recycling.

The choice of IPPC as the entry into a Negotiated Agreement was poorly made. Any company prepared to enter a Negotiated Agreement should have been allowed so to do. Furthermore, a company that meets its target should pay 0 per cent CCL rather than the 20 per cent now allowed. Taking even 20 per cent off of a successful company means less money for investment in energy efficiency measures. It would not have been difficult to allow a 0 per cent rate of the CCL if the company could show that it had invested more than that sum in energy improvement. The government offer of grants towards capital expenditure for energy saving equipment was inadequate.

Furthermore, the choice of IPPC and the decision about technically linked processes has meant in the aluminium extrusion industry, for example, that there are extruders paying 100 per cent of the CCL in direct competition with other extruders in the same market paying 20 per cent of the CCL. Recent proposals on changing the qualifications for entry into Negotiated Agreements have been too restrictive and have not changed the situation.

The original claim by government that the CCL was fiscally neutral and that money collected under CCL would be returned in reduced NIC contributions, was a blatant example of political spin. In the aluminium industry, with large energy bills and low employment levels, the industry would be a net payer under CCL. For a service industry with small energy bills and large levels of employment, companies would be net beneficiaries. In any event, the increases in NIC subsequently have eliminated any claims of fiscal neutrality.

The UK introduction of CCL, some years before any comparable measures have been taken in almost all other EU countries, has merely made the UK companies less competitive compared to comparable companies in Europe. Knowing that an EU scheme would be introduced eventually and trying to find ways of making the two schemes fit together, has increased the uncertainty. Global aluminium companies are making investment decisions that need to minimise uncertainty and the UK is suffering as a result.
The Government's approach to CCL has been on an ad hoc and simplistic basis. The regulations about CCL, such as the criteria for entry into Negotiated Agreements, were being decided as the process proceeded. CCL only finally worked in practice because of a huge investment by manufacturing industry and Trade Associations to put data collection and monitoring systems in place at their own expense. Life cycle analysis approaches were ignored and only primary production and fabrication processes considered. The use of aluminium saves more energy than is required to produce it but the Levy fell on production with no regard to final use. It was considered to be too complicated to take this into account.

Q22. What impact will EU Emissions Trading have on your industry? How will it interact with the Levy and Climate Change Agreements, both in the initial phase and in phase 2, post-2007?

A. There will be no effect on the aluminium industry in Phase I of the EU Emissions Trading Scheme, apart from one primary aluminium smelter which also operates a power station that feeds into the grid. Decisions by government about Phase II have yet to be made, but at the moment non-ferrous metals are not scheduled to be in Phase II, unless the Government decides otherwise. The Aluminium Federation expects that the CCL Negotiated Agreements will run their full legal term up to 2012. Beyond the next 2006 milestone, companies will not be able to use their algorithm or tolerance band to account for product mix and targets will move from relative to absolute targets. It is essential that there is still a trading scheme associated with CCL, otherwise companies who fail to meet their target have no opportunity to trade into a position of compliance.

Q23. It is widely argued that the most effective way to reduce energy consumption is to increase prices, either across the board, or, if the object is to reduce carbon emissions, through targeted “eco-taxes”. What would the impact of such an approach be on your industry?

A. Those who argue that the most effective way to reduce energy consumption is to increase energy prices, should realise that this trend will merely make UK companies totally uncompetitive in the world markets, bearing in mind that many of the countries with whom we compete, such as China, India, USA, Australia etc, are not signatories to the Kyoto Protocol. The first effect would be in the UK primary aluminium smelters. There are three plants, in North Wales, Newcastle and the Scottish Highlands, employing 2,000 people directly and twice that number indirectly. These areas are already areas of high unemployment and limited job opportunities. The global aluminium companies have the ability to increase production in areas of the world where that production is more economic and sustainable, and to close plants in areas that become uneconomic. Increased prices will lead to reduced energy consumption, although the industry is approaching the point at which further improvements are limited without new technology. Increased energy prices will lead to the closure of the UK primary aluminium industry. That aluminium production will be absorbed by other, less efficient, primary smelters in other parts of the world and, overall, global warming gas emissions will increase.

The Government would be well advised to look for energy improvements in other sectors of the UK economy than manufacturing industry, which has already greatly contributed to the UK target. The Government would also be wise to confine themselves to the “Kyoto” target value and not to seek higher targets that can only be to the detriment of manufacturing industry.

March 2005
Supplementary memorandum by The British Cement Association

13. Can you summarise trends in your industry since 1990, both as regards total energy consumption and greenhouse gas emissions?

The trends in specific energy consumption and CO₂ emissions are given in the following graph and table.

![Climate Change Agreement Performance 1990 to 2004](image)

**Data on CO₂ emissions from cement manufacture**

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2002</th>
<th>Reduction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>tonnes, cement</td>
<td>13.75M</td>
<td>11.54M</td>
<td>(16)</td>
</tr>
<tr>
<td>tonnes, CO₂</td>
<td>13.22M</td>
<td>10.15M</td>
<td>(23)</td>
</tr>
<tr>
<td>total tonnes CO₂/tonnes cement</td>
<td>0.96</td>
<td>0.88</td>
<td>(8.5)</td>
</tr>
<tr>
<td>fuel tonnes CO₂/tonnes cement</td>
<td>0.435</td>
<td>0.355</td>
<td>(18)</td>
</tr>
</tbody>
</table>

Note: The “fuel tonnes” relates to the CO₂ emissions from all non-biomass fuels, [ie conventional plus waste-derived fuels], as in the EU ETS.

14. What proportion of total UK industrial and business greenhouse gas emissions is represented by your industries? How has this changed since 1990 and what changes are predicted between now and 2020?

In 1990, the cement industry CO₂ emissions accounted for 2.19 per cent of the UK total anthropogenic CO₂ emissions. By 2002, this had fallen to 1.84 per cent. [Data from National Air Emissions Inventory 1990 to 2002].

These are the total CO₂ direct emissions from the industry of which about 40 per cent is from the fuel, (“fuel CO₂”), and 60 per cent from the decomposition of limestone, (“process CO₂”), [ie in a typical modern 5-stage precalciner kiln].

15. How do you monitor and calculate the greenhouse gas emissions produced in your industry? What is the process of verification?

Involvement in trading of carbon credits through the UK Climate Change Levy, UK Emissions Trading Scheme and the EU Emissions Trading Scheme requires external verification of the components from which CO₂ emissions are calculated, ie coal, petroleum coke, waste-derived fuels, and electricity.

Through the World Business Council for Sustainable Development Cement Sustainability Initiative, WBCSD CSI, the industry has agreed on a global protocol for the reporting of greenhouse gas emissions. This forms the basis of the reporting of emissions in the UK and EU, with certain modifications to accommodate the relevant legislative framework.

16. How far have such changes since 1990 been as a result of restructuring, changes in output, export of capacity overseas, and so on, and how far as a result of technical developments in energy efficiency?

The UK industry currently manufactures ~90 per cent of the cement used in the country, but this level of domestic production is under threat from imports from countries in which the financial burdens associated with emissions trading are substantially less. In addition to this competition on the price of cement, cement manufacturers face strong internal pressure from within their own companies for the capital funding of new plant with which to meet increasing demands of low CO₂ emissions.

The installation of new, energy efficient plant, and/or the shifting of production to large modern, efficient kilns requires substantial investment. This is dependent upon securing the requisite funding which in turn demands a high level of certainty in the legislative regime. The development cycle [ie from planning to full scale operation] for plant in the energy intensive sector is many years and is generally longer than the phases of the Kyoto agreement. In the case of cement, this development cycle is ~7 years, and once installed, the plant will have an operational lifetime of 30 years or more.

Within the United Kingdom, the cement industry is engaged in a £400 million programme of investment in new plant. As part of larger international groups, UK cement companies must compete for funding of capital projects on an international basis, and consequently, any “gold plating” of European legislation or additional national controls provide strong disincentive for investment in UK projects. Uncertainty over future phases of the EU Emissions Trading Scheme has resulted in the postponement of the proposed new cement plant and the installation of a terminal for the import of cement from elsewhere in the group.

17. What is the scope for further reductions in both energy consumption and greenhouse gas emissions within your industry? What are the main difficulties and the main opportunities you face?

An analysis of the cement industry in 2002 by the World Business Council for Sustainable Development, (WBCSD), indicated a worldwide potential to reduce CO₂ emissions by approximately 30 per cent by 2020 using conventional approaches such as those described above. In order to deliver CO₂ reductions of 60 per cent or more by 2050, it indicated that the industry must explore a number of advanced CO₂ management approaches, and three potential options are: the use of non-limestone based binders; produce cement and electrical energy on hybrid cement-energy facilities; employ carbon capture and sequestration. Cement companies within the UK are investigating the use of biomass as fuels (including energy crops), and the siting of wind power generators adjacent to their quarries.

18. In assessing the opportunities for reducing energy consumption within your industry, how do you interpret the term “cost-effective”? How far are energy efficiency gains just a by-product of normal investment in improved equipment, and how much of conscious investment?

Unlike the primary production of aluminium for which electricity is the principal energy source, in the cement industry coal, coke and petroleum coke account for 82.5 per cent of the fuels used on an energy basis.

**Energy Sources in Cement Making (BCA data, 2003)**

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>65.4</td>
</tr>
<tr>
<td>Coke</td>
<td>9.0</td>
</tr>
<tr>
<td>Petroleum Coke</td>
<td>8.1</td>
</tr>
<tr>
<td>Gas Oil</td>
<td>1.1</td>
</tr>
<tr>
<td>Heavy Fuel Oil</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>LPG</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>0.3</td>
</tr>
<tr>
<td>Electricity (kilns/grinding)</td>
<td>11.0</td>
</tr>
<tr>
<td>Waste derived fuels</td>
<td>5.0</td>
</tr>
</tbody>
</table>

The cement industry is continually seeking to reduce energy consumption, improve its energy efficiency and
thereby reduce CO$_2$ emissions. Worldwide, the cement industry is responsible for $\sim$5 per cent of anthropogenic CO$_2$ emissions, but within the United Kingdom the contribution is 1.8 per cent. Within the industry, each company is engaged in a programme on continual improvement of its processes through:

— Improved kiln control systems;
— High efficiency motors and drives;
— Improved energy management procedures;
— Higher efficiency crushing and grinding techniques; and
— Optimization of raw material chemistry.

Although individually these result in relatively small, progressive reductions in CO$_2$ emissions, together they lead to significant overall improvements. However, large “step changes” in fossil fuel CO$_2$ emissions can only be achieved by replacing fossil fuels with waste-derived fuels, or investing in new plant.

The replacement of fossil fuels with waste-derived materials provides an important means of reducing CO$_2$ emissions. The range of waste-derived materials used has now expanded from used oils and solvents, sometimes referred to as SLF (Substitute Liquid Fuels), or RLF (Replacement Liquid Fuels), to include: used tyres; pelletized sewage sludge (PSP); meat & bone meal (MBM); packaging (such as Profuel); refuse-derived fuel (RDF).

The use of these waste-derived material as fuels in cement kilns is an efficient means of recovering their energy content which would have been lost had they been landfilled, or generated CO$_2$ in an incineration process. This avoidance of emissions, such as methane from landfills and CO$_2$ from incinerators, through the use of waste derived materials in the cement industry is an important component in the overall reduction in GHG.

The development of replacement fuels has been more marked mainland Europe, where from a level of 3 per cent substitution in 1990, the average rate has risen sharply to 12.2 per cent in 2001, and in many countries extremely high levels of waste-derived fuel are used: $>$ 80 per cent, Netherlands; $>$ 40 per cent, Switzerland, Austria; $>$ 30 per cent, Belgium, France, Germany, Norway. (Sweden 29 per cent).

Typically, the time involved in gaining permanent authorisation for a new fuel is 15–30 months. In addition the up-front costs of plant required to trial are £1 million to £2 million, with trial costs adding a further £600,000 to £800,000. All of these costs are essentially risk capital, which is forfeit if permanent permission is not forthcoming. These lengthy authorization periods have a significant effect on the payback period. Delays between the end of trials and the granting of permits are problematic in terms of continuity of supplies (of alternative fuels to required quality standards) and operational conditions.

In addition to cutting down CO$_2$ emissions, other significant environmental benefits result from the use of waste-derived fuels: reduced emissions of NO$_x$ and particulates; conservation of resources; and avoidance of the use of waste treatment options at the lower end of the waste hierarchy. In 2001, the recovery of energy from 4.37 million tonnes in European cement kilns saved 3.5 million tonnes of coal and yielded significant reductions in stack emissions. Of these wastes, approximately ½ was hazardous.

19. How has the burden of environmental regulation on your industry changed since 1990?

The graph below indicate the cumulative effect of European legislative measures in the area of the environment since 1990, [UNICE data].
In addition, the recovery of energy from the use of waste-derived materials as fuels is subject to the Substitute Fuels Protocol, an extra-statutory provision administered by the Environment Agency.

Modifications to streamline this procedure were introduced in February 2005, but these controls only apply to the cement and industries, although waste-derived materials are used in a number of industries without these restrictions.

Furthermore, these are “vertical” controls, applied on a plant-by-plant basis on each occasion when a waste-derived fuel new to a specific plant is used. More appropriate would be “horizontal” controls that used a single assessment of each fuel used in cement kilns, and used this across the industry in conjunction with local stakeholder consultation at a plant level.

20. How high a priority is energy efficiency within your industry? Do individual companies have energy efficiency representation at Board level? How are investments in energy efficiency measures handled and budgeted?

Energy accounts for approximately 35 per cent of the variable costs of cement manufacture, and this is strongest driver towards the improvement of energy efficiency, particularly during times of rapidly escalating energy costs. Mandatory measures are counter productive for energy intensive industries such as cement.

21. How effective have the Climate Change Levy and Climate Change Agreements been in your industry? What progress has been made towards achieving your 2010 targets?

The industry met its targets in the “target years” of 2002 and 2004, and the graph/table given in response to question 13 indicates that it is on course to meet the 2010 targets.

22. What impact will EU Emissions Trading have on your industry? How will it interact with the Levy and Climate Change Agreements, both in the initial phase and in phase 2, post-2007?

As noted in the response to question 16, there is a long investment cycle for the cement industry. This has precluded investment, in addition to that already planned, which is necessary to reduce the impact for Phase 1 of the EU ETS. Thus the effect of the European scheme will be to add costs to our members, since as overall it appears to be unlikely that the Phase 1 allocations will meet the industries needs.

The interaction of the EU ETS and CCL is a burdensome bureaucratic duplication of effort, which does nothing to further reduce CO2 emissions. There are two different monitoring systems and the rules for interactions between the two for indirect emissions, process emissions and waste fuel derived emissions are convoluted and unnecessarily complex.

The UK Government presentation to the European Commission recommending the UK “opt out” argued the equivalence CCA and EU ETS on the basis of the same inputs and outputs of both schemes.

The BCA believes that installations covered by the EU Emissions Trading Scheme should be excluded from the Climate Change Levy, and thereby reduce the duplication of effort by government and industry.

23. It is widely argued that the most effective way to reduce energy consumption is to increase prices, either across the board, or, if the object is to reduce carbon emissions, through targeted “eco-taxes”. What would the impact of such an approach be on your industry?

The World Business Council for Sustainable Development Cement Sustainability Initiative (WBCSD CSI), estimated that a carbon tax of $50/tonne (€38.9/tonne), an amount implicit in a number of potential (worldwide) government policies would add an average of ~$12/tonne (€9.3/tonne) to the manufactured cost of cement.

Compared with other materials, cement has the highest CO2 emissions per unit of profit, and along with lime, the highest CO2 emissions per unit of turnover. Furthermore, unlike steel, cement is a low value product with limited ability to absorb additional costs. It is thus very susceptible to any additional carbon dioxide/energy related costs.

For example, emissions trading at €15/tonne CO2 will approximately double the variable cost of cement production. The value of €15/tonne equates to about the cost of transport per tonne of cement from the Far East, thus placing domestic manufacture at a severe disadvantage.

[Since emissions trading under the EU ETS came began on 1 January, carbon prices have risen from €4–5 per tonne to about €15–16 per tonne].
INTRODUCTION

1. The purpose of this memorandum is to summarise for the Select Committee parliamentary estate policies, actions and plans in connection with energy management.

PARLIAMENTARY ENERGY POLICY

2. An energy policy statement for the two Houses was first established in 2003. A copy is at Appendix A. Our engineering staff are currently consulting stakeholders to update the policy in line with the Government’s plan for actions to implement the energy white paper. Our updating will include targets for reducing carbon dioxide emissions.

ENERGY SAVING TARGETS AND ACHIEVEMENTS

3. The two charts at Appendix B show the energy saving targets and achievements for 2003–04 and in 2004–05 to date, in terms of kWh per square metre of floor area of buildings. Information in this form is seen monthly by managers and technical staff.

4. The continuing installation of more computers and office machinery and demands for new air conditioning, for example in committee rooms, has resulted in a considerable increase in electricity consumption on the estate. This has risen from 107 kWh per square metre in 1996–97 to 159 kWh per square metre in 2003–04. The overall energy savings shown at Appendix B have therefore been achieved mainly through heating efficiencies to save gas.

ENERGY SAVING MEASURES

5. The Parliamentary Communications Directorate has agreed to amend their standard power management settings for parliamentary computers so that systems go into a power saving stand-by mode during long periods of inactivity. Flat screens are now being introduced more widely. These use less power and also save space so that more staff can be accommodated in open plan office areas.

6. The new main boilers and chillers for the Palace of Westminster were commissioned in October 2004. The respective efficiencies of the old equipment which is now removed and the new equipment are some 45 per cent and 82 per cent. New, more efficient boilers were also installed in 2003 to serve Norman Shaw North and South.

7. A combined heat and power plant (CHP) capable of generating 150 kW of electricity is installed at Canon Row and plans are being prepared to operate this in conjunction with an absorption chiller plant.

8. Portcullis House is an exceptionally energy efficient design. Among its features are ground source cooling; computer controlled blinds to either collect or reject solar heat according to the ambient conditions; light shelves to reflect sky light into offices; heat exchangers between fresh and exhaust air; the use of the thermal mass of the building to balance diurnal demands for heating or cooling; and the use of groundwater for non-potable purposes.

9. When 7 Old Palace Yard was refurbished in 1995, heat pumps were adopted for heating and cooling. In 2004, Fielden House was refurbished with a similar variable refrigerant volume heat pump system using fan coil units in the offices and roof mounted condenser units. These systems are up to three times as efficient as traditional boiler installations.
10. Each year we allocate £30,000 for investment in tactical energy saving schemes. These are selected in order of pay-back period and include, for example, energy saving lamps, lights switched by motion detectors, insulation, draught proofing, more sophisticated energy metering and monitoring, refinement of our computer controlled building energy management systems, lift machinery controls, and water saving measures.

11. An Energy Group comprising representatives of the departments of the two Houses, chaired by an engineer from the Parliamentary Estates Directorate, meets regularly to advise, help and encourage occupants to economise. They review monthly consumption figures for each building. The Group’s energy saving messages appeared on House of Commons staff wage slips in July and August 2004 and a feature advertisement was published in the magazine “In-House”.

12. We have a framework agreement with the Carbon Trust under which they are helping us reduce energy consumption and carbon dioxide emissions. Among our activities with the Carbon Trust are training for housekeeping and catering staff; a lighting survey; and development of awareness literature. They are contributing £20,000 towards this work.

**Energy Purchasing**

13. Our energy is purchased through the Office of Government Commerce who are able to purchase in bulk and obtain very competitive prices by aggregating public sector demands. Our heating gas supplies to the Palace are in interruptable contracts so that we obtain favourable prices by allowing the supplier to cut off in extremely cold weather. In that event our main boilers can use oil.

14. At present 11 per cent of the electricity supplied to the parliamentary estate is from renewable sources.

*January 2005*

**Appendix A**

**Parliamentary Estates Directorate Energy Policy**

**ENERGY POLICY**

1. **The Two Houses of Parliament are Committed to:**

1.1 Increasing efficiency in the use of energy by reducing consumption measured as kWhr/square metres per year.

1.2 Purchasing 10 per cent of electricity from renewable sources.

2. **Between 1990–91 and 2002–03:**

2.1 Our energy use has reduced from 378 kWhr/square metres per year to 368 kWh/square metres per year: an efficiency improvement of 2.5 per cent. This includes electricity and heating fuels.

2.2 Our consumption of electricity from renewable sources has increased from zero to 10 per cent.

2.3 Our investment in improved, energy efficient technologies has been:

- New Palace boiler and chiller plant £6.7 million
- Portcullis House energy efficient heating and ventilating systems £21 million
- Combined heat and power plant £200,000
- Annual investment in tactical energy saving works £30,000
- Low energy flat computer screens £500,000

2.4 Energy is purchased through competitive contracts, generally arranged by the Office of Government Commerce, who bulk purchase by aggregating public sector consumption.

3. **Service Delivery**

3.1 Energy management is a shared service for the two Houses.

3.2 The Parliamentary Estates Directorate acts as client on behalf of the two Houses, purchases energy, manages the energy conservation programme and conducts the liaison with nominated Energy Savers in the departments of the two Houses.
3.3 The Parliamentary Works Services Directorate manages contracts for investment in energy saving works and operates the building services including heating, ventilating, air conditioning and electrical distribution.

3.4 Members of staff in each Department and Office of the two Houses and in the various parts of the parliamentary estate are involved in energy management as nominated Energy Savers.

*September 2003*
Examination of Witnesses

Witnesses: Sir Michael Willcocks KBE, Gentleman Usher of the Black Rod, and Mr Henry Webber, Director of Parliamentary Estates, examined.

Q603 Chairman: May I remind members of the public that there is a note of all our declared interests, so we do not need to say them again. May I thank our witnesses very much for coming to give evidence to us today.

Sir Michael Willcocks: As Gentleman Usher of the Black Rod, in terms of your Lordships’ committee, I am the management board member responsible for delivering the energy savings policy and associated things because I look after support services for the House.

Mr Webber: I am Director of Parliamentary Estates.

Q604 Chairman: Perhaps I could begin by asking you about the widespread publicity that we had with the colourful picture of the heat losses from the Palace of Westminster, unfortunately showing extensive loss of heat from the Lords’ end of the Palace. What is your response to the press coverage and what are you doing to address the problems that were thereby exhibited?

Sir Michael Willcocks: Of course that thermal image does not show heat loss; it shows temperature differential. That is the first point. Nevertheless, the areas shown red are hotter than any others and they are easily explicable. The first thing I would say is that if you look at the picture, I do not think the Commons was sitting when this was taken.

Mr Webber: We do not know which date it was taken. I think it highly likely it was a time when the Commons was not sitting and the Lords was, so possibly a Friday.

Q605 Chairman: Do we know what time of day it was?

Sir Michael Willcocks: We think it was on 13 January.

Mr Webber: We do not know on which date it was taken. I think it highly likely it was a time when the Commons was not sitting and the Lords was, so possibly a Friday.

Q606 Chairman: Was it at night or in the afternoon?

Do we know what time of day it was?

Sir Michael Willcocks: I would not be surprised if it was probably night-time because the area shown in red is the Cholmondeley Room terrace, and it would seem to me there was a function going on. If you look outside your Lordship’s windows, a canvas tent is not hugely energy efficient. There is the major source of heat certainly. Mr Webber can explain, if you look at where we are now.

Mr Webber: You look at the image, you will see that it does not necessarily show waste. For example, the windows along this committee corridor, all of which are double-glazed and therefore as reasonably insulated as they could be, show bright yellow. At the level below this, the windows again show, generally speaking, yellow. Those that show red, in other words more loss, are the House of Lords Library and the Pugin Room, which are the only windows on this side of the building yet to be double-glazed, and they are due to be double-glazed this coming summer. As Black Rod has said, the canvas tent shows red, as one might expect.

Q607 Chairman: There is, unfortunately, a problem with the double-glazing here, which we have noted several times as we have met in these committee rooms, and that is that these inner windows, or the inside glazing, are almost always open in one or two panes. Given that they can only be opened, I understand, by officials, and they have special keys which lock and unlock them, it must be that somebody is unlocking them regularly. That of course means that the heat is simply going up and out into the river, particularly with the little panes. You will notice here there are two of them that are quite wide open, the little diagonal panes.

Mr Webber: They can very easily be locked again, if that is the wish of the committee. I would surmise that they have been unlocked because committees have asked for that to be done. I can very easily arrange for a man to go along and close all of them.

Q608 Lord Young of Graffham: Greenhouse gas emissions from the public sector in 2002 are estimated by the Government to be about 30 per cent below the 1990 levels. What do you think the Parliamentary Estate comparable figure would be?

Sir Michael Willcocks: Wethinkitwasoneandtwenty-one.

Mr Henry Webber: With the note I provided to the committee, I showed a graph and some figures indicating our targets and achievements for overall energy saving, which is round about 10 per cent at the end of this year. We are well on target to achieve the 10 per cent saving against the base line year this year.

Our saving in carbon dioxide emissions, however, is not directly in proportion to that. Generally speaking, electricity results in about twice as much carbon dioxide emission as the use of gas for heating. The trend over the period since 1990–91 here has been one of increased consumption in the Parliamentary Estate of electricity but a compensating reduction in heating load. The increased electricity is largely as a result of much more office equipment—computers, faxes, photocopi...
Q609 Lord Young of Graffham: What do you think of the future? Can you see that as a trend to the future in which you are looking towards increased carbon dioxide saving?

Mr Webber: Our intention in the next revision of our energy policy is to adopt the targets that the Government has set itself in its White Paper on this subject, which will give a reduction in carbon dioxide emissions. We will need to find methods of achieving that. I think we shall be successful. My impression is that the proliferation of desktop computers in people's offices is probably now, more or less, complete. To a large extent, the spread of air-conditioning through the Palace has reached completion, with the committee rooms, for example.

Q610 Lord Young of Graffham: Conveniently, the Government has abandoned targets at the moment, have they not, until after the election? You can certainly fulfil those targets.

Mr Webber: I think we shall be able to set reasonably satisfactory targets on which we shall consult the two Houses and move towards achieving them.

Sir Michael Willcocks: Nevertheless, speaking from the user side of it under Mr Webber, if we are to do so, he is absolutely right if you look at the three elements of an energy conservation strategy and you start with building components and then go on to good building management. That really is what Henry Webber is talking about there. Of course, the third strand is the strand that worries me most, as your Lordships' person responsible, and that is good housekeeping. The fact that we build in the maximum number of these things does not mean that that we will reduce energy wastage if we do not get people to buy into conservation measures. That is where my focus is at the moment.

Q611 Chairman: Thank you for that and we will be coming to that later. One of the questions I want to put to either of you in this regard is: have you ever considered individual heating controls room by room, or indeed lighting controls? There is no way in committee rooms that one can regulate the heat or the cold in the summer and no way can one regulate the lighting. You have to call for an attendant to get any change at all.

Mr Webber: In the public rooms the set points to control heating and lighting are operated by a computerised building management system run by the engineer's control room. A telephone call to them is all that is needed to make an adjustment. In private offices, the situation depends on where one is on the Estate. But in very many of those that have recently been refitted, we have installed thermostatic radiator valves where there are radiators, or electronic controls on the walls that people can adjust.

Q612 Baroness Platt of Writtke: Are there energy saving bulbs? I understood there were in all the lighting?

Sir Michael Willcocks: There are of that sort here in this room completely but not throughout the offices. There is a lighting survey going on at the moment, which we can speak about later. That is not complete.

Q613 Baroness Platt of Writtke: That is very important.

Sir Michael Willcocks: Absolutely. May I say why I come back, and I will keep coming back, to the housekeeping element in this? Millbank House at your Lordships' end of the island site there actually does have a building management system which will make it cool in summer in the rooms, rather than asking to do what Henry Webber was talking about. Of course, what happens is that when people go in and they think they are hot, they open the windows. The poor old system then struggles to try to cool it down and it is always defeated because all the windows and doors are open. This is what I am getting at. The education process is going to be rather important.

Q614 Lord Broers: Could I reinforce that? This room is an archetypal example. The windows are open; the heat is pouring out of here. I am sure that is because many of our Lordships think it is unhealthy to have windows closed, and so if they happen to be closed, they will come in and open them. I think it does require a lot of education to point out that there is a thermostatic control on the heat in the room and that if one does open windows, one is just wasting heat in the most profligate way. I share your view that there is going to have to be education to win hearts and minds.

Sir Michael Willcocks: Perhaps, when it is appropriate, I will come back to this whole issue because it is rather a major one. I have to say that I am afraid it is largely entirely the members that need educating. I can order staff and others to do things but I would not dream of trying it with your Lordships.

Chairman: As far as this room is concerned, it does not have a thermostatic control and the windows can only be opened by staff; they cannot be opened by members and so we are not entirely to blame.

Q615 Lord Lewis of Newnham: There are other things like stand-bys, which do use a tremendous amount of energy on computers. I am with you all the way in what you are saying. I do think some of our colleagues are not aware of just how much these things use. I was not aware until I came on to this particular committee. I think it could be a useful measure to let people know exactly what they are wasting, as it were.
Sir Michael Willcocks: May I just return to the point that Mr Webber made? The controls vary across the buildings. In Abingdon House or Fielden House each room has an individual control. The Estate has grown up patchwork and we have different systems in different buildings.

Q616  Lord Paul: You have provided us with a copy of the Parliamentary Energy Policy. I have three questions. How was this policy agreed, and at what level, and what formal status does it have?  
Mr Webber: The policy was endorsed by the Clerk of the Parliament on behalf of the House of Lords and by the Clerk of the House of Commons on their behalf and was subsequently reported to domestic select committees.

Q617  Chairman: Was it ever reported at board level? Was there a board level adoption of the report?  
Mr Webber: There was by the Clerk of the Parliament within his own management board.  
Sir Michael Willcocks: That is why I was then charged, being the provider of support services, with becoming the board member responsible for delivering.

Q618  Lord Lewis of Newnham: I think you have in part answered this question. At what level is energy managed within the Administration? Is there an energy manager, for instance, and, if so, what grading is this associated with? How is this information fed into the strategic decision-making?  
Mr Webber: The energy manager is a professional chartered engineer in my office. He works through the group of energy savers, which consists of representatives from all the offices of both Houses, including a representative of the Secretaries and Researchers Council in the other House. By encouraging and working with them, we seek to influence the hearts and minds of staff.  
Sir Michael Willcocks: On the Energy Savers’ Group, we have an energy efficiency manager who manages it on behalf of Mr Webber. Your Lordships are represented on that Energy Savers Group by my staff superintendent, Major Charlesworth. They have been focusing on, going back to targets for a moment, ways of getting this message across. They have tried a number of ways. The global e-mail method appears to have no effect whatever and I do not know for what reasons. Advertising in both the magazine in respect of members and the staff magazine in respect of members of the staff has been done. Notice boards with “Turn it off” and savings type messages have been looked at near tea-points and things like that. They have been focusing on that. I still, though, am not convinced. As your Lordships know, we have been looking to the Carbon Trust who are advising us on this. I think we need a rather more subtle message, or perhaps a more obvious message on this; for instance, perhaps the environmental foot-printing method, which is saying, “If you do not turn your machine off, with the action of the individual scaled up, look what you are doing in terms of carbon emissions”, or something like that. There are lots of other ways of doing it. One has to say, from my perspective and being absolutely frank, that what I have tended to do thus far is to manage the problems around members. This is not an easy problem because we are not an office block with 9 to 5 working hours where we can say “Turn the lights off on the third floor at 6”. It is a heck of a problem with the working patterns and sitting patterns and members’ own wishes. You can put in place, and I have done, a global system so that when the security officers go round or the cleaners go round, they are trained to turn things off when they lock up and shut doors and windows, and they do that. Of course, if the House is sitting late, that might be at midnight and all day in that office you may have had nobody in there but all the lights and everything else are on. In this area I am wrestling with how I get that side of it across. We have tried, and Mr Webber will tell you, to look at the problem of motion sensors, for instance. Many of your Lordships have complained bitterly about being plunged into Stygian gloom when they have been working and they have to keep waving and so on. That is not necessarily the answer. When we were fitting out Abingdon House and Fielden House, I was offered an immensely sophisticated light management programme that enabled one to do everything, it said. After looking at our working patterns and at the size and cost of it, I am afraid, I reverted to switching off with a button. That is how I am looking at this.

Q619  Lord Patel: My question is in two parts. It relates to the business plan. First of all, we do have a business plan at both ends. Who approves the business plan?  
Sir Michael Willcocks: Ultimately, in the case of your Lordships, the House Committee. It goes to the House Committee and is approved by them. It is constructed via the Management Board, but ultimately, because there are financial plans attached to it and the House Committee is now your Lordships’ finance committee in effect, the business plan is approved by the House Committee.

Q620  Lord Patel: It is presumably similar for the Commons?  
Mr Webber: It is very similar. The committees have slightly different names. It is the House of Commons Commission that is the top body rather than the House Committee.
9 March 2005

Sir Michael Willcocks KBE and Mr Henry Webber

**Q621 Lord Patel:** So the buy-in from the members is through that?

*Sir Michael Willcocks:* Yes.

**Q622 Lord Patel:** Do the business plans have targets, for instance of the percentage of electricity from renewables, targets for recycling, targets for energy savings?

*Sir Michael Willcocks:* Certainly when I started this in the first year, and we are only just a couple of years into the business plan, I looked at waste recycling data and the like. I set the goal for the first year of achieving the Government targets, which I think is for 25 per cent recycling.

**Q623 Lord Patel:** That is in the business plan?

*Sir Michael Willcocks:* It was in my business plan. I think I know where you are coming from. It was in my business plan below the level of the House of Lords’ business plan. I do not think it was reflected in the overall plan. I have discussed this with the Clerk of the Parliaments and it should be, and it will be in the future. For instance, we have met targets in full on waste. We have exceeded the Government targets. I think we do about 27 per cent of recycling and 100 per cent recovery. I am happy with the waste side, and it was in my business plan and reflected. We have not yet got, even in my plan for this year, the actual energy targets. We are waiting—and I hear what Lord Young said—to use Government targets so that we get some objective standard to aim at. That is where it will be.

**Q624 Lord Patel:** You have no percentage targets for renewables?

*Sir Michael Willcocks:* That was in there in the original policy. It was for 10 per cent renewables. That has always been extant in the original policy side in 2003.

**Q625 Lord Patel:** That is in both the business plans?

*Mr Webber:* Yes.

**Q626 Chairman:** I am glad to hear the House of Lords Business Plan will catch up with the House of Commons Business Plan which does set targets. It would be nice if we could do that.

*Mr Webber:* On the question of renewables, the target in the energy policy is 10 per cent electricity from renewable sources. Actually the figure is 11 because we have to buy it for a whole building at a time, and so we have chosen the building which is nearest to 10 per cent.

**Q627 Lord Wade of Chorlton:** What are these renewable resources for this energy?

*Mr Webber:* We do not see far enough down the line to know where it is coming from, whether it is from wind power or hydro power, for example.

**Q628 Lord Wade of Chorlton:** You are just told by the people who buy electricity that so much of it is coming from renewable sources?

*Mr Webber:* We buy our electricity through Office of Government and Commerce contracts. They are able to amalgamate demands from across government and therefore are in a very powerful buying position. Several of their contracts are set up to supply electricity from renewable resources, and so we buy it from there.

**Q629 Lord Wade of Chorlton:** It is just that I do not quite understand how anybody knows, and unless there is a direct relationship between the energy being used and where it is coming from, it just comes from a renewable plant or whatever it is. I would have thought it was extremely difficult to know how it is getting to there. A mass comes through a wire. I do not know who makes that decision. I would be interested if you could find out at some stage what renewable resources we are actually using.

*Mr Webber:* I would like to do that, and I will. The arrangement, as I think you perhaps understand, is that generators account for the amount of electricity they feed into the network and the suppliers purchase that from the network. There is an amalgamation in the pool in between source and use.

*Chairman:* If you find out, perhaps you could send us a note.¹

**Q630 Lord Paul:** I take it that you do not pay any extra, whether it is 10 per cent renewable or 5 per cent renewable? You pay an overall price?

*Mr Webber:* We do. The cost is a little higher, about 10 per cent higher. When I first proposed to domestic select committees in the two Houses that we might make this purchase, there was initially not enthusiasm because of the initial cost, but subsequently, in line with the agreed policy, they concurred, and so we do make that purchase.

**Q631 Chairman:** Presumably the heritage aspects of this building make it very difficult to install things like solar panels and so on. Have you explored this at all?

¹ The Committee asked me if I could find out the actual types of sources which supply the electricity we purchase under our contract for power from renewable sources. I am informed by the Office of Government Commerce (who let our electricity contract) and London Energy that the main UK sources are as follows:

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hydro</td>
<td>15 per cent</td>
</tr>
<tr>
<td>Landfill and Bio-gas</td>
<td>30 per cent</td>
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<tr>
<td>Waste Incineration</td>
<td>21 per cent</td>
</tr>
<tr>
<td>Wind</td>
<td>3 per cent</td>
</tr>
<tr>
<td>Other Bio Fuels</td>
<td>31 per cent</td>
</tr>
</tbody>
</table>
Sir Michael Willcocks: Thank goodness they did not take a picture of the Houses of Parliament from above. If you think that the roofs here are cast iron on tiles and we have suspended ceilings between them and really the major heat loss goes straight up through the roof, it is a big problem. Henry wrestles with that all the time with the conservation agencies. Mr Webber: We are actually helped by the building regulations in this respect. May I quote from Building Regulation L2, which is in relation to conservation of heat and power in historic buildings. It says that the aim should be to improve energy efficiency where and to the extent that it is practically possible, always provided that the work does not prejudice the character of the historic building or increase the risk of long-term deterioration to the building, fabric or fittings. One of the particular characteristics of the Palace of Westminster which derives from Dr Reid’s original heating and ventilating system of the 1840s and 1950s is that there is an enormous rate of flow of air through the building because Reid’s system included ducts, roofs and chambers, through which air was intended to circulate, and still does circulate to a degree. The effect of that, of course, is that it controls the humidity and the general environment of the fabric of the building and there could well be deleterious changes if one interrupted those flows of air too dramatically.

Lord Wade of Chorlton: Dr Reid the ventilator, as he was known.

Q632 Lord Broers: Your memorandum notes that information on energy consumption, in terms of kWh per square metre, is seen monthly by managers and technical staff. Do you have any plans to increase the amount and quality of the data on energy use that is collected and distributed?

Mr Webber: At the moment, we do, as you note, restrict the information to the question of kWh per square metre. The thinking behind that was that if one gives people a clear and simple target, they have got something to manage against and it provides a focus. As I said earlier, we shall, in our revised and updated policy, also set CO₂ targets, and it would then be appropriate, I think, to provide that information to occupiers and managers. One route that this information goes through is the Energy Savers’ Group, so it is quite widely disseminated, and they see the figures on a building-by-building basis. Other routes include the graphs such as you have seen, or similar graphs for particular buildings, being shown to maintenance staff and other managers.

Sir Michael Willcocks: We receive that in a monthly report—I have one here—which literally gives you all the targets and everything else. Your Lordships may be interested to know that at least in December Millbank House came top of the pops in terms of efficiency and saving and, amazingly, 1 Abbey Gardens came third, which I would have thought was astonishing in terms of the fabric of that building. That is how we get it. It is very simple. I think there is a danger, if one gets too complicated in the presentation of it, of losing the lay members of that committee.

Q633 Lord Broers: I think that is the case. However, we have been impressed on several visits that we have made recently, but especially one to Leicester where they have a programme of continual monitoring of energy consumption. They have installed quite expensive instrumentation, and I think it cost about half a million pounds, but their prediction is that it will save them £160,000 a year on the buildings that they are monitoring. This instrumentation allows them to have a real-time feedback that they can monitor. If they see something going out of line in a building, and they showed us several examples of this, they can immediately step in and identify the problem, or at least identify that a certain building is using more energy or more water than normal, and hunt down the reason for this. This struck us as a sensible approach. We have been looking quite a lot at schemes that monitor continually so that people can address the problems straight away. It is something we would certainly suggest.

Mr Webber: I am not quite sure whether you may perhaps be referring to a computerised building energy management system. We do have those systems. As I mentioned earlier, our Engineer Control Centre and operates the system that relates to the Palace of Westminster. Other outbuildings are similarly monitored.

Q634 Chairman: It is not a building management system; they have monitoring units in each of their buildings. Of course, these are buildings spread all over the city; they are schools, leisure centres, libraries and so on. The information is fed into a centralised computer which gives them a day-by-day report on what has been used. They do not control it; they monitor it. Their control is simply in responding if they see, as Lord Broers has said, something out of line or very unusual in a building; for example if a school is going on generating electricity all during the weekend, then they can respond very quickly to find out what has gone wrong.

Sir Michael Willcocks: Was that in Leicester?

Q635 Chairman: It was in Leicester city, but we saw it in Sweden and Germany as well.

Sir Michael Willcocks: From what you say then, I wonder whether this is on-line meter reading effectively, which we are also studying at the moment.
Lord Broers: Presumably, some of the instrumentation that is used in a building management system can be used in this way, but it is an additional scrutiny of these data.

Q636 Lord Patel: May I ask a supplementary on something that Black Rod said? I think you said that Millbank House was recorded as one of the most efficient in the comparison?
Sir Michael Willcocks: Monthly we get a read-out from what are called energy action centres, buildings, and there are nine of them, the Palace of Westminster being considered as one for that. That shows the consumption in December. There are targets to achieve and you can see whether you are meeting them or not. In this month of December, the consumption is the lowest and below the targets set for that building for Millbank. That does not surprise me too much. Fielden/Abingdon House is not on here yet as it is our newest building.

Q637 Lord Patel: Was Abingdon House designed with a view to being energy efficient?
Mr Webber: Yes. The brief for the refurbishment work included the requirement to be energy efficient. The heating system is what is known as a VAV system, which effectively is a heat pump, and it is perhaps three times as efficient as conventional boilers and heating.

Q638 Lord Patel: One part of the Parliamentary Estate that is reported to be the most energy efficient is Portcullis House. What is its performance like in terms of energy efficiency?
Mr Webber: We have had Arups do a study of the energy usage in Portcullis. What they find is that the basic rate of use of energy in the building is in accordance with the design parameters.

Q639 Lord Patel: It is per the design laws?
Mr Webber: These are very complicated parameters. I could not quote them offhand. The effect that they also note is that the hours that the building works, the hours that the building is open for occupation, are something like twice as long as those that they find in typical commercial office buildings. To that extent, the building is therefore using more energy in a year than a commercial equivalent would. The other effect they find is that Members there tend to bring a very large number of supporting staff into their staff offices, each of whom tends to have a computer, and so the light current usage within the offices is higher than would otherwise be expected.
Sir Michael Willcocks: It came sixth out of nine I think, not very good, but it is part of the problem we suffer from as well, that all kinds of extra equipment gets brought in. Members, when they think they are cold, ask for electric fires, for instance, and some 200 have been issued, which is ridiculous, I am afraid, because that just eats electricity.

Q640 Lord Young of Graffham: May I ask Mr Webber this? You say Portcullis House uses more than a comparable office building, despite the fact that they are on vacation and there is probably only an eight and a half month year?
Mr Webber: Yes. The total number of occupancy hours in a year is roughly twice as many as the yardstick for commercially-operated offices.

Q641 Chairman: That is because of longer days.
Mr Webber: Longer days, yes, but also there is a very clear tendency for members of the other House to be in their offices during recesses as well.

Q642 Lord Paul: There is a number of visitors. On renewable energy and the use of it in buildings, have you considered putting up a wind turbine? It might look very nice. Are you using biomass and CHP schemes?
Mr Webber: No, we have not looked at those two options. We have restricted our renewables to commercially-purchased renewable electricity.

Q643 Lord Wade of Chorlton: You mention in your memorandum about Parliament’s combined heat and power plant and how it has an electrical capacity of 150 kW. What do you do with the heat? Could you explain how long this plant has been in operation and what plans, if any, you have to increase the combined heat and power capacity within the Palace?
Mr Webber: You are obviously very prescient to ask about the heat because the determining factor in running the plant is actually an economic use of the heat. Sometimes, it is not possible to run the plant at full capacity for that reason. We have, however, recently been developing plans for an absorption chiller, which is close by the plant and should provide summer use for the heat. In wintertime, the heat is intended to be used as the primary source of heat for neighbouring domestic hot water and building heating. It is a complicated balance to maintain at any one time to get the maximum efficiency out of both heat and electricity from these systems.

Q644 Lord Wade of Chorlton: That is the whole key to successful combined heat and power at the moment if you are structuring to use the heat to produce hot water in the winter but we also use hot water during the summer, so it could be used to heat the water all the year round, could it not?
Mr Webber: Indeed, but this is often not sufficient to cope with the output.
Q645 Lord Wade of Chorlton: Looking in terms of how long this one has been in place and what future plans you have to increase combined heat and power, is that on the agenda?

Mr Webber: The plans for further use of combined heat and power relate to co-operation in Whitehall where there is a large plant under the Ministry of Defence main building, which links in with the Whitehall district heating system. At the moment, that appears not to be making good use of its electricity, oddly. This is against the normal expectations, and so we are meeting with the operators of that system with a view to purchasing their electricity.

Q646 Lord Wade of Chorlton: If I may move on, we have already discussed the whole question of how we can reduce waste by getting individual members of the House to take a slightly different view. You mentioned some issues. I wondered if you had any thoughts that you at some stage might put to the noble Lords as to how they might improve their efficiency. It was interesting that you made the point about educating noble Lords. One thing about a person who becomes a member of the House of Lords is that he thinks it is his job to educate others, not to be educated himself. I do not think it is an easy trick to play. You must have some tricks up your sleeve if you think you are going to make it happen.

Sir Michael Willcocks: You do recognise the problem. I do not think energy conservation is at the top of your Lordships’ agenda. I do not mean that disparagingly. It is the last thing noble Lords would be thinking about when they are engaged on something else. It was suggested to me that if we could get a monitoring of energy usage by parties out of their offices, we could then say, “All parties are signed up to energy conservation and the like, and you are not doing very well as opposed to the other parties”. I know your Lordships well, and so I do not think I will go down that route. We are looking at the whole point of literature. People could be made aware. It is not that they do not care but that they do not necessarily think about it or focus on it. They could be told even if an individual action might be relevant in the scale of things: “Just turning this off in the course of the year would mean . . . .”. That is one area we are looking at. I really do not think the use of motion sensors and complicated lighting control systems would justify the cost, and they do not really work anyway; they are either overridden or there are constant complaints about the darkness. I think we need a combination of what we do now, which is the staff morning and evening controlling it, or trying to, and education. I am open to suggestions but there is quite a lot of literature around now on what could be useful in these environmental foot-printing type ways that I think would bring home to the individual what this means. The other thing is to try and make sure that our building control systems work because, if they do, then your Lordships will not complain about being cold in the offices and demand electric fires. Certainly, for new buildings we are producing tea-points to obviate the need for members to bring in their own kettles. An astonishing array of electrical implements is brought into your Lordships’ House, I am afraid. We are looking at a combination of all these things.

Lord Paul: The idea of measuring one party against another might not be as bad an idea as you might think, but how will you solve the problem in the House of Lords with a lot of Crossbenchers and the bishops?

Q647 Lord Wade of Chorlton: In many places now there are timed switches. If you walk into a room, you press the switch and it automatically goes off in an hour or something. Have you looked at that as an option?

Sir Michael Willcocks: Yes, and at that sort of thing but my experience is that really your Lordships are here to do your political work and the like and having to get up from a desk and turn the lights back on I think would cause mayhem. One has to be realistic about this.

Q648 Chairman: I am interested in what you say about the motion-sensitive lighting because that is very easily dealt with. Having moved from an office which did have motion-sensitive lighting to one that does, it strikes me that every time I come back to an empty office, particularly if it is late in the evening, the lights are still blazing and there is no-one there, whereas at least in my previous office they would have gone off. If you sit very still, the lights go off. It is not a big problem; you just wave your arms in the air and they come back on again.

Mr Webber: We did install that system in the House of Commons members’ offices in 1 Parliament Street.

Q649 Chairman: There are some here as well.

Mr Webber: At 1 Parliament Street I was instructed to discontinue the arrangement.

Q650 Chairman: I am amazed because many university buildings have them.

Mr Webber: However, we have used quite a lot of motion sensors in corridors, in lavatories and in rooms of that nature.

Q651 Lord Lewis of Newnham: The point you made earlier is very significant about the information flow of what is going on. If you turn down a thermostat by 2 degrees, the amount of energy you save is very significant because you are interested not in the absolute energy but in the energy difference.
9 March 2005  Sir Michael Willcocks KBE and Mr Henry Webber

Sir Michael Willcocks: Yes, absolutely. The figure for normal office working is 20°C. On walking around in advance of this meeting with a thermometer, most of the offices I think were at 28°C. If you realise that you can save between 8 and 10 per cent of your space heating costs with a 1°C difference, that is staggering. As you say, that is what we need to get across.

Q652 Lord Lewis of Newnham: It comes forward also with the purchasing of your equipment because having certain equipment on stand-by is just a factor of what equipment was 10 years ago. We really have improved our standardised facilities tremendously.

Sir Michael Willcocks: We have a programme on the computer control in place, or coming into place, for that, for instance.

Q653 Chairman: You have given us such full answers to our questions that we have covered all that we wanted to cover. I do not know whether there is anything else that you feel we have not asked you would like to tell us about?

Sir Michael Willcocks: No, but I would very much welcome the support of the Committee in the forthcoming attempt to get this information programme and co-operation from members would be hugely helpful.

Q654 Chairman: Thank you. We have certainly seen some very good examples in other countries, in Sweden and Germany, which we have visited, of what they use to ensure the public do take part. I commend the one visit we have made to Leicester where they do seem to have created a consciousness in the civil public as to what they should be doing about energy efficiency. They have done it right across transport and everything else. We were certainly very impressed. I know that you have a very busy programme and you are already giving us time from another meeting. May I thank you both very much indeed for coming to talk to us. We felt that we should, while we were inquiring about energy efficiency, look at the place in which we all work.

Thank you for coming to co-operate with us over that.

Sir Michael Willcocks: My Lord Chairman, a taxi driver was driving me the other night. He did not know who I was. As we drove past he said, “Do you know what we call this place”, looking at the Palace of Westminster. I said, “no”, and he said “the gasworks”.

Memorandum by Combined Heat & Power Association

INTRODUCTION

Combined Heat and Power (CHP) is recognised across the world as a key energy efficiency technology.

The Combined Heat and Power Association (CHPA) therefore welcomes this opportunity to respond to this timely and important review of energy efficiency. Indeed CHP remains the only energy technology specifically promoted as part of the Government’s energy efficiency programme, with its own growth target.

CHP plants typically operate at thermal efficiency levels in excess of 70 per cent, with more modern schemes working at 80 per cent and above, making them the most energy efficient form of generation plant.

In turn, CHP not only ensures that fuel—predominantly natural gas in the UK—is used in the most effective way, it also provides competitively priced heat and power to consumers, simultaneously delivering significant carbon dioxide savings. In a recent report to the EU Environment Minister’s meeting, CHP was described as “the single biggest EU solution to the Kyoto targets”.

However, the UK now stands at an important crossroads where, for the first time, CHP development has come to a virtual standstill. The CHP plant recently commissioned at the ConocoPhillips in Humberside was the last major industrial project being developed. There are now no new industrial CHP schemes being commissioned, constructed or developed: ConocoPhillips have made it clear to Government that they have identified several similar schemes to that they have just developed, however, even with the extensive experience gained, current volatile market conditions means they will not proceed with them.

Government inaction in addressing the impacts from the reform of the electricity market has led to this halt in the growth of the CHP industry. The industry has observed a 95 per cent reduction in the growth of new net capacity over the past few years.

In its long awaited 2004 CHP Strategy, the Government announced that whilst it remained committed to its CHP target of 10,000 MWc by the end of the decade it will not achieve its target without new measures. To date no new Government measures have been outlined.
CHP IN THE UK

CHP is a form of onsite or distributed generation, providing heat and power directly to the consumer, helping to avoid the inefficiencies typified by larger electricity generation schemes. Approximately 7.5 per cent of total electricity supplied in the UK is wasted due to the delivery of electricity over the electricity transmission and distribution grids—approximately 28,000 GWh. In addition, the power sector has historically wasted enough heat energy to heat every home in Britain. CHP schemes make use of the heat produced during the generation process, providing consumers with a range of products from high quality industrial steam, to lower temperature water for domestic hot water requirements and space heating.

CHP operating efficiencies are therefore inherently much greater than those of more conventional generating plant—a summary of which are detailed below in Table 1. On industrial sites where substantial heat and power loads are required, CHP is usually the single most effective energy efficiency measure. CHP has typically been available in generation capacities of 20 kWe [kilowatt electrical] to several hundred megawatts. Around 1,200 of the 1,500 UK sites currently operating are below 1 MWe [megawatt electrical] in size. These operate in developments such as leisure centres, hospitals, residential schemes, and public and commercial buildings.

A summary of the recent development of CHP in the UK is produced below in Table 1.

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<thead>
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<th>Table 1</th>
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<tr>
<td><strong>Unit</strong></td>
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<tr>
<td>Number of Schemes</td>
</tr>
<tr>
<td>Net Number of schemes added during year</td>
</tr>
<tr>
<td>Electrical capacity (CHPQPC) MWe</td>
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<tr>
<td>Net capacity added during year</td>
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<tr>
<td>Capacity added in percentage terms</td>
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<tr>
<td>Electricity generation (CHPQPO) GWh</td>
</tr>
<tr>
<td><strong>Overall Thermal efficiency (gross calorific value basis)</strong></td>
</tr>
<tr>
<td>CHP %</td>
</tr>
<tr>
<td>Combined cycle gas turbine stations %</td>
</tr>
<tr>
<td>Coal fired stations %</td>
</tr>
</tbody>
</table>

Larger scale schemes are powered by a combination of gas and steam turbines, ranging from a few MWe up to several hundreds of MWe—the largest of which was recently commissioned by CHPA Member ConocoPhillips at their Humberside refinery, and has a total electrical generating capacity of 730 MWe. Approximately 350 large-scale CHP schemes currently operate in the UK, providing heat and power to a wide range of manufacturers such as paper and board, pharmaceuticals, food and drink and refineries. These schemes make up the vast majority of UK CHP capacity—around 3.5 GW.

Total UK capacity, as detailed in the DTI’s Digest of UK Energy Statistics, stands at 4,800 MWe, however, the recent commissioning of the ConocoPhillips schemes has helped achieved the last Government’s original target of 5,000 MWe of CHP, albeit four year’s later than the current Government’s initial target date of 2000.

INNOVATIVE CHP

There is an ever-increasing range of technologies that qualify under the term CHP. To ensure their environmental integrity and create a legal definition that differentiated CHP operationally from lower efficiency Gas Combined Cycle Plant the Government launched the Combined Heat and Power Quality Assurance (CHPQA) programme in 2000. CHPQA is now a rigorous, bureaucratic, programme designed to monitor, assess and improve the performance of UK CHP Schemes.

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1 Estimated that 5,700GWh (1.5 per cent of electricity available) were lost from the high voltage transmission system of the National Grid and 22,7000 GWh (6 per cent) between the grid supply points (the gateways to the public supply system’s distribution network) and customers’ meters. Digest of UK Energy Statistics 2004, DTI.


4 A case study of the ConocoPhillips scheme is attached in Appendix 1.
CHP schemes operating in the UK range from reciprocating engines, microturbines and gas and steam turbines, as detailed above, to Stirling Engine microCHP applications, anaerobic digestion based schemes, fuel cells and biomass, as well as geothermally fuelled CHP and community heating schemes.

MicroCHP

The UK has taken a lead position in the research into microCHP technologies based on the heat and power requirements of domestic premises. These units are rated around 1 kWt and supply up to 15 kWth of thermal heat. CHPA Member E.ON, under its Powergen brand, is currently the market leader and is introducing its Stirling engine-based unit via a number of developments with housing providers.\(^5\)

Of the 24 million households in the UK, as many as 14 to 18 million UK households are thought to be suitable for microCHP units. If microCHP were installed in all these households, this would comprise as much as 20 GWt of electrical capacity.

The UK housing stock has relatively low levels of insulation and therefore requires higher levels of heating compared with much of north-west Europe. For example, only 14 per cent of UK homes have full insulation\(^6\)—which covers loft insulation, cavity wall insulation and double-glazing which increases the suitability and potential for microCHP. Current and near-to-market 1 kW microCHP units are anticipated to help reduce a typical household’s CO\(_2\) emissions by at least 1.5 tonnes a year.

Powering communities

District Energy Schemes typically deliver heat to more than one building, dwelling or customer from a central source. It may also provide power or cooling. The heat supply may come from waste heat produced in power generation or from industry, or it may employ renewable energy sources such as biomass or waste.

The majority of District Energy schemes operating in the UK are fuelled by natural gas. However, work undertaken by the Community Energy Programme (CEP), a Defra funded scheme promoting the use of CHP and community heating in public sector buildings (managed by the Energy Saving Trust and the Carbon Trust), has helped fund a number of new innovative community heating schemes, and identified a significant potential for renewable energy based community heating schemes, in both urban and rural areas.\(^7\) These schemes include the use of:

- geothermal energy;
- biomass (such as tree waste which would otherwise go to landfill);
- biogas (produced for example, from anaerobic digestion of food waste);
- landfill gas.

As the Committee concluded in their report earlier this year, the Government’s policy on biomass has resulted in a confused regulatory environment leading to little success in encouraging the uptake of biomass plant. The CEP has been one Government led programme that has had considerable success in attracting applications utilising biomass—some 25 per cent of the overall number of CEP awarded projects utilise biomass.

The programme has, in particular, identified the significant potential in Scotland for increasing the amount of biomass fuel, with the Scottish mainland having a 20 per cent woodland coverage. A conservative estimate suggests that the use of thinnings and toppings alone would be enough to provide a continuing energy yield of 300MW fuel.\(^8\) Scotland has been particularly successful with its applications to the CEP.

Little work has been undertaken by the Government to realise the capacity for biogas schemes as yet. Woking Borough Council has taken the lead in adopting the use of anaerobic digesters in CHP mode, and is planning to expand with a major development that should come into operation in 2007.

Renewable CHP schemes are also heavily utilised by the UK’s water companies. A large number of sewage treatment works in the UK use biogas-fuelled CHP plants, and a number of new smaller scale CHP plants have been introduced in this sector.

Heinz is also seeking to construct an anaerobic digestion plant on their site in Wigan, which will produce 10 per cent of the site’s electricity consumption, as well as supplying heat to the various production processes onsite.\(^9\)

\(^5\) A brief summary of the E.ON WhisperGen unit is attached in Appendix 2.
\(^6\) COGEN Europe MicroCHP Factsheet November 2004.
\(^7\) A full list of the community heating schemes awarded capital and development grants under the CEP is attached in Appendix 3.
\(^8\) The Potential for Community Heating networks off the Scottish natural gas grid, BRE 2004.
\(^9\) Heinz plans on-site anaerobic digester, ENDS Journal November 2004.
Paper company Arjo Wiggins are also examining the scope to introduce a wood-fired industrial CHP scheme on their site in Fort William. The CHP scheme will replace the existing 40-year-old oil fired generator and in addition to supplying the factory’s entire heating requirements it will also contribute up to 80 per cent of their electricity needs with the remaining spare capacity fed straight into the national grid.

**Potential for CHP**

The Government acknowledged earlier this year in their CHP Strategy, that they now expect to fail in achieving their 10,000 MWe CHP target by perhaps as much as 20 per cent. The Government’s failure to create and implement policies to achieve the 10,000 MWe target is particularly disappointing as the potential for CHP in this country has already been identified by Government as at least 2-3 times this amount.

Achieving the current CHP target should be the first step in realising the full potential for CHP, putting the UK in-step with a number of other European countries where CHP use constitutes up to 30 per cent of overall generation, compared with the 6 per cent current level in the UK.

The Government’s own commissioned work to quantify the technical and economic potential for CHP capacity in the UK concluded that in the industrial and commercial sectors up to 17,000 GWe of CHP capacity was possible over a range of industrial and commercial applications.10

A further Government study11 commissioned from the Building Research Establishment and the Carbon Trust concluded that there is also significant potential for the growth of CHP in community heating and concluded that:

- Community heating has the potential to deliver significant cost effective energy and carbon savings;
- There is a UK potential for community heating of 18,263 MWe of CHP depending on the economic criteria selected.12

Community heating on this scale could make a major contribution to the UK’s Climate Change Programme. The technical potential could be up to 10 MtC.

There are currently over 1,000 CHP schemes installed in buildings, including two in the Palace of Westminster and others at both Buckingham Palace and Windsor Castle amongst other high profile locations. However, this represents only a small fraction of the sites in the UK that could be installed. For example, CHP engines have been identified as being well suited to operate in sheltered housing schemes, however, CHP is only installed in a few tens of such schemes around the country. In this sector alone, therefore, a huge potential exists as there are currently over 21,000 sheltered housing schemes in the UK providing approximately 500,000 sheltered housing units, with over 300,000 of these in the public sector.

Further, in the buildings sectors (as identified in the Digest of UK Energy Statistics (Dukes)) CHP is currently operating in just over 1,000 schemes. The Association has undertaken research to estimate the number of other such sites in the UK where CHP could potentially be installed. This is summarised in Table 2.

12 Based on the Treasury’s Green Book Guidance for evaluation of public sector investment by whole-life costing, accounting for all costs and benefits, including income and expenditure (such as energy maintenance and replacement costs) over a 25 year period, and discounted back to current values using a discount rate of 3.5 per cent.
Table 2

<table>
<thead>
<tr>
<th>Sector</th>
<th>CHP schemes installed in buildings by sector in 2003 (from DUKES 2004)</th>
<th>Total buildings in sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure(^{13})</td>
<td>426 Public sports facilities 3,210; Private sports facilities 2,943; Total 6,153</td>
<td></td>
</tr>
<tr>
<td>Hotels(^{14})</td>
<td>299 22,000 hotels and guest houses (registered), 16,000 b&amp;b (total with unregistered = 50-60,000)</td>
<td></td>
</tr>
<tr>
<td>Health(^{15})</td>
<td>208 Approximately 1,200 hospitals across more than 300 NHS trusts</td>
<td></td>
</tr>
<tr>
<td>Residential Group Heating(^{16})</td>
<td>48 Tower blocks: more than 4,000 in UK, 21,000 sheltered housing schemes</td>
<td></td>
</tr>
<tr>
<td>Universities(^{17})</td>
<td>32 88 universities, 58 higher education institutions, 516 further education colleges</td>
<td></td>
</tr>
<tr>
<td>Offices(^{18})</td>
<td>25 Estimates of between 288,396—319,285 offices in England and Wales</td>
<td></td>
</tr>
<tr>
<td>Education(^{19})</td>
<td>23 25,500 maintained and independent schools in England, 17,762 primary schools, 3,409 secondary schools, 470 nursery schools, 1,148 special schools</td>
<td></td>
</tr>
<tr>
<td>Government Estate(^{20})</td>
<td>15 &gt; 50,000 buildings</td>
<td></td>
</tr>
<tr>
<td>Retail(^{21})</td>
<td>10 188,600 VAT-registered businesses in UK with 311,000 retail outlets, 215,000 business with over 310,000 shops</td>
<td></td>
</tr>
</tbody>
</table>

CHP AND CARBON SAVINGS

At the May meeting of EU Environment Ministers in Maastricht, the Dutch EU-Presidency commissioned several studies, including a report on technologies which would help Europe move to an eco-efficient economy. This report stated that:

“Co-generation is the single biggest EU solution to the Kyoto targets”\(^^{22}\)

Where CHP is the heat source, savings in primary energy (and therefore emissions) of 25 per cent or more can be made compared to alternative methods of providing heat and electricity.

Government calculations show that for currently installed CHP plant, carbon savings of between 0.7—0.9 MtC per 1,000\(^{23}\) MWe of installed CHP capacity are achieved. DTI statistics estimate that current UK CHP capacity saves over 4 million tonnes of carbon annually being emitted into the atmosphere.

Figure 1 below shows the carbon emissions associated with heat from different types of heating system. Carbon emissions from electric heating are high because of centralised power stations energy inefficiencies and because of the proportion of energy lost transferring from the power station to the end user.\(^^{24}\)

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\(^{13}\) www.theleisuredatabase.com and personal communication
\(^{14}\) http://www.bha-online.org.uk/hotels-profile.asp
\(^{15}\) http://www.wsufftrust.org.uk/Facilities/HotelServices/Catering.htm
\(^{16}\) http://www.towerblocks.org.uk/streets_sky.pdf
\(^{17}\) http://www.dfes.gov.uk/rgateway/DB/VOL/v000211/006-13-1.htm
\(^{19}\) http://www.dfes.gov.uk/rgateway/DB/VOL/v000495/schools—04—final.pdf
\(^{21}\) http://www.brc.org.uk/latestdata04.asp?Cat = 52&amp;Cat = RETAIL + KEY + FACTS and www.dti.gov.uk/retail/part1.pdf
\(^{22}\) Examples of eco efficient innovations, Final Report, May 2004 PricewaterhouseCoopers study for the Dutch Ministry of Housing, Spatial Planning and Environment.
The Government has failed to recognise and consequently exploit the full potential of carbon savings delivered through CHP. Indeed the Government itself has outlined that it anticipates over 50 per cent of industrial sector carbon savings to come from CHP and that CHP remains the single largest carbon reduction policy in the Government UK Climate Change Programme. The recently released Review of the programme has stated that the Government is now not expected, under current policies, to achieve its 20 per cent carbon reduction target by 2010. Introducing new measures to return confidence to investors in the CHP market, and moving CHP back onto a path to achieve the 10 GW target would help to shift the Government’s ambition back on-track.

**CHP: Policy Failure**

The Association remains concerned that the Government has yet to fundamentally tackle the key problems that exist in the market relating to long-term customer confidence in investing in new CHP projects. The Government has initiated a wide number of policy tools to help realise the significant CHP potential that they have identified exists.

However, with the exception of a single measure, the exemption from the Climate Change Levy (CCL)—which took Government over 4 years to achieve and implement, these tools have proven to be ineffective in returning investor confidence.

A number of initiatives, detailed below, are listed in the Government’s Energy White Paper (February 2003) and the Government’s CHP Strategy (April 2004). However, the majority of these measures have either “disappeared” or been diluted to a degree where they will fail to provide any benefits.

From the Energy White Paper:

“We will undertake a review of the existing guidance on information required to accompany power station consent applications.”

The Government introduced the so-called “Stricter Consents Policy” on power plant between 1998 and 2000, however, because of its environmental benefits, CHP was eventually exempt from this policy. Once this moratorium was lifted, and despite Ministerial assurances to the contrary in Parliament, the DTI issued somewhat weak guidance to power stations to seek and develop heat loads (to ensure that the energy efficiency of these plant could be enhanced). The review of this guidance, as announced in the Energy White Paper, has been substantially stalled by the DTI’s unwillingness to explore this issue once again. New draft guidance was eventually issued in September 2004 and is currently under consultation. It remains remarkably similar in language to the previous guidance, and, the Association believes, is a poor tool in encouraging new power plant to increase their operating efficiencies.

“We will continue to emphasise the benefits of CHP and community heating whenever Planning Policy Guidance, Regional Planning Guidance or Sustainable Development Guidance is introduced or reviewed.”
Little has happened in terms of promoting CHP and community heating in the ODPM’s current extensive revision of planning policy. Indeed, the draft of Planning Policy Statement 1 (PPS1) dilutes the previous guidance\textsuperscript{25} that its predecessor department—the DETR—issued in 1998. Additionally, the publication of a CHP and community heating planning guide, to be issued by the EST, has been delayed.

“We will work with OFGEM to keep these developments under review since the existence of a level playing-field for smaller generators, including CHP and renewables, is essential if our ambitious targets are to be met.”

The Association remains disappointed at the lack of progress by OFGEM on helping deliver the Government’s commitment to the 10,000MWe CHP target. The latest energy statistics for the UK, published by DTI in August 2004, shows that CHP electricity output has decreased for the second time in the last three years. CHP electricity output remains 9 per cent lower than that in 2000, even though CHP capacity has nominally increased over this same period (NETA has led to a situation where CHP, and many other types of generating plant, are more inefficiently operated—this in turn has partly lead to the observed increase in carbon emissions from the power sector since the introduction of NETA in 2001).

“We will now proceed with this, over the coming months we will consider the nature and extent of our conclusions in the energy section of the Framework for Sustainable Development on the Government Estate that we hope to publish later this year. We will also encourage other parts of the public sector to consider whether setting CHP targets would be appropriate.”

The Government published in December 2003 a target for Government estate to source 15 per cent of its electricity from CHP by 2010.\textsuperscript{26} The Association however remains disappointed with a number of aspects of this target, including:

— the target only relates to electricity and not heat, thereby providing little incentive for departments to undertake feasibility studies for onsite CHP use
— Only a selective number of departments are included within the Order: the Health sector, one of the largest areas for CHP use, is not included
— Defra did not engage in any dialogue with the Association in the drafting of this target, and no details have been given on how 15 per cent level was determined as the target; additionally no interim targets have been given.

A series of parliamentary questions in 2004 on the Order revealed that, to date, most departments have as yet undertaken little work to achieve this target.

“As we consider and consult on the expansion of the energy efficiency commitment (EEC) for households from 2005 onwards and on whether to extend the EEC beyond the household sector (see chapter 3), we will explore the opportunities for incentivising CHP technologies.”

The Association believed that the expansion of the EEC to EECII (which comes into operation from April 2005) and the possible creation of a Business Energy Efficiency Commitment were significant areas that could increase the role of CHP.

The Association has unfortunately been disappointed by the outcomes in the reviews of both.

The Government’s “Energy Efficiency Action Plan”, published in April 2004, dismissed the idea of extending the EEC to business, and the Government’s recently released Energy Efficiency Obligations order,\textsuperscript{27} apart from the welcome promise to reduce VAT on microCHP engines (subject to the outcome of field trials), fails to promote the use of larger-scale CHP and community heating in the domestic sector.

The Association finds this particularly disappointing as CHP with community heating has been identified as one of the most effective ways of removing households from fuel poverty, especially those classed as hard to heat homes—this is precisely the sector that the National Audit Office’s report\textsuperscript{28} on the EEC has stated that OFGEM is failing to adequately address.

“We have invited the Energy Saving Trust and the Carbon Trust to review their current and future programmes to ensure that they reinforce the delivery of the Government’s CHP target.”

\textsuperscript{25} Planning for Sustainable Development: Towards Better Practice DETR 1998.
\textsuperscript{27} Statutory Instrument 2004 No. 3392 The Electricity and Gas (Energy Efficiency Obligations) Order 2004.
The Association believes that there remains significant scope for both Trusts to improve and promote the use of CHP and, as the White Paper states, help reinforce the delivery of the Government’s CHP target. The Association is, however, unaware of any new initiative taken forward by either Trust that focuses on CHP since the publication of the White Paper.

“Under the UK Emissions Trading Scheme, carbon savings from CHP can already be traded, and we will work on a framework for pilot projects within the Scheme for which CHP projects may be eligible.”

The UK Emissions Trading Scheme (UKETS), which started in 2002, highlighted CHP as a priority sector and introduced two potential routes where the uptake of CHP could be promoted: the Climate Change Arrangements (CCAs) for industry sectors (who wished to gain an 80 per cent reduction from the cost of the CCL) and, as the White Paper stated, the Pilot Projects initiative.

The collapse in prices in the electricity sector due to the introduction of NETA (March 2001) removed incentives for energy-users to invest in energy efficiency measures. Moreover, the ease by which virtually all CCA industries achieved their targets, as highlighted by the NAO’s report of 2004, led to a huge surplus in the market of very cheap carbon allowances, further eroding incentives for industry to invest in CHP.

Following the publication of the White Paper, the Pilot Projects phase of the UKETS was postponed as the Government stated that it was to be overtaken by the European Commission’s proposal to link projects into the EU Emissions Trading Scheme, which would take precedence over the UK scheme.

Some further proposed incentives over and beyond those listed in the Energy White Paper were reported in the long awaited Government CHP Strategy of April 2004:

“Introduction of the EU Directive on the promotion of cogeneration (CHP) based on useful heat demand in the internal energy market”

The Cogeneration Directive, which was formally adopted in February 2004, unfortunately does little to promote CHP, as the Government have stated several times this year. The Directive has been reduced to a requirement on governments to report on the use of CHP in each Member State, along with ongoing work to determine an EU-wide definition of CHP. Defra in fact stated that “the Government’s priority was to ensure that the proposed Directive will benefit, rather than harm, the prospects for CHP in the UK”, which was a major concern throughout the negotiations.

“Encouraging the take-up of CHP through the Building Regulations”

ODPM’s consultation on the revised Building Regulations, undertaken over Summer 2004, does mention CHP, however, in a very limited capacity and much more could be undertaken to promote the use of CHP and other low and zero carbon technologies—especially in relation to the significant new-build housing programme that the Government is committed to.

“Improvements to existing CHP schemes through development of a Quality Improvement Programme.”

The CHPQI measure has been pending since May 2002 when the Government first announced details of it. Government have, however, stated, that its ambitions for the programme have been substantially reduced—from 750 MWe in the Draft CHP Strategy of 2002 to 250 MWe in the final CHP Strategy of 2004. The Government’s last comment on the Programme is that it “is currently in development”.

CONCLUSIONS AND RECOMMENDATIONS

The Association has strongly welcomed the Government’s initiatives to encourage the uptake of renewable generation. However, it must be recognised that even if the Government does achieve its ambitious long-term goals for renewables, the UK will still be around 75 per cent fossil-fuel powered in 2020.

Many of the Association’s Members state that “CHP’s time will come”. There will eventually be a recognition by Government that CHP does and will continue to contribute significantly to UK carbon emissions reductions, as long as the UK remains a fossil-fuel powered economy.

However, the current standstill in UK CHP generation and the lack of commitment by Government to CHP, has translated into all industrial UK CHP development teams now being disbanded. As a result, several thousand jobs have been lost in high technology areas such as gas turbine manufacturing.

An array of policy tools could be introduced by Government to help incentivise CHP. These include:

30 http://www.defra.gov.uk/environment/energy/internat/cc-cogen.htm
31 PQ 181953 12 July 2004.
32 Updated UK Energy Projections, May 2004, DTI.
— Introduction of a CHP commitment—for which the Government has already taken the power;
— Proving greater stability to the spark-spread for CHP;
— Proper recognition in the EUETS of the carbon savings delivered by CHP;
— Valuing Heat, especially when it is derived from renewables;
— Longer term guarantee of CHP’s exemption from the Climate Change Levy;
— New fiscal instruments to boost Community Heating;
— Promoting CHP more actively through the planning regime.

In fact a Defra report,33 undertaken by Future Energy Solutions, and published after the CHP Strategy, suggests that CHP schemes could become economically viable with less subsidy than previously thought—and that a CHP commitment on electricity suppliers would be the most cost-effective and certain way of achieving the Government’s CHP target. It is unfortunate that Government took so long in publishing this work, one can only speculate as to why it was not published during the cause of this House’s deliberation of the Energy Bill.

Government needs to ensure that CHP once again becomes a central element of the energy efficiency agenda, helping deliver major carbon reductions, supporting security of supply, ensuring the UK economy’s competitiveness and, critically, helping deliver the eradication of fuel poverty.

The views expressed in this paper cannot be taken to represent the views of all members of the CHPA. However, they do reflect a general consensus within the Association.

January 2005

APPENDIX 1

CASE STUDY OF CONOCOPHILLIPS CHP SCHEME HUMBERSIDE REFINERY, IMMINGHAM

ConocoPhillips have invested £350 million in the Immingham Combined Heat and Power Plant, which will generate 730MW of good quality CHP, representing 14 per cent of the remaining CHP capacity needed for the UK Government to meet its target of 10GWe of good quality CHP by 2010.

The plant will produce energy to heat the homes 1.2 million people per year. The plant is very fuel efficient, and will conserve 15–20 per cent of the fuel that it would otherwise take to generate the same energy by other methods, thereby helping the UK become less dependent on foreign imports. The plant is very flexible, using either natural gas or liquid fuels from the refineries.

The Immingham plant contributes towards reduction of carbon dioxide emissions by 3 million tonnes per year, equivalent to taking one million cars off the road. In addition, the plant will reduce emissions of Sox Nox and carbon monoxide by thousands of tonnes compared to coal and gas-fired power stations.

The production of steam and electricity at competitive rates means that the plant helps to provide a defined basis for the industrial development of the area. It is expected to last a long time due to its cutting edge equipment, configuration, reliability and efficiency.

In terms of employment, at the peak of construction 1,000 people were employed and the plant will employ 40 people on an ongoing basis. The South Humber Bank (incorporating one of the best deep water ports in Europe) has 1,700 acres of green field land available for industrial development. It is classified as an “EU Zone 2” area allowing UK Government funding to support new jobs and investment. It is understood that local authorities and regional development agencies are working on a development plan for the region.

APPENDIX 2

THE E.ON WHISPERGEN MICROCHIP UNIT

Micro CHP functions as a miniature power station in residential homes, using a small gas-fired engine to drive an electric generator that produces electricity as well as central heating.

The WhisperGen unit is connected to the central heating system, producing heat that is fed to the radiators and hot water cylinder as well as generating electricity as a by-product. This engine drives a generator, which is wired, into the electricity system of a home, contributing to the electricity consumption of the home. If the unit produces more electricity than is needed, the electricity flows to the electricity supply network and

33 Study of the economics of example CHP schemes, July 2004.
Powergen offer a price for this. on the other hand, if the unit produces less electricity than required, the remainder can be bought from Powergen’s normal electricity supply.

The WhisperGen unit burns natural gas that is converted to heat at the same efficiency as a conventional boiler (80 per cent). Around 12 per cent of the gas is converted to useful electricity.

The cost savings are significant. A home with an annual heat demand of 18,000kWh per year could, with the WhisperGen unit, generated 3,000kWh of electricity per year, and would most likely use about two thirds of this, saving £120 per year. The final third would be exported to the grid, with a £30 credit from Powergen, thereby bringing the total to £150.

Savings in carbon dioxide emissions can amount to around 1.5 tonnes per year, thereby contributing to the national target of carbon dioxide emissions reduction. The WhisperGen unit is most suitable for family homes with a heat loss of up to 8kW and can be installed in a floor-mounted configuration to connect to a conventional central heating system and is ideal for replacement of older floor-mounted boilers.

The total installed cost of the unit is £3,000 with an average payback period of around 4 years.

APPENDIX 3

COMMUNITY ENERGY PROGRAMME: COMMUNITY HEATING SCHEMES AWARDED CAPITAL AND DEVELOPMENT GRANTS

The Community Energy Programme (CEP) is a £50 million fund to support community heating schemes in the public sector across the UK. Community heating is a method of taking heat from a central source and distributing it through a network of pipes to multiple customers. This reduces carbon dioxide emissions and lowers fuel bills.

The CEP has, to date, awarded over £44 million in capital and development funding.

The schemes awarded capital grants (see list 1 below) have been granted funds towards the capital costs of implementing a community heating scheme, which could include an energy centre, pipework or internals for buildings or dwellings.

The schemes awarded development grants (see list 2 below) have been awarded grants to help them assess whether community heating or district heating is the right option for their buildings. Three main types of work are eligible for development grants: option appraisal, business planning and preparation of tender documentation for a community heating scheme. Over 114 public sector organisations have been awarded a development grant.

1. Community energy capital grants awarded

<table>
<thead>
<tr>
<th>Round</th>
<th>Scheme</th>
<th>Grant (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pathfinder Norwich City Council</td>
<td>300,000</td>
</tr>
<tr>
<td>1</td>
<td>Pathfinder University of Warwick</td>
<td>650,000</td>
</tr>
<tr>
<td>1</td>
<td>Pathfinder University of Edinburgh</td>
<td>250,000</td>
</tr>
<tr>
<td>1</td>
<td>Pathfinder Shetland Heat Energy and Power Ltd.</td>
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<td>1</td>
<td>Pathfinder Aberdeen City Council</td>
<td>659,716</td>
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<td>1</td>
<td>Pathfinder Southampton City Council</td>
<td>101,000</td>
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<td>2</td>
<td>2 London Borough of Croydon</td>
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<td>2 Midlothian Council</td>
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<td>2</td>
<td>2 Edinburgh University</td>
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<td>2</td>
<td>2 University of Dundee</td>
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<td>2 Woking Borough Council</td>
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<td>2 Rotherham Borough Council</td>
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<td>3</td>
<td>3 University of East Anglia</td>
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<td>Barking NHS Trust</td>
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<td>Shetland Charitable Trust</td>
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2. Community energy development grants awarded

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Examination of Witnesses

Witnesses: Mr David Green, Director, Mr Ian Calvert, Policy Analyst, and Mr Syed Ahmed, Head of Research, Combined Heat and Power Association, examined.

Q655 Chairman: We welcome our witnesses from the Combined Heat and Power Association. Thank you for coming to talk with us and for the very helpful note you sent for us to read beforehand, which we have read with considerable interest. I hope we can press you on the detail of it in some of our questions.

Mr Green: Ian Calvert assists us with policy analysis. He is on secondment to the Combined Heat and Power Association part-time from British Sugar. You have virtually the full complement of the CHPA here today, and we are pleased to be here.

Q656 Chairman: Perhaps in a sentence or two you could explain to us exactly what the Association is and does?

Mr Green: The Association was formed by one of your noble colleagues, Lord Ezra, in a previous life in 1967, jointly by what was then the National Coal Board and Shell Mex BP, originally the District Heating Association. It changed its name in 1983 to the Combined Heat and Power Association. Our basic job is now, and has been since 1967, to promote the development in the UK and elsewhere of the use of combined heat and power.

Q657 Chairman: You really are formed from many different parts of the industry?

Mr Green: We have fewer members now than we used to have. We have about 75 to 80 members across what is now all four sectors of the market including: small domestic CHP schemes; CHP schemes such as described by the previous witnesses here in the House of Lords and in Parliament, a small CHP unit; large industrial CHP plants; and urban or district energy plants, such the scheme described that keeps the heat flowing in Whitehall.

Q658 Chairman: You state in the memorandum you sent us that despite the Government’s reaffirmation of its commitment to a long-standing target that the 10,000 MW electrical should be generated from CHP by 2010, “to date no new Government measures have been outlined”. Is this still the case?

Mr Green: That remains the case. Very briefly, the origin of the target goes back to the Earth Summit in 1991 when the then Secretary of State Chris Patten introduced the first target, which was a 4 GW target. That was then increased by the subsequent Secretary of State John Gummer to 5 GW by the end of the year 2000. The Government when in opposition adopted the target to double the use of combined heat and power by 2010, and that is the derivation of the 10 GW target. In the last period, as the Government has done its climate change programme, approximately 20 per cent of the carbon savings that were estimated to be needed in the UK to achieve the 20 per cent carbon reduction target by 2010 would be expected to come from CHP. As we outlined in our memorandum, the frustration is that despite the Government’s very high level of commitment, and that is across parties, for many years now we have not seen many new measures for CHP since 1997–98. One or two changes were introduced after a lot of work by a number of your colleagues in this House and in the other place to persuade the Government to exempt CHP from things such as the Climate Change Levy. If you were to turn to Defra’s CHP strategy, under our analysis, most of the measures that have been outlined in there are fairly hollow. I imagine that if you look at parliamentary answers, it sounds a very impressive list. If you go down virtually any of the items, they are not delivered in a particularly effective way, nor are they particularly all-embracing. If it would be helpful to the Committee, and I know it as not in our memorandum, we would be more than happy to pick up on that as we go through, but at the moment we have no new measures and we are seeking...
to persuade the Government yet again to introduce new measures.

Chairman: Thank you. That is very disappointing.

Q659 Lord Lewis of Newnham: I realise of course that in your combined heat and power you are dealing with both heat and electricity here. Is there a risk that the Government’s focus, which has been primarily on electricity from the point of view of general discussions, may obscure some of the benefits of this technology? In other words, I am asking: is the heat output really being neglected? To add a supplementary factor to that on incinerators, which also produce heat and power, they are, from this Government’s point of view, a forbidden fruit. Would you like to comment on that as well?

Mr Green: Certainly, and thank you for the invitation. There are two aspects to that. CHP is basically heat-driven. I think that was explained very well by the House authorities when they were explaining the use of the energy in this building. I am very pleased to hear that they are looking at other ways of using the heat, which will hopefully keep the building chilled or cool in the summer. A very creative approach has been done elsewhere and hopefully it will work well here, but heat is the main driver. My colleague, Ian Calvert, as part of his industrial background worked for British Sugar. Obviously refining sugar, as I am sure Ian Calvert would outline, is very heat-driven; you need the heat and that is what drives the demand for CHP. On the back of that, you can then generate power, some of which is used on industrial sites, some of which can be exported. The difficulty that CHP has had since the introduction of the new electricity trading arrangements at the turn of the century, as it were, round about the year 2000, was that the value of the exported electricity just plummeted, just disappeared, and therefore that affected the viability of many CHP plants. You also mention incineration. There is one major CHP plant that is fired by energy from waste and that is in Nottingham. That was initiated by Lord Ezra, again when he was at the National Coal Board. That provides heat for the whole of the centre of Nottingham and was revitalised about eight or nine years ago. In the last 10 or 12 years, there has also been the development of a major CHP scheme in Sheffield, again by a company of which Lord Ezra was chairman, Sheffield Heat and Power, which now provides the heat to virtually the whole of the centre of Sheffield, not every building but all the main municipal buildings and local authority housing estates. Indeed, Lord Young’s former building, the Manpower and Service Commission, gets its heat and electricity from that scheme. We have tried on occasions to persuade the Government that if they did choose to make more use of energy from waste, then one of the benefits for the local community could be heat that could be provided to that local community. In particular, if you look at SELCHP in south London, there is a very deprived community around that area where the incidence of fuel poverty is probably quite high and you could, through interconnection, taking the heat from that plant, make much better use of the heat and provide households and businesses in that area with a very cheap source of keeping warm in the winter.

Q660 Lord Lewis of Newnham: It does strike me that this difference between incineration, particularly the European interpretation of it, is no longer utilisation of waste; it really is a disposal method as far as they are concerned rather than allowing people to use recycling or a different method. One of the features in this country, as I understand it, which differs very significantly from the situation in Europe is that in this place once you start incinerating waste, then you have to have a chimney of a certain height. This strikes me as being rather an anachronism because it is certainly not required in Europe and methods of removal of the various emissions from these stations now, with modern technology, does not require that. We are back to the 1866 Alkali Act virtually in talking about the height of chimneys. What is your view about that?

Mr Green: I do not think any of the three of us is an expert on chimney heights. I would bow to your knowledge of continental practise. All I know is that when I have been to Denmark and visited schemes based on clean coal technology for municipal incineration, there has been a high level of acceptance by the local community. These are incredibly clean places. I can remember going to them 10 or 15 years ago when I started my job and they were so proud of the boiler room that they gave us our refreshments there, and the place was immaculate. It is quite possible to do this, and you may have seen it on your visits. If you look at some of the new modern plant that has been developed in the UK, it is possible to do it. As for your specific question on chimney heights, I am afraid I just do not have the knowledge to answer it. If it would be helpful, I could probably look into but I am not an expert on chimney heights.

Q661 Lord Young of Graffham: Other than Lord Ezra, who seems to have been able to overcome many problems, what other barriers are there to the development of district heating schemes? I know that there were a few in the post-war days. I am familiar with Sheffield, and Nottingham. Are there barriers today and, if so, what recommendations would you make to overcome them?

Mr Green: I think the main barrier is often a perceptual one, that people think it is not possible to do. You take the point that schemes that have been developed have been championed by one particular
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person or set of people who have gone out and actually made it happen. I am sure in your experience that often happens, either in industry or in parts of government. If you look at all the schemes round the country, by and large they happened because there was a strong champion. It was the same in Leicester which we were talking about earlier; there was a series of strong champions there. Clearly there is always an issue of capital cost for the investment. It is very interesting, taking the example of Sheffield, that basically the local authority there said, “We as a local authority would like to see CHP developed in our city. We do not have the capital or the expertise to do this but our buildings do need heating”. Basically they challenged the market to come forward with solutions. They brought to the table the value of their heating contracts. On the back of that, they were able to raise finance and develop a system in Sheffield. Once they got going, it began to spread to the city and people saw the benefits of it. There are some short-term difficulties that are faced in developing a programme. Those are two-fold and one I will deal with is quite straightforward and slightly amusing but frustrating. Under the Government’s Enhanced Capital Allowances, if you put an un-insulated pipe into a building, you can claim a capital allowance on insulating it; if you put what most district heating schemes have, a pre-insulated pipe, into the ground, you cannot claim capital allowance on it. That is an anachronism, and we take this up frequently and will continue to do so. It is just one of those things. The key issue is the overall capital cost. We did a lot of work with what was the Department of the Environment, now Defra, which eventually resulted in a successful bid by the department to the Chancellor’s Capital Modernisation Fund about four or five years ago for a community energy programme, which provides capital grants for the renewal of district heating systems and their upgrading to include CHP. That is only a three-year programme. We were able to persuade your fellow noble Lord, Lord Whitty, and his team at Defra to apply for additional money for the programme. Eventually, an additional £10 million was found. It will eventually be a five-year programme with a spend of about £60 million. It took a while to get going because very often capital expenditure programmes do take a while to ramp up, but now it is going very well. It will be finishing in about 18 months’ time. That has been quite a successful programme and one of the most successful programmes of the Energy Saving Trust, which has jointly run it with the Carbon Trust for a number of years. It certainly has more schemes happening in quite a few areas around the country.

Q662 Lord Young of Graffham: Have you done any work or is there any work available publicly to show the cost benefit analysis of district heating schemes or the return on investment you make, something which would encourage more people to do it?

Mr Green: There has been a very useful piece of work done by the Building Research Establishment (the BRE as it is now) looking at whole life costing of district heating schemes. That shows that if you look at it on a whole life basis, then the return is very good, but if you compare it on a short-term basis, you have a lot of up-front capital, as you have for any big capital investment, and it is quite expensive, although the running costs and the costs to the end consumers are very cheap. The whole issue is how you actually amortize the costs over a number of years. That is effectively what the Sheffield scheme is doing; it smooths the costs over a number of years. We did try and suggest to Defra that they should try more creative ways of spending the money on the community energy programme so that you could build a self-sustaining market and introduce a new financial instrument that might build expenditure over a longer period. The sorts of forms of structure we were suggesting do not fit comfortably alongside the Treasury’s financial rules. It tends to be a year-on-year wrap programme, whereas we were suggesting more of a sequel approach which would suit our buildings do need heating. Basically they challenged the market to come forward with solutions. They brought to the table the value of their heating contracts. On the back of that, they were able to raise finance and develop a system in Sheffield. Once they got going, it began to spread to the city and people saw the benefits of it. There are some short-term difficulties that are faced in developing a programme. Those are two-fold and one I will deal with is quite straightforward and slightly amusing but frustrating. Under the Government’s Enhanced Capital Allowances, if you put an un-insulated pipe into a building, you can claim a capital allowance on insulating it; if you put what most district heating schemes have, a pre-insulated pipe, into the ground, you cannot claim capital allowance on it. That is an anachronism, and we take this up frequently and will continue to do so. It is just one of those things. The key issue is the overall capital cost. We did a lot of work with what was the Department of the Environment, now Defra, which eventually resulted in a successful bid by the department to the Chancellor’s Capital Modernisation Fund about four or five years ago for a community energy programme, which provides capital grants for the renewal of district heating systems and their upgrading to include CHP. That is only a three-year programme. We were able to persuade your fellow noble Lord, Lord Whitty, and his team at Defra to apply for additional money for the programme. Eventually, an additional £10 million was found. It will eventually be a five-year programme with a spend of about £60 million. It took a while to get going because very often capital expenditure programmes do take a while to ramp up, but now it is going very well. It will be finishing in about 18 months’ time. That has been quite a successful programme and one of the most successful programmes of the Energy Saving Trust, which has jointly run it with the Carbon Trust for a number of years. It certainly has more schemes happening in quite a few areas around the country.

Q663 Lord Broers: The question I was going to ask you have essentially already answered. Let me put it in a slightly different way. We have visited Leicester and Gothenburg and in both places we saw very effective district heating, but those systems had been put in some long time ago. It sounds, from what you have just been saying, as though it is not totally uneconomic to build a new one. How can Government help to persuade people to do that? What would you suggest we might put in our report that would help people trying to build new district heating systems?

Mr Green: I have to answer that at a number of different levels. If you first think of the Government not as a policy instrument but as a customer, the Government owns a lot of buildings all around the
country. One of the things we would like to see is the Government becoming an informed purchaser of heat so that they are going out to the industry, to other players, and saying, “In this area—Manchester, London, wherever—we have these buildings which are currently heated in this way. We would like to see if we could get the heat for these buildings from a local CHP scheme”. We would like to see them being prepared to sign up with a contract on a long-term basis, provided the costs is reasonable—we are not looking for it to be done in a subsidised way—and test the market and see if people can come forward with more creative schemes that join up schemes in a number of areas. That is what was done in Sheffield and what the plans are to do in Leicester. There is another area where you might want to think about making a recommendation. When this House passed the Private Member’s Bill that initiated in the other place, the Sustainable Energy Act as it is now, the Government—and this goes back to one of your earlier questions—agreed to have a clause in there to make it statutory for Government departments to purchase their electricity from CHP schemes. The accent there is on electricity. Unfortunately, Defra did not consult us about the statutory instrument before it was introduced. Had we been consulted, we would have said it should be framed not only in terms of electricity but in terms of heat as well. There is a great tendency for Government always to think about legislation in terms of electricity, not in terms of heat. If it was reframed, and it is just a statutory instrument now and not main legislation, to include heat, then that would provide a benefit. In addition, I do not know if you are aware that the statutory instrument that flows from that Act defines the NHS as being outside the public sector. We argue that the NHS should be included in the public sector, unless of course it is in a privately-provided facility, or broadly in the public sector. If you did that it would make it much easier to introduce heat connections or indeed CHP to NHS facilities. Moving on from that, we would like to see continuing support under the Community Energy Programme. We have made suggestions to the Government, and we gave Lord Whitty proposals in December. We are waiting to hear back from Defra about at the moment. In fact Baroness Maddock formally made a submission. She led a delegation to see Lord Whitty about it. She made a proposal that had about 10 separate recommendations as to how you could move away from a publicly-funded programme to a series of measures that built a more self-sustaining programme. That is all to do with things you could tweak in statutory instruments and elsewhere, such as I have mentioned, and that would help. If it would be helpful to the Committee, I would be more than happy, through the Clerk, to provide you with a copy of that submission.

Q664 Chairman: We would be very interested to read it.
Mr Green: It is also very specific.

Q665 Chairman: When was the decision taken to exclude the NHS from the public sector?
Mr Green: Perhaps Syed can remember the dates. It was last year or the year before.
Mr Ahmed: Defra undertook a great deal of discussion amongst government departments but they could not quite agree on what was and what was not within the government estate. There seemed to be some difference of opinion between Defra and the Department of Health in about summer 2003 and ultimately the statutory instrument which was released towards the end of 2003 decided that the Department of Health would not be included within that SI.

Q666 Lord Patel: What reasons were given?
Mr Ahmed: I think the Department of Health did not want to be. There has been a great deal of inertia within the Department of Health in terms of energy efficiency and specifically CHP. A recent document the Department of Health just released on carbon and energy efficiency in the Department of Health mentioned CHP in only the slightest way. We are disappointed because, of all the sectors where CHP works, the health sector and hospitals are probably the most attractive. It seems incredible that they are not using CHP as much as they could do.

Q667 Lord Patel: Could there be some cynical motive?
Mr Green: A hospital is there to keep us all healthy. The easiest thing in a hospital would be to plug it into the electricity system, plug it into the gas system, and we are suggesting something different and different often seems to be difficult. One of the things we did suggest is that there is no particular need for government to use its money to pay for this because, given the role of the PFI in new hospitals, if you create the right contract structures that encourage energy service providers to partner with the building providers, it could include CHP and other things but we would hope, where appropriate, it would include CHP.

Q668 Chairman: You have talked already about your frustration at not being consulted about the statutory instrument. Presumably you also were not consulted about whether the NHS would be included in the government scheme.
Mr Green: No.

Q669 Chairman: Do you feel that you are consulted sufficiently by the Government or would you like to be consulted more?
Mr Green: We have a continuing dialogue with government. Tomorrow evening, for the first time since 1997, we will be meeting in one room together the Treasury, Environment and DTI Ministers to discuss the state of the industry, a meeting that Lord Whitty has set up. Often, the industry finds itself as a sort of ping-pong ball between three or four different government departments. It is not that we are not consulted but we often feel that we are not listened to. We like to feel that in the industry we would never say that CHP is going to work everywhere but we always point out that the government has a CHP target but it is the poor relation of the renewables target and the broad energy efficiency target and it seems to come down to a continued debate between DTI and Defra over who has control over which policy lever to pull at any moment in time.

Q670 Chairman: That is certainly a theme that we have had from other witnesses. Do you find one government department talks to you more or listens to you more, to use your phrase, than another? Is there one you particularly have a close relationship with?

Mr Green: Our sponsoring department is Defra because ever since the Department of Energy was abolished energy efficiency has been under Defra. We are in the slightly analogous position of being the only energy supply technology that is under Defra. If you include biomass we are not the only one but at the time we were the only one, whereas all the other supply technologies are under the DTI. We talk regularly to both of them but we seem to spend more time listening to the moans of one department against the other than getting progress.

Q671 Baroness Platt of Writtle: In other European countries local government appears to be far more proactive in developing local projects than it is in the UK. Is this also your impression? Does the CHP Association engage in regular dialogue with local authorities and their related industry, because in Sweden we found they worked very closely together with industry, which sounded a good idea, or with regional agencies such as the RDAs with a view to promoting the benefits of CHP?

Mr Green: The Association’s foundations are to a certain extent in the local authority sector. We have about 15 or 20 local authority members so we have a regular dialogue with local authorities. On particular issues we have a very close, strong dialogue with the Local Government Association and its predecessor bodies. At that level it is a good relationship. The difference I have noticed between what happens in Sweden, Denmark and the UK is the legal underpinning of what local authorities can and cannot do. I am not an expert in international and local government law but if you look at the way in which local authorities function in Denmark and Sweden they tend to be much more to the fore in the delivery of a whole range of services. They have a much more general power of competence to deliver local services. The way in which their finances operate is much more removed, as I understand it, from central government so they have the freedom to raise capital borrowing in ways that perhaps do not occur in this country. It is not unique to CHP. All that affects their ability to engage. You tend to find that there has always been a much stronger drive from the local municipalities in Sweden and Denmark and, for that matter, in Germany. The Länder have quite a few large CHP schemes. We work very closely with our colleagues at the Danish District Heating Association and the Swedish District Heating Association. They often cannot understand why local authorities are not more active in the UK, apart from one or two notable examples like Leicester, Sheffield, Newcastle, Lothian and a few others. It is largely because the legal framework is different. They have a different power of leadership in local communities.

Q672 Lord Paul: Could you explain why the New Electricity Trading Arrangements have had such a marked impact on the CHP sector? There are four issues which I would like to raise. Have the balancing requirements imposed on generators by NETA penalised CHP generators and, if so, why? Have recent changes to NETA rules, introduced by Ofgem, made a difference? Why has NETA, in the words of the memorandum, “led to a situation where CHP and many other types of generating plant are more inefficiently operated”? Lastly, what are the Government and Ofgem doing to rectify these problems?

Mr Green: At a high level, when we started the discussion with John Battle, the first of the six Energy Ministers we have had, he was clearly signed on to this. It was in the original terms of reference for the NETA project that one of the objectives should be to encourage CHP. One of the things my colleague, Mr Ahmed, is assiduous about is tracking the way in which the words change from speech to speech. The commitment was diluted over time so what came out at the end was quite different from what came out at the beginning. We have always argued that if we had kept the high level policy principle from the outset we probably would not be where we are now. In electrical terms, in terms of the way the market operates, CHP is regarded as an intermittent source of energy. I suppose this building is a good example of it, if you think of it as scaled up to a large, industrial site. The main requirement for this building is to provide heat. This building has a yearly cycle of intermittent occupancy so some times of the year the machinery is not operating all the time. At
other times power would not be used in this building. It would go in the electricity grid locally, off site but how it does that will depend on what debates you have in the House, how many people are here etc. The flow into the electricity market is intermittent and not consistent. Its main purpose is keeping the lights on here. If you scale it up and think of a Rowntree chocolate factory with CHP in York, their main job is to keep the chocolate flowing, not to generate electricity for the electricity market. The production goes up and down so therefore the flow goes up and down. In electrical terms, CHP is treated the same as an intermittent source. The way in which the balances settlement system was introduced, it was designed broadly speaking to provide benefit for people who provide guaranteed output to the market. One or two can but broadly speaking CHP is not designed to do that. It is designed to meet the on site demand of a building or a site. Therefore, it gets penalised because it is intermittent in the market. The way the Balance and Settlement Code operates, it is designed to discourage intermittent generation. The cost of the renewables obligation was increased to provide compensation to renewable operators for the loss of value they would get as a result of NETA. No such mechanism was put in place by Defra for CHP so CHP is fully exposed to NETA and to the Balance and Settlement Code in particular, which is why in the first six months of NETA coming in output to the power market of CHP went down by about 60 per cent. It has recovered a bit now because people have become smarter about operating it and there have been some new CHP schemes going in. The ones that have gone in, a couple of megawatts here and a couple of megawatts there, have all been non-exporting schemes because of the volatility. You mentioned Leicester earlier. We still have in our file the letter that Leicester City Council had from Powergen on the day NETA came in, terminating all electricity sale contracts for CHP. They said, “From this date, we will not buy the power from you”, because it was too risky.

Mr Calvert: That summarises the first part of your question. You then asked about recent changes and whether they help. There have been a couple of hard won changes negotiated by players from within the governance system that runs the New Electricity Trading Arrangements. They do address slightly the balancing effect and some other effects that directly impacted on small generators more than large portfolio generators. One of the tools brought in to address the balancing issue was quite effective. That was called shortening gate closure which just meant you had to predict less far in advance what you were going to do, which helped the more intermittent generators. They have had a small impact. However, balancing effects and problems of NETA are only half the story. The other major impact of NETA was the way it changed the market and moved the value away from generation, down the chain to supply. That hit all generators, by definition. There is no implication here that CHP has been exclusively the only technology hit by NETA. I do not think there have been any major power plant orders placed since NETA so it is not just CHP plants that are not being built; it is generators. It is a wider issue. That is the answer to your second question: small but nibbling at the edges really, leading to some real problems.

Mr Green: One of the companies that led the way in this was Slough Heat and Power. They had to write down the value of their CHP plant in Slough after NETA came in by some £60 million because of the decline in value of the plant. The difference is that if you are a company that has supply, distribution and generation, albeit under different licences, you can move where you make the value between those three areas. If you think back to what you might have read in the press around 2000/01, quite a few major energy companies were buying up the supply businesses of other companies. The reason was to provide hedging against the loss of value in generation. One of the things that affected British Energy was that they bought a supply business and sold it, so they were fully exposed to NETA because they did not have a supply business that they could pass some of the costs through. CHP schemes, by their very nature, do not have supplies because they are supplying one customer. What we argued from the outset was that the Government has two policy targets, one on renewables, one on CHP, and we are where we are.

Q673 Baroness Platt of Writtle: What would you see as the solution to this problem post-NETA?

Mr Green: I do not think we are that confident of getting changes through the NETA system to address it. Ideally, what we have always argued at a high level is that what you need is to have arrangements in place, similar to those for renewables, for CHP. When Parliament passed the Utilities Act in 2000, provision was made in it to introduce a CHP commitment which would provide a similar level of support for CHP to that which operates for renewables. That is what happens in Germany and other countries where, because of liberalisation, they put in place the transition mechanisms that meant you did not get the dramatic effect you had in this country. The measures that are in place for renewables in Germany include CHP as well.

Q674 Baroness Platt of Writtle: Perhaps you could let us have a list of the European countries that have done that.

Mr Green: We have that list. That would not be a problem.
Lord Wade of Chorlton: What did the Government expect the consequences to be of NETA? Did they expect it to do what it did in terms of combined heat and power?

Mr Green: They have always said that it was an unintended consequence and that they were not aware this was happening. We pointed out that at virtually every stage this was likely to happen if measures were not put in place to prevent it.

Lord Wade of Chorlton: They still maintain that these would not be the consequences?

Mr Green: Yes, although privately officials said to me afterwards, “You were right after all. We should have listened to you”.

Lord Wade of Chorlton: That was after the event.

Mr Green: Yes.

Lord Wade of Chorlton: In your memorandum, you refer to the 730 megawatt ConocoPhillips plant in Humberside which you say has the capacity to heat the homes of something in the order of 1.2 million people. We understand since then that it has not been connected up to heat anybody. Maybe you could explain to us exactly what steps have been taken there to utilise the heat and what sort of customers have come forward to buy the heat, if any.

Mr Green: The figure of 1.2 million homes was used to illustrate the volume of heat the plant would provide. It does not mean there are 1.2 million homes in the vicinity of that plant. The plant is required for the heat needed for a chemical site adjacent. There is a very large chemical refinery right door to the plant.

Baroness Platt of Writtle: Is it for manufacturing?

Mr Green: Yes. Virtually all the heat is used there. It is an example of electricity impact. They were strongly encouraged by local authorities to locate there because that area is quite stressed in terms of electricity grid connections. The local authority wants to develop more industry in the area which will clearly need more electricity. By generating this large amount of electricity in that area, it is effectively taking pressure off the local network and releases capacity for economic growth in other companies. They also have planning permission so that if there was demand in the area they would look at how they could provide the heat. If you have the opportunity to visit the plant at Immingham, there is quite a sizeable town there but where the chemical plant is, by the very nature of the processes, for safety reasons, it is somewhat removed a large number of homes. The figure of 1.2 million homes was to illustrate the physical size of the heat. All the heat is used for the processing which has dramatically improved the cost efficiency of that refinery and has made it able to compete again in the European market very efficiently. One of the arguments I am always trying to convince the DTI of is this is the way to improve the competitiveness of key sectors of the British economy.

Lord Patel: What scale of CHP is likely to give the best value?

Mr Green: In a sense, it is horses for courses. If you look at the household scale, you probably would not put a large combined cycle plant in a house. The technology developing there is to use smaller scale plant in a house.

Lord Patel: What fuel would it be?

Mr Green: Gas. The comparison there is to say is it more or less efficient than a gas condensing boiler. They are by and large slightly more efficient because they are generating the electricity as well. If you then look at the small scale CHP projects, such as the one in this House, they are very efficient in that sector because they are very often replacing an old boiler, providing a new, more efficient source of heat and producing electricity for the property as well. There are 1,200 small scale CHP schemes around the UK. The control centre for this scheme is in Horsham because they have an on board computer so they monitor that remotely, as indeed they do in other parts of the country as a result of some innovative technology that was introduced from the University of Manchester about 10 years ago. If we take a step back, we have this 10 gigawatt target. What is the best way of achieving that? The area we need to do a lot more on is large, industrial plants because they give very large carbon savings. They are very large contributors to the UK economy. They also take a long lead time. If you look at what has happened in the CHP market, it has been large industrial plant that have seen no development over the past four years, which is why neither Siemens in Lincoln, nor Centrax, the family business, have had any orders for CHP gas turbines for about three years. We will know the market is turning round when they start getting fuller order books. At the moment, they have had one order in four years.

Lord Patel: What fuel could be used in a large scale plant?

Mr Green: Historically, it was coal. By and large, it is gas now. In the medium range in remoter areas, the area we are all looking at much more intently now is the potential for biomass based CHP. I do not think you would run a very large, 750 megawatt scheme off biomass. There may be some innovative gas use but you are probably talking about smaller, 500 kilowatt
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To one megawatt plant that would be run on biomass, provided the crops were there etc. We have had discussions with Sir Ben Gill and his colleagues in the Biomass Task Force for Defra and they are certainly very interested in thinking through what the policy framework might need to be to use more combined heat and power.

Q683 Lord Patel: What about biodegradable waste? Mr Ahmed: Anaerobic digestion is an interesting technology and I am not sure why it has not been picked up in the UK as much as it could have been. Woking Borough Council has had an anaerobic digestion combined heat and power plant for a number of years now. Part of the problem goes back to incineration. The waste streams in the UK in terms of recycling and separating our waste are not as advanced as in many other European countries. When we do increase recycling rates and the sorting out, there will be better opportunities for utilising incineration. What goes in the incinerator largely dictates how high the chimney has to be and that also applies to an anaerobic digestion plant.

Q684 Lord Patel: I have the impression from the answers you have given that there does not appear to be a Government coordinated strategy about CHP. Would that be accurate? Mr Green: Yes. If you were to ask for the Government's CHP strategy, they will give you the Government's CHP strategy. Colleagues in this House and the other place have assiduously asked parliamentary questions about this on various occasions. When you get into it, a lot of it is quite hollow. Ministers are very well aware of that.

Q685 Lord Patel: You say they are aware, but what is the response? Mr Green: You seem to get into this circular debate between DTI, Defra and the Treasury over whether or not new measures are needed. If so, what should they be? That discussion has been going on for many years. We had a big debate about introducing a CHP commitment and that was shunted into the siding in the Energy White Paper process. This House passed an amendment to the Energy Act last year which would have removed the cost of the renewables obligation from CHP. That was rejected by the Government in the other place but did leave the Government looking for a proposal which my colleagues and I are working on at the moment to set up a more market based mechanism, to provide some financial stability in the market, looking at the difference in the future between gas and electricity prices. That is the subject of a meeting with ministers tomorrow evening. The indication from last July was that the DTI was not minded to go down that route.

Q686 Baroness Platt of Writtle: We wish you well. You refer to the potential of micro-CHP to reduce household CO₂ emissions by at least 1.5 tonnes a year. Given that condensing boilers now achieve efficiency levels of up to 90 per cent and that in CHP such efficiency is lowered, as a result of introducing electricity generation, to around 75 to 80 per cent, can you explain what advantages micro-CHP has both in terms of household energy efficiency and carbon emissions? This may be a rather complex question and you may think you want to write to us instead of answering it off the cuff.

Mr Ahmed: It may be helpful if we write to you but, just to give you a brief illustration, the figures are derived from desk top studies that have been done largely on one particular product designed by a New Zealand company called WhisperGen, which Powergen is beginning to install. It is a floor standing, small CHP system based on the Stirling engine.

Q687 Baroness Platt of Writtle: That is gas? Mr Green: Yes. We were very keen to see the Government mount proper field trials so we all knew how this technology would work in the market place. Customers want to use it, at the end of the day. Those field trials are currently underway and are being developed by the Carbon Trust. They are due to report some time later on this year or early next year. We will then have more definitive figures as to what the carbon savings are. At the moment, the carbon savings are largely based on desk top studies, looking at and comparing against gas condensing boilers. As a matter of interest, my colleague Mr Ahmed and I attended a very interesting briefing by Baxi recently and they are putting a lot of effort into developing a wall mounted micro-CHP system using the Rankine cycle. I am not an engineer but I would be more than happy to supply you with additional information about how it operates. They are reasonably confident of bringing it to the market in about 2008. The other unit was developed by Microgen, which is a subsidiary of the BG Group. They are reconfiguring their system and they hope to be able to bring it to the market in about 2007. If you wanted to get one, the only unit on the market at the moment is the WhisperGen unit which stands on the floor, rather than being wall mounted like the other two are.

Q688 Lord Broers: This is again relating to micro-CHP. Are there any technical developments likely in micro-CHP that would either reduce costs or increase its applicability in domestic settings? Mr Green: From the briefing that we have had recently in the past month from both the main companies—there could be others coming onto the
market yet—the technical developments that are going on are things to do with getting the weight down because you want to physically put it on a wall so it has to be comfortably installed by a heating engineer into a house. Also, getting the interface right between the heat exchanger and the Rankine cycle engine. There seems to be quite a lot of technical work going on in that field. We are not privy to all of it because these companies have their own proprietary technologies but the development seems to be trying to get the weight down so that it is physically easy to install and also making sure that in doing that they do not sacrifice efficiency. There have also been some developments in metering technology that goes with them as well because you need on board metering so that you can get a real time read out for the purposes of billing.

Q689 Lord Broers: Why does it have to go on the wall?
Mr Green: It does not. The two companies developing it, Baxi and BG Microgen, want customers to see this as another form of household boiler. Most people, as I understand it, have their gas boilers on the wall. The WhisperGen unit sits on the floor. If you live in the right area, you can have a floor mounted unit. At the moment, they are increasingly available. The idea has been to increase customer acceptability and then you will get volume by making it as light as possible.

Q690 Baroness Platt of Writtle: Is that just a fashion?
Mr Green: I do not know.
Baroness Platt of Writtle: I have a condensing boiler which is on the wall but I have never thought of it as particularly advantageous compared with putting it on the floor.

Q691 Lord Broers: I would have thought noise was the bigger problem.
Mr Ahmed: You are right about the noise. One of the big issues for most modern households is space. With most kitchen appliances, the sizes are already specified. There is also the issue about not scaring customers. Boilers are distress purchases.

Q692 Baroness Platt of Writtle: I suppose you could put it higher up on the wall and it saves space, perhaps.
Mr Ahmed: It is just a direct replacement.

Q693 Lord Patel: Surely you can have it on the wall, higher or lower or even in your bedroom if you wish?
Mr Ahmed: Exactly. It depends on the customer.
Mr Green: There are some situations, for example, in tower blocks where for gas safety reasons you cannot have gas appliances. That does not mean to say you cannot have CHP. There are a number of tower blocks around the country where they are interconnected and they have a CHP system providing heat and power to four or five tower blocks.

Q694 Chairman: Using what fuel?
Mr Green: Gas. When I first started in the industry, most CHP schemes were coal fired. In the last 10 or 15 years they have all become gas fired. I suspect that if we develop some other technology in the future that we do not yet know about, provided it is in the right form, you could use that as well. The big issue we have stressed to the Government in terms of the debate about security of supply is that, as we move towards importing more gas into the country, it makes a lot of good sense to make sure that at the point of use we are using it to maximum efficiency. At the point of use, CHP systems are typically between 70 and 90 per cent efficient, whereas conventional, large scale gas plant in the UK, according to the DTI, is only about 45 per cent efficient. We are still wasting a huge amount of energy in the process of combustion. If we can use more CHP, we will be making much more efficient use of the gas we do import, therefore improving our security of supply.

Q695 Lord Wade of Chorlton: How do you see the market for micro-CHP developing over the next five years up to 2010? Is there anything the government could be doing to encourage its use more effectively in households?
Mr Green: The Government has put in place, after pressure from the industry, quite a creative package. Subject to the field trials, there are now going to be reduced rates of VAT. There are various other measures that have been put in place as well. The challenge now is for companies in the market to get their product to a state where customers will accept it in their homes so that they can utilise either the enhanced payment under the energy efficiency commitment and/or the reduced rates of VAT. Talking to Lord Ezra at his farewell lunch when stepping down from the chair of the Micropower Council, his view is one I would share. The Government has gone about as far as it can at this stage with field trials and incentives. The challenge is now for the industry to get the product to a state where it can be comfortably used.

Q696 Lord Wade of Chorlton: Do you think that technology will improve considerably over the next four or five years?
Mr Green: From the presentations we have had from Baxi, the level of commitment they are showing and the history of how they have brought new growth to the market, it has increased my own level of confidence about their ability to do this because they
are a company that know about how we use energy in our homes and the sort of things people prefer in terms of boilers because, as has been said, they are typically distress purchases.

**Q697 Baroness Platt of Writtle:** What about the use of the heat in manufacturing industry? Are there some coming on in that direction too?

**Mr Green:** There are no plans at the moment for any new industrial CHP plant in the UK because of the market conditions. We wish there were orders coming through.

**Q698 Baroness Platt of Writtle:** What is the solution to that problem because that would be a better use of gas, would it not?

**Mr Green:** It goes back to what we were talking about earlier, trying to make sure that we have an effective set of market conditions, that we ameliorate the impact of NETA, that we make sure that we get into the UK gas at an affordable price and that moves you into a wider debate about gas liberalisation in Europe and the price we pay. It also moves you into a wider debate about whether or not you could, through the legislative means at the Government’s disposal, put in place measures to bring forward the carbon benefits of CHP in a way in which the government and the DTI have chosen to do for renewables. We have never argued that it is a choice. We have always argued that it is a continuum. Making more efficient use of fossil fuels is a vital part of the solution to climate change just as, in the longer term, moving over to wider use of renewables is important. I would personally say from my background in energy efficiency over 20 years, the first point to start on all of this is how we can make more efficient use of energy in a whole range of buildings so that however we generate it we are making the best use of it in buildings.

**Q699 Baroness Platt of Writtle:** Including manufacturing industry?

**Mr Green:** Certainly.

**Q700 Chairman:** That is a very good note on which to end. Thank you very much indeed. If there are any points that you would like to write to us about, particularly the technical point in Lady Platt’s question, we would be very happy to receive that and I think you have made a promise to send us two lists which will be very helpful. Of course, we will publish any additional, written evidence just as we will publish a record of what has been said today. Mr Green, can we thank you and your colleagues.

**Mr Green:** Thank you for inviting us. Thank you to you and your colleagues for trying to support the industry over the years.
WEDNESDAY 6 APRIL 2005

Present
Broers, L
Lewis of Newnham, L
Oxburgh, L
Patel, L
Paul, L
Perry of Southwark, B
(Chairman)

Platt of Writtle, B
Sharp of Guildford, B
Taverne, L
Wade of Chorlton, L
Winston, L
Young of Graffham, L

Examination of Witnesses

Witnesses: Lord Whitty, a Member of the House, Minister for Food, Farming and Sustainable Energy, Miss Jackie Jones, Head, Sustainable Energy Policy Division, Department for Environment, Food and Rural Affairs; and Mr Simon Barnes, Head of Branch, Built Environment, Office of the Deputy Prime Minister, examined.

Q701 Chairman: Lord Whitty, can we thank you very much indeed for coming to meet us this afternoon, especially as it is a rather busy time of the parliamentary timetable and I know that you have a Bill to present in the Chamber later on this afternoon. I think we would all like to say that we understand that you have already announced that you are not wishing to be part of the Government when you come back after the election, so this is perhaps your last appearance before a Select Committee. I do not know whether you regard that as a mixed blessing!

Lord Whitty: I will let you know later!

Q702 Chairman: We feel especially honoured that you are with us this afternoon.

Lord Whitty: Thank you very much.

Q703 Chairman: I think you have had a copy of our declared interests and there is a copy for members of the public who are here today, so we will not need to repeat our special interests and, as you know, we are being recorded for broadcast as we go on the Internet. Minister, I will start with asking a question which you have already seen. We have been concerned as we have been pursuing our inquiry into energy efficiency that the evidence we have had is that there was a lot of muddled thinking and indeed what seemed to us to be confusing and contradictory policy-making, so I ask you, are you satisfied that the fundamental objectives underlying the Government’s promotion of energy efficiency are sufficiently clear, can you tell us what they are and can you also tell us how you measure energy efficiency?

Lord Whitty: Well, I think they are sufficiently clear. Clearly if this august Committee is finding they are not that clear, then there is a communications issue which the Government needs to address, but I would have thought it was pretty clear from both our Climate Change programme and from the Energy White Paper what the medium and long-term ambitions of the Government were, in terms of carbon savings, delivered through energy efficiency improvements. In fact in relation to the 2010 targets, we are expecting energy efficiency to deliver roughly half the carbon saving and that seems to be a pretty clear strategy. In relation to individual sectors, there is a fair degree of clarity of objective within that total and I would have thought reasonable clarity about the measures. I appreciate that the measures are quite multifarious; they inevitably are multifarious in relation to the different sectors we are dealing with. How you deal with building regulations and improvement in standards of buildings is of course dramatically different from how you are with us this afternoon. How you deal with transport or how you deal with products and market transformation towards less energy-intensive forms of consumer goods and, therefore, there are quite a lot of different initiatives ranging from the regulatory and fiscal right the way through to persuasion and design, so it is not surprising that there are a lot of instruments, but I would have thought the overall objective is clear. In terms of measurement, of course there are two points to make here in a sense. It is of course clear that measurement of direct energy use is relatively straightforward at the household and the firm level in terms of the energy intensity of output or the energy intensity of income, but where it becomes less easy is where you need to take into account the energy intensity of, if you like, embodied energy, but even that is subject to a degree of methodology which is usually quite easily calculated. There are, therefore, reasonably established means at a sector level and at the individual company level of measuring energy efficiency improvements. Where I think it is less clear and where it is possible that we might need some further research, although I think the effect of this can be exaggerated, is that clearly
as far as there is a synergy between energy efficiency achievements or carbon efficiency achievements and a reduction in costs, what happens to the reduction in costs and what happens to the extra money in the pockets of the householder or in the pockets of the company and how far is that deployed on less or more energy efficiency products and services? In overall terms, I think I can answer that question, but there are ways in which we need to address that problem with a greater degree of calculation and sophistication.

Q704 Chairman: I think one of the areas where we really would welcome your clarification is whether the Government is aiming at absolute reductions in the use of delivered energy, and you did mention that and you said all carbon emissions, but if it is a reduction in the use of delivered energy, what is the baseline, reduced from what, or are you talking about more efficient use of the existing energy supply or about a reduction in greenhouse gas emissions, and how do those various objectives relate to each other? For example, what is the methodology for translating the figures for consumption of delivered energy into greenhouse gas emissions because there can be different forms of energy with different levels of carbon emissions and changes in the electricity-generating fuel mix can alter the carbon emission equation very, very dramatically? We could not help noticing that in the White Paper there is only one mention of the baseline of the Climate Change programme and we were not very clear exactly what that baseline was even there.

Lord Whitty: I am not sure, but in terms of the Climate Change programme, the baseline for everything is 1990 and 1990 carbon or greenhouse gases. The Climate Change objective of the Energy White Paper is a reduction in carbon content of delivered energy, but one of the ways of achieving that is to shift into renewable energy and one of the other ways of achieving that is to make energy in total more efficient wherever it is coming from. If you are using electricity, it does not really matter very much in terms of energy efficiency calculations whether it is a renewable source or a carbon-based source. You can contribute to the carbon figures by improving the use of energy in total and indeed of course the Climate Change objective is not the only objective of the Energy White Paper. The other objectives of fuel security, of competitiveness and of eliminating or reducing fuel poverty are also helped by improving the efficiency with which you deliver energy as a whole, so all of the objectives of the Energy White Paper are helped by the energy efficiency mechanism. I am focusing particularly on the Climate Change one, but that is not the only objective which is achieved by the better use of energy generally.

Chairman: I think we should move on perhaps to our next question on that, although I am not sure I have completely grasped your answer and I think there is still some confusion in our minds about whether the Government’s objectives for the reduction in fuel poverty and the reduction in carbon emissions are necessarily always in harmony with each other, but perhaps we will come to that question later on as we go through.

Q705 Lord Paul: Minister, in one of the reports of this Committee earlier, it was recommended that perhaps the Government should look at the possibility of appointing one minister for all aspects of energy. It was rejected by the Government and instead they decided to rely on the Sustainable Energy Policy Network. Are you satisfied that the SEPN are doing a good job?

Lord Whitty: I think it is early days, but the SEPN have done a pretty effective job so far and we are reviewing their role to make sure that they do continue to fulfil the purpose. I think my view on the question of which Whitehall department deals with which issue is that we can become too obsessed by this and there is always going to be a boundary line somewhere. Even when we had a Ministry of Fuel and Power, which I can remember, and the Department for Energy subsequently, then not all aspects of energy policy fell within that Department, and whole swathes of transport and buildings were always outside that Department, so it is not clear that you could ever get all of energy-related policies into one department with one minister in any case. One could argue about what should lie either side of the line and basically we could spend a lot of time arguing about that, whereas really what I think you were asking in your opening question was whether we have clarity of direction. If we have clarity of direction, then I think it is a second-order issue as to which department is responsible for which bits of delivering those objectives.

Q706 Lord Paul: Part of the question really came up with Sweden, for example, which has recently brought the responsibility of energy policy within one ministry. Is there any lesson in that?

Lord Whitty: Well, my last understanding of the Swedish system is that, for example, transport, which is 27 per cent of energy use, is not in the Swedish structure, so whatever you do, there is something outside of it and I suspect that we could fiddle around with the boundaries of Whitehall a bit and it may be that the Prime Minister will decide so to do quite shortly or at some subsequent point, but it is clarity of purpose which is necessary and co-operation between the various government
departments which contribute towards it and that is what the SEPN organisation is supposed to do and I believe it is beginning to do that, but we do need to keep it well under review to see that it is doing its job.

Q707 Baroness Platt of Writtle: But are you satisfied that security of supply is sufficiently directed and co-ordinated because that is so vital to this country?

Lord Whitty: Yes, I think security of supply is in part achieved by clarity of purpose and by diversity of source and that does obviously need to be kept totally under review in relation to economic, technological and political changes around the world, but security of supply, which is primarily the DTI and a bit of the Foreign Office rather than Defra, is nevertheless one of the key objectives of the Energy White Paper and I think the interdepartmental structure does take care of that.

Q708 Chairman: Minister, we understand when you say that the organisation of government is not necessarily the key thing, provided the policy objective is clear and understood by all the departments, but there are confusing examples of different government departments pursuing quite different lines. For example, Defra has just launched last year the consultation on the Climate Change programme, inviting comments on ways to ensure that the Government’s targets for greenhouse gas emissions are met while at the same time the DTI is arguing with the EU Commission to revise downwards the emissions reductions required under the EU Emissions Trading National Allocation Plan. The DTI is quite properly defending the profitability of industry, but it is, in so doing, actually moving in the opposite direction from the direction in which Defra is consulting.

Lord Whitty: Well, no, I think there is a misunderstanding behind that question. Both of those positions, both the consultation paper and the position the Government is taking in relation to the European Commission, are cross-government positions and they have obviously been subject to the normal interchange between departments to reach those positions, but they are coherent government positions. I think also there is some misunderstanding particularly about the so-called reduction downwards of the figures of the National Allocation Plan in relation to the trading scheme. Basically the figures, the latest projections, indicated that our base for calculating the original proposition to the Commission was wrong, it was out of date, and we, therefore, revised our position and the actual carbon burn was higher and we were starting from a different point. Therefore, I think I said it was Oscar Wilde, but it was actually John Maynard Keynes who said, “If the facts change, I change my opinion. What do you do?”

The Committee suspended from 3.43 pm to 3.51 pm for a division in the House

Q710 Lord Oxburgh: It is come down?

Lord Whitty:—but there is no obvious technological, social or economic reason why it should not continue to go down to below nought and indeed in certain other areas where we have used raw materials, in the use of sulphur, for example, we have genuinely decoupled in the total sense. We have decoupled in the relative sense quite dramatically on energy and I see no reason why we should not decouple in an absolute sense on energy as well because I am not sure that it is entirely due to the change in the mix of delivered fuels, but it is the mix of economic activity and the quality, if you like, of economic activity which has changed and led to a significant reduction in the marginal coefficient of energy and I do not actually see why that should not go significantly further to the situation where a pattern of economic activity led to such a significant increase in the energy efficiency progressively that we were having growth combined with a negative use of energy. It will take time and it will be a long-run thing, but I think it is achievable.

Q711 Lord Oxburgh: It is a noble aspiration, but you agree that no one has ever managed it before?

Lord Whitty: I think at high rates of growth it has not been managed before, but it has been managed to some degree for periods of time.

Q712 Lord Oxburgh: For long periods?

Lord Whitty: No, it is of course also true that energy policy and the direction of corporate policy has never been so focused on the minimisation of energy use before—
Q713 Lord Oxburgh: Absolutely.
Lord Whitty:—and, therefore, it is the national and international governmental and corporate framework which will drive it. Whereas previously it has been driving largely, though not totally, towards minimising the cost and maximising the efficiency of delivery of fuel, we now have other objectives, including the minimisation of the use of fuel which I think can deliver a prolonged reduction in total use.

Q714 Lord Oxburgh: The other fact of course is the one that you hinted at which is the change in the pattern of industry, and the more our heavy energy-intensive industries move abroad, of course that is going to cause a change in the energy intensity on the economy. Would you foresee more of that happening?
Lord Whitty: I do think some more of that will be happening, but it is also true that we are talking, certainly in a Climate Change dimension, on a global basis as well, and whereas energy-intensive industry may be increasingly located in some other countries, and clearly that is the tendency, then the technology which they adopt in delivering that energy-intensive industry must of itself adopt the cutting edge of technology rather than reproduce the kind of productive processes that we were adopting 20 years ago.

Q715 Lord Oxburgh: Globally it is a zero-sum gain. Do you see our assisting those countries in developing?
Lord Whitty: It depends what you mean by “assisting”, but yes, I certainly think it is part of the responsibility to developing countries to ensure that the optimum energy technology is being used in the course of their development.

Q716 Chairman: Minister, can I just press you on this. In the last couple of years energy consumption emissions have in fact been rising, not falling, and your own review of the Climate Change programme shows that we are falling short in this country of your 2010 targets. What measures do you think should be, and could be, taken to improve that situation?
Lord Whitty: Well, there have been two years where carbon emissions have increased almost entirely because of the change in the electricity sourcing and there has been a higher level of coal-burn than had previously been expected. That is not a long-run tendency, but it does of course mean that there has been a slight rise over the last couple of years of carbon. The actual energy consumption has not had the same blip, it has not been on the same trend, so I think that we do still believe that we will be well in line for achieving the Kyoto target and we will achieve significantly better than the Kyoto target as far as the carbon target is concerned, but at the moment we will still need further measures and an intensification of the process in order to meet the 20 per cent 2010 carbon target.

Q717 Chairman: Of course, as you yourself mentioned in the answer to the first question, there is a sort of negative spiral very often in increased energy efficiency through better technology and better developments and materials and so on because as we improve our technology and so reduce the cost of energy, then at the same time we give people, as you said, individuals and industry, extra money in their pockets which quite often they use to consume more electricity and buy more goodies for the home or to buy increased plant capacity in industry and so on, so the more you make energy more efficient and, therefore, cheaper, the more you actually encourage people to use more. I think this was shown in the United States when they got more efficient fuel consumption in cars, that people just said, “Oh, that’s lovely, we can now drive an extra 200 miles for the same amount of gas as we used to drive 150”, so to speak, so is there any hope, do you think, of changing and breaking that cycle?
Lord Whitty: I think you are right to point out that that cycle exists in some contexts and the transport one is a pretty good example of one where you do have that perverse effect, although even there it is not quite as absolute as I think you are stating, but in general this cannot be the case. Roughly speaking, for primary fuels, we spend roughly five per cent of household income, for example, on primary fuels which is 40 million tonnes of carbon equivalent. The rest of our expenditure, which is nearly 20 times as much, only creates 60 million tonnes of carbon equivalent. I think I am right in saying and somebody will correct me if I am wrong, but roughly those figures anyway. Now, that means that you save yourself £10 on fuel and you are going to spend it on something which has a 20 times less almost carbon or energy-intensive propensity. Now, you can argue that at the margin, we spend towards the higher end of the energy intensity, but actually that is yet to be proven and in any case it would still be lower than spending the money on more directly delivered heat or fuel, so I think in aggregate terms it cannot be true. It may be true in relation to some sectors and some choices and clearly if everybody spends the money saved on fuel on hiring their own plane to go to the West Indies, clearly we are in a problem, but most people will not and in one sense as we become richer, we buy more high-value products which tend to be services or highly processed, but not high energy-intensive, goods, so I think in general that cannot be true, but that was why I said earlier that we do actually need a bit
more research and clarity in the area of this rebound effect.

Q718 Lord Wade of Chorlton: Before I ask this question, I should declare that I am President of the Combined Heat and Power Association, as you know, so I do have a personal interest in the outcome of this inquiry in this regard. What we are concerned about here is how the Government and how the energy policy treats heat. As a result of our inquiry so far, we have got the impression that whilst the Government has devoted considerable resources to sustainable electricity production, for instance, through the Renewables Obligation, they are failing to take seriously the development of sustainable markets for heat. We would like to know really what steps the Government are taking to rectify this because clearly we have had a lot of evidence of technologies where heat is a by-product or a result of that activity in addition to the use of electricity energy and that is not being recognised in the system which the Government is going to in order to support these activities and really we would like to know how you see this coming forward.

Lord Whitty: Well, as you will know, I have been disappointed in the progress on the combined heat and power front which has largely been as a result of changes in prices between gas and electricity which one could say were episodic, but it is a rather long-run episode which has changed completely the apparent economics of CHP. I think partly as a result of this, and we are looking at other methods to support CHP as is, in addition, and we gave this commitment during the passage of the Energy Bill in 2004, as some people will recall, we are looking at how to quantify both carbon and other benefits from renewable heat and the extent to which we can maximise access to renewable heat, and we hope that that report which is being led by the DTI should give us some further indications of how we need to support the development of the heat market, including possibly a special renewable heat obligation, so all those areas are being looked at. I think, if I may make a personal view, that the role of heat has been underestimated in the overall policy approach, but the way in which we actually maximise that and, in particular, renewable heat, we are yet to find what is the best way of doing that in the light of the relative price position on gas and electricity, but the Government is on the case, though we have not yet come up with the final answer.

Q719 Lord Wade of Chorlton: At least that is a bit more reassuring than some of the evidence we have had before. Even so, I think you would agree there is a long way to go. It seems to me there are a lot of issues that have not been addressed, the value of heat that comes from combining power and biomass, for example, which, from the evidence we have received, does not get anything like the support it might do and certainly does in other countries. Biomass, developing an alternative energy source, has solved a great deal of problems and will continue to drive forward the economic benefits that we referred to in the previous question and that is an area that we could do a lot more with. Although I hear what you say I think there has to be a much stronger will in Defra to solve this problem because it is not a difficult thing to solve if you want to solve it.

Lord Whitty: I think it is quite a difficult thing to resolve. As far as biomass is concerned, for example, there have been significant incentives for biomass in terms of capital grants and access to the grid and in terms of energy crop support. Both for some time were not fully taken up. I think they are in a more benign position now and perhaps we are focusing on a slightly smaller scale of plant as being the most efficient use of biomass and the use of biomass within CHP where there is a double benefit in using renewable feedstock as well as the knock-on benefit of heat. More can be done. I would dispute that the government has not attempted to do it. In the heat context there is a lead which the government has taken in relation to CHP and government buildings which will help, but we also need to find mechanisms whereby the market can also fully recognise the benefits of heat provision and we have yet to crack that.

Q720 Lord Patel: My question concerns the relationship between central government, local authorities and businesses that might deliver the most efficient energy savings. In our visits to, for instance, Germany and Sweden, we found that there was a strong relationship in the lead taken by the local authorities working with local businesses that deliver the most efficient energy savings, and whilst in the UK you see some isolated good examples, such as Leicester or Woking, this is not a policy issue so what can central government do to drive this forward a bit harder?

Lord Whitty: I think there is quite a lot of government support for local and local government led initiatives. It is clear, certainly on the energy efficiency front, that the performance of British local authorities is very disparate. Some authorities, as you rightly say, have taken great initiatives and made significant returns on this, but we have through Defra and the DTI and the Energy Saving Trust and the Carbon Trust a number of support systems for local authorities to take forward renewable energy, community based energy schemes and local networks. I think that there is a lot of mileage in us taking that further and in persuading
local authorities to give priority to such schemes within their own approach to their eco obligations and so on. There is more that can be done on the local authority side. I am not sure that it is entirely a matter of money because after all central government fund local government rather more in the UK than they do in Sweden or Germany to which you referred. It is a matter of information and following best practice and there is a lot of best practice in some local authorities, but if that were generalised or even partly generalised we would have a much better achievement in social housing, in commercial developments and in public buildings than we have had so far.

Q721 Lord Patel: Is it a question then of more clear direction from central government to the local authorities?

Lord Whitty: No. I think the direction is clear, in particular in relation to public buildings, but one could always sharpen up the information. It is also prioritisation within local authorities of the energy efficiency and sustainability objectives when they are approaching building and planning decisions.

Q722 Lord Patel: I will give you a real example in Leicester of the situation where there were plans to fuel the district heating system with biomass fuel, which was halted because, although the Carbon Trust were prepared to help and fund it, the RDA was not.

Lord Whitty: That project also had an offer from central government under the Community Energy Programme, if it is the same one I am thinking of, and so I do not think you can fault central government in that respect. Indeed, it was a very good scheme and there are other schemes which have gone ahead with local government and RDA support. We have also tried to encourage local councils so that we have a sustainability objective by using the Beacon Councils Programme as a way of encouraging excellence and best practice in the area of local authority approaches to energy efficient buildings and heating systems within those buildings.

Q723 Baroness Platt of Writtle: What are the Government doing to improve the energy efficiency of new buildings in the UK?

Lord Whitty: We have done a lot and it is a rather faster process than has happened in the past. We are already progressing well with the next revision of Part L of the building regulations on energy conservation so that we bring that forward at the end of this year. That would expect a 25 per cent better performance for buildings than the current set of standards so it should be a very significant step increase in the pipeline. We intend to have further reviews of the building regulations standards and their impact on energy efficiency every five years thereafter and, of course, the last review is just coming in so that from 1 April central heating boilers, for example, fitted either in a new building or in a replacement situation have to be up to A or B standard, that is, an efficiency level of 86 per cent. That will make a big difference to heating systems not only within new buildings but also where a replacement boiler is required in existing buildings.

Q724 Baroness Platt of Writtle: You said A or B but we have been told that if you want a really efficient one it is now A++ or A+, and A and B have been downgraded.

Lord Whitty: No, they have certainly not been downgraded. I am sure my colleague on the right can describe it in more detail but up until we met this requirement boilers considerably less efficient than grade B would have been allowed under building regulations.

Q725 Baroness Platt of Writtle: But I am surprised it was not A++ while you were doing it. That is why I am asking the question.

Lord Whitty: You can only make step changes in this requirement and you would have to have excluded a lot more buildings than are required from this requirement if you were to go to A++. We are going one step at a time here and we will revisit the boiler objective, along with others relating to the heating system and conservation of energy in the next round. This is a really big step, this designation of A and B, and it should not be understated.

Q726 Baroness Platt of Writtle: The Commons Environmental Audit Committee in its recent report concluded, “If the shortages of skills are not properly addressed as a matter of urgency it is increasingly likely that we will end up with a large number of badly built houses in poorly designed communities with limited transport infrastructure that have severe environmental impacts”. What do you feel about that?

Lord Whitty: There is a skills issue in the building trade and in the heating and insulation trades, one which the Government and the industry have begun to address, but there has been a skills gap in the fall-off of apprenticeships and other forms of training within the building industry in previous decades. We are addressing that now and it will come right as the tens of thousands of people we are putting through the training come into play. I cannot disguise the fact that there is some shortage. Some of this shortage is effectively being dealt with by immigration. Quite a lot of skilled labour is coming into the country from eastern Europe and elsewhere.
to fill the gaps in the construction labour market which are clearly there, but we need to train our own people who are going to stay here to develop their own skills and hand on those skills, and that is why we have stepped up the programme but we need to step it up a bit further.

Q727 Chairman: We also wondered about the standard of our existing building regulations. Part L still does not even require double glazing. It seems incredible that we are building houses in the 21st century with single glazed windows.

Mr Barnes: I do not think that is the case. We do require a high level of energy efficiency through the glazing. How that is achieved with certain types of glass or double glazing or triple glazing is up to the builder. The building regulations are functional. We do not say, “You will provide blue windows” or whatever. We say we want a certain energy efficiency outcome. It is not prescriptive in that respect.

Q728 Chairman: Is not double glazing an absolute bare minimum essential for energy efficiency?

Mr Barnes: There are very few cases where windows can be put in which are not double glazed now and comply with the building regulations. It would generally only be in cases where you have got heritage problems where you need to make sure that the house looks as it did when it was first built if it is an old property.

Q729 Chairman: That is another issue we have encountered in our various visits, that the heritage requirements mean that some quite sensible forms of double glazing in retrofit schemes have to be cancelled because they say something to do with the convection is not quite right, the way the glass is reflective, which cancels out all that people are trying to do in putting retrofit into older buildings.

Lord Whitty: You are certainly flooring me and it seems you are flooring Mr Barnes as well at this point. The central point about building regulations as compared with the way they were written 30 years ago or even 10 years ago is that they are not product specific. They are largely but not entirely written in the energy efficiency sector in terms of the outcome rather than in terms of the prescription of precise techniques or precise products and that seems to maximise the flexibility for meeting those objectives and encourage innovation in this area. We need more innovation in building if we are to have truly sustainable buildings.

Q730 Chairman: I think there is a real problem with the inspection and enforcement regime which has come up with witness after witness. Even when the new EU directive comes in the preparedness of the inspection programme to deal with the enhanced regulations which will presumably eventually emerge from the implementation of the EU directive just are not there. There are not going to be enough inspectors properly trained to be able to implement that inspection requirement. It is one thing to have requirements about how well a house is built but it is never really checked, particularly not during the process of construction. That leads back into the lack of skills. You get a bunch of likely lads, if I can put it that way, on a building who are not conscious of the building regulations, who throw their coke cans and their packets of sandwiches down the gap in the walls and by the time the building inspector turns up the walls are completed and there is no way that he or she can know that the regulations are not being met. It really does require a much tighter inspection programme during the course of the building rather than during the final inspection.

Lord Whitty: It is important that both the enforcement agencies and the industry’s own quality control people are aware of and trained to meet those standards and are competent people in that terminology to do so. As with other areas of enforcement, you are never going to have everything inspected at every point in the building but everything should be subject to inspection and therefore the industry itself should be expected to ensure that the standards are being met. That is a requirement in the training and provision of competent people within the industry as well as on the part of local authorities and other enforcement agencies.

Q731 Lord Lewis of Newnham: We had a visit to the British Research Establishment and they told us that in fact they had gone out testing some of the buildings, essentially pressure testing, and one third of them failed the testing procedures. This is really quite a significant problem. I know the point that has been made about the deficiency of testing. What happens in the case of the one third who failed?

Lord Whitty: I am not sure what criterion we are talking about.

Q732 Lord Lewis of Newnham: It is essentially a pressure testing technique that they use, which is one of the ideal methods of testing the effectiveness of windows.

Mr Barnes: The air pressure testing is a very good proxy for trying to understand whether a house is reasonably air tight and therefore does not leak heat in very simple terms. We recognise that the 2002 Part L regulations have not really been that well adhered to. This test has shown up the problems we have got. The test is not obligatory at the moment. We are looking to making it obligatory in the new Part L regulations and bringing in other ways of ensuring better compliance. To that end we expect
to get a much better outcome but we think that the information we have from those tests and other tests that we have carried out is helping us formulate how we should take this forward and get a better result. We recognise that there is a problem here.

Q733 Lord Lewis of Newnham: But what about the BREEAM/EcoHomes standard that has been suggested by the BRE?
Mr Barnes: That is another issue and it goes beyond energy efficiency in terms of Part L.

The Committee suspended from 4.20 pm to 4.27 pm for a division in the House

Q734 Lord Paul: We have talked about inspections and better building etc, but industry found a long time ago that the more inspectors you have you almost end up with the worst product and a very costly product. What we really need is less inspection but more training to get better buildings. How are we going to achieve that?

Lord Whitty: Up to a point I agree with you. I think that the self-inspectorate of industry is quite important and that is referring to training competent people within the industry itself and those schemes are very important and they are industry-based schemes which, if they are working properly and the industry bodies which deliver those competent person accreditations are properly monitored themselves, then you do not need government inspectors to come in every five minutes. On the other hand it is also important that we have an effective check from the building regulations people at local government level, so I cannot get inspectors entirely off your back. They are always going to be there in the background but it would be useful if the industry itself had equally competent selfinspectors.

Q735 Lord Paul: I have no quarrel with that, if the government wants to keep inspectors, but we still need to get through the training and skills shortage.

Lord Whitty: I absolutely agree with that.

Q736 Lord Paul: What are we trying to do about that?

Lord Whitty: Our estimate was that to do the heating and boilers system properly we would need 70,000 more installers. So far we have trained new nearly 20,000. There is still quite a gap there so we are still working on the training.

Chairman: I cannot help feeling, given the prices they charge, that it would be attractive for them.

Q737 Lord Oxburgh: Could I ask whether there are any examples, and if so how many, of inspections of new buildings which have had an unsatisfactory outcome and where the builder has been made to remediate the fault?

Lord Whitty: I do not know the answer to that. I do not know whether my colleagues from ODPM would have the answer to that. I suspect it more frequently happens under planning than under building regulations.

Mr Barnes: I do not have the answer to that because it is very rare that it will come to ODPM. It would usually stay within the local authority remit. If a building failed for some reason or other it would be dealt with at local authority level.

Q738 Lord Oxburgh: But if we are trying to do something about this it is clear that the building industry must know that defective buildings, however much the cost, are going to be required to be remediated. It seems to me that you need to know that as part of policy.

Mr Barnes: I take your point and I think the issue we talked about earlier on about the air tightness testing reflects the fact that we are moving into an area here where we can take some action because if it is required and there is a failure builders will have to do something about it. We have already introduced on the acoustics side trying to make houses less noisy to the people next door with pre-completion testing, and builders are concerned about that now because they have to make sure that they comply with the acoustic requirements. If they do not have to have the air tightness testing. If there is failure they will have to do something about it, and that is much more difficult than having to deal with the sound problems.

Q739 Baroness Sharp of Guildford: One of the Government’s main policy instruments at the moment is the energy efficiency commitment which places on energy suppliers a heavy emphasis on what might be called passive energy efficiency, cavity wall and loft insulation in particular. We wonder whether these are sufficiently rigorous in themselves and in particular whether they take effect both of the rebound effect that you have already mentioned, in other words, that gains made from installing loft insulation and cavity wall insulation are dissipated either in expenditure on more energy because you heat your house better and to a higher standard, or for that matter frittered away in other ways, in particular on things like taking cheap flights to the Caribbean and the like. Also, in a sense there is a finite limit to the amount that can be done in that area and what is going to be done and yet there is a great deal more that can be achieved in terms of energy efficiency than just these two issues.
Lord Whitty: I do not quite know what you mean by “two issues”. The energy efficiency commitment can be delivered in a multiple of ways in terms of improving the quality of the building — various appliances, the connections on appliances, the electrical system, the heating system. There is a whole range of things.

Q740 Baroness Sharp of Guildford: I agree with that. We feel that perhaps undue emphasis is being placed on these two issues.

Lord Whitty: I think the cavity walls issue in most circumstances is one that needs to be addressed in old buildings. There are places where it is not physically possible or too expensive to address it but in general it is a fairly basic requirement, which is why so much emphasis has been put on that area. The delivery of the energy efficiency commitment in total, because it addresses the problems of individual households and individual buildings through the customerupplier relationship, is a very cost effective way of delivering energy efficiency in households but there is a long way to go. Ultimately, you are right, there is a finite limit to it but we are well short of that and certainly the doubling of the energy efficiency commitment in this coming (now current) period will not exhaust the number of things which can be delivered in that direction. As to the rebound effect, yes, a little bit will be taken in additional heat and comfort but not by and large most. Even in a fuel poverty area in general people have improved the heating and the comfort of their homes without any increased expenditure once effective insulation has been put in, so it is not as if they are taking too much of the saving directly in heat. As I said earlier, in terms of spending it on other things, it is probably my fault by “two issues”. The energy efficiency has been put determines the total priority or that spending in that direction. The mechanism is efficient whole range of things.

Q741 Lord Lewis of Newnham: You quite rightly, Minister, state that in fact there are many ways of solving this particular problem. How do you decide on any form of priority in this? Is there any research going on that you are sponsoring into this sort of energy efficiency?

Lord Whitty: There are various bits of research which are being carried out by ourselves, the Energy Saving Trust and the Carbon Trust to establish the energy efficiency return on different interventions. Just to give you a measure of the energy efficiency commitment approach, which does give you flexibility and therefore addresses the particular issues in a particular building and the use to which that building is put, the estimate there would be that if you were to have to achieve that same energy efficiency improvement through the market, ie, increase the price and then rely on the elasticity of the price, it would be three times more expensive than delivering it through placing the energy efficiency commitment on the supplier and delivering it that way. The mechanism is efficient and we are looking at various bits of research to see how the individual components are efficient. It is important to recognise that if you find one is more efficient than others that will only apply in certain circumstances, so you are not just focusing on cavity wall insulation or other high return areas. You have to address the whole gamut of how the building is used, not simply at one level.

Q742 Lord Lewis of Newnham: I realise of course that the Building Research Establishment is not under your department. It is DTI which is the sponsoring department.

Lord Whitty: Yes.

Q743 Lord Lewis of Newnham: When we visited them we were rather surprised to discover that the amount of money which had been allocated to them in 1997, which was £17.5 million, has now dropped to £5.5 million, which seems to us the wrong direction.

Lord Whitty: I could not comment on that. There is very substantial industry expenditure there as well, of course, which is part of the change of status of BRE. The funding may be a bit misleading, to say either that central government spending in BRE determines the total priority or that spending in BRE is the totality of government spending. I or one of my colleagues would need to come back to you on the total spending in this area before you got the full picture.

Baroness Platt of Writtle: That is something that we would like to know because we feel a very experienced organisation is really suffering.

Chairman: I have been asking several questions for written answer on this and we have quite a substantial set of figures now which bear out the fact that the overall spend on applied building research is dramatically down in the last three years, partly, as I understand it, that in transferring the research monies to the DTI the DTI has put a lot into blue skies research and not into applied research, so it has hit research in the construction industry which is largely applied research. Perhaps it would be better to leave it now as I do not have those written answers here.

Q744 Lord Lewis of Newnham: Obviously, a critical date as far as the building situation is concerned is 2006 when the Energy Performance of Buildings Directive will be allegedly implemented. We have
already referred to the problem area of inspections and things like that. Will there be enough inspectors around by 2006 to deal with it? I have a feeling that you have already in part answered that but let me put it to you specifically. Can you also tell us what sorts of buildings are to be involved in this? Is this to include buildings where the public will gather, cinemas and theatres and libraries? What exactly is it referring to?

Lord Whitty: On the question of the numbers of inspectors, whether they are government inspectors or people from within the industry, there is an advisory group convened by ODPM looking at the training and accreditation of people who are required under that directive. The certification process is being addressed through that joint industry/government committee. As to which buildings will be covered, I will have to come back to you on that because my understanding is that we are still in the consultation phase on that.

Mr Barnes: Yes, we are certainly in consultation at the moment on the EPBD and the various certificates for different types of property. We are going through the process of talking to the different types of housing areas and also commercial buildings and currently there is quite a lot of work taking place there. The issue for us, as you say, is the number of inspectors we will need. We already have inspectors who will be looking at the home condition report so we will be getting on the back of that to look at energy efficiency reports which will go into that. Quite a large proportion is already there. We are now looking to see how we might combine what is already happening with what we need to do with the other certificates that need to be put together.

Q745 Lord Lewis of Newnham: As far as things like cinemas and things like that are concerned, that will still be a matter for discussion?

Mr Barnes: There is one article that deals with what they call public buildings.

Q746 Lord Lewis of Newnham: Exactly.

Mr Barnes: We are yet to discover what “public buildings” means. There is some discussion as to whether that is all buildings that the public might go into or whether it is buildings owned by the government that people go into or whatever. I do not think it is a big issue because at the end of the day it will probably encompass all buildings but it is what we start with. What we start off with is important because it governs the number of inspectors we need on day one. Maybe in a few years’ time it will be extended and we will need a few more inspectors but we need to be sensible about how we apply this to make sure that it can be done with the number of people we have available.

Q747 Lord Young of Graffham: Minister, can we turn to domestic energy users? I claim a small interest. I chair the West Sussex Design Commission which was set up to set standards for the 100,000 or so homes that the Deputy Prime Minister wants us to build in West Sussex. We have taken evidence from housebuilders, because we have housebuilders on our Commission, who have shown us how they can build zero energy homes quite easily in fact, and indeed the energy might be used for cooling in summer rather than for heating in winter, and yet they tell us that there is no way they are building these houses because people will not pay a penny more for energy efficient homes than they would do for normal homes and therefore the additional costs come out of their profits. Have the department looked at ways in which you can persuade house purchasers of the great advantages of buying an energy efficient house because the payback for this is comparatively short, or is there any way in which there could be fiscal advantages?

Lord Whitty: The problem of consumers making energy efficiency their priority is no different in the purchase of a home than it is in the purchase of anything else. There is a serious problem not so much of awareness as of prioritisation and behaviour. In one sense it is an across the board issue where the government is clear that we need to raise awareness and point that awareness to choices at the better end of the energy efficiency spectrum. As far as new buildings in total are concerned, then the government intervenes in two senses in terms of the building regulations, by setting the minimum standards of energy efficiency in new buildings, but we are also looking at a higher standard under the Code of Sustainable Building which we believe, once it has been embedded, will have a certain cachet about it which will mean that the market will begin to be ready to pay a premium within that location for sustainable new build. That has not yet been achieved but it must be part of the general approach to making a market for these things because you will not be able to achieve zero carbon components through market mechanisms alone unless you create a lead sector of the market in the same way that you probably need to create a lead sector of the market in Hollywood stars buying hybrid cars and similarly you need to make it smarter and more attractive to buy a zero or near zero-carbon home if you are buying a newly built home. The other part of the problem obviously is that new homes, whatever you may think of the figures for West Sussex, are a very small part of our total housing stock and a lot of our activity needs to be directed towards how people behave and the appliances they buy and the way in which they use them within existing homes and the improvements that can be made at relatively small cost, be it carbon or energy saving, within existing
homes and not entirely focused on the new home end of the spectrum.

Q748 Lord Young of Graffham: The trouble is, of course, new homes are a relatively small proportion but over a period of time they become a larger proportion of the housing stock. If its only optional I do not believe people will ever pay extra money for an energy efficient house but, if the building regulations or standards were lifted so that it became compulsory that new homes were energy efficient, in a fairly short period the additional costs would come out of that because the market price would be for new homes which would then achieve the new standard. I put it to you that is the only way in the longer run that we will gradually change the housing stock because the opportunity for changing the existing housing stock comes about very rarely indeed.

Lord Whitty: That is true. The process that I described of ratcheting up the building regulations is built into the approach now, so we have had 2002, 2005 and we will have another lot, so we will be ratcheting it up. The minimum standard will approach what a few years ago was the gold plated standard, if you like, and the gold plated standard will go ahead of that. That is part of the overall strategy. You can push the market in that direction to some extent. It is also true that the building regulations now require replacement boilers to be of a certain standard from 2010 and we will be looking at building regulations applying whenever people carry out work on a house of a certain description so we can require standards in the existing stock to be ratcheted up as well.

Q749 Baroness Sharp of Guildford: Am I not right in thinking that we are going to be introducing the A, B, C energy efficiency grading on new homes and sellers’ packs are going to have something somewhat equivalent to this on older homes?

Mr Barnes: Sellers’ packs will require something like the SAP rating of homes to be displayed and what would be required to raise the SAP standard of the home. In that sense there will be a reasonably comprehensive energy label relating to any house that is sold, old or new.

Q750 Baroness Sharp of Guildford: When we went to Germany we saw the examples they were developing in Germany. Will this apply also for all new buildings?

Lord Whitty: Some of those new buildings will be covered by the public buildings, probably incrementally. The housing regulations provision will not apply to anything except housing and if you are talking about commercial buildings, then—

Mr Barnes: Under the Energy Performance Buildings Directive new buildings will be expected to have what we are calling an asset rating, which is very similar to what Lord Whitty has been talking about.

Q751 Chairman: I think it was last July the Deputy Prime Minister announced that there would be a new draft code for sustainable buildings published in January of this year but we cannot find that such a thing has been published. Has that draft code been published yet?

Lord Whitty: It is a question of when it comes into effect.

Mr Barnes: The outline of the code was announced at the Buildings Summit at the end of January by the Deputy Prime Minister and it is on one of the websites but, to be honest with you, I could not tell you which one it is at the moment. We will give you that. The code itself is expected to be published at the end of this year or the beginning of next year.

Q752 Lord Broers: Minister, I am sure you would agree that if you want to control and help regulate something you have to be able to measure it. We would not have speed limits without cars having speedometers, and yet we have houses without any real time measurement of energy consumption. Nothing seems to have been done on smart or remote metering since the Smart Metering Working Group was formed in September 2001. Why not?

Lord Whitty: Broadly speaking, I think that is fair comment although it does take an awful lot to generalise smart metering. More generally, the way in which we will get the adoption of smart metering is through the regulatory framework and through Ofgem and their requirements of supply companies, and supply companies deal with their own consumers. Ofgem are now working with at least one of those suppliers on a smart metering trial. We would expect improvements in metering and billing to stem from the Directive, the Energy Services Directive in particular. I think we can say that in the days of 2001 the framework was not there either in terms of law or in terms of the regulatory requirements but we are moving into that area. Personally, my view is that a lot of objectives of energy efficiency within housing and, to some extent, within commercial buildings as well and, indeed, some of the fuel poverty measures could be better achieved by smarter billing as well as smarter metering. We are talking about millions upon millions of meters in every building in the land before you can generalise that.

Chairman: I wondered if you wanted to pursue your idea of visible meters in every home.
Q753 Lord Broers: We have discussed in this Committee that clearly it would be a very positive move from the point of view of saving energy if homeowners could see in real time the total energy being consumed in their home and it could be displayed either in terms of carbon or in terms of cost to them, which might be an even stronger motivator.

Lord Whitty: You will know that in a number of new systems that is precisely what can be done. The question is whether we rip out all the existing systems and replace them and whether the cost and energy effect of replacing millions of individual meters by these smart metering systems and whether we are yet at the optimum efficiency of those would be worth it. That is really what Ofgem is exploring with the supply companies at the moment.

Q754 Lord Broers: It would seem that it is an area that should be encouraged because with modern micro-electronic systems costs can be extremely low if you get modern power.

Lord Whitty: The costs of the individual meter may come down but you have also got the cost of installation and fitment which undoubtedly will need to be done at some point, but it is not an insignificant cost, it is a pretty huge cost to the supply companies who own the meters and would require the meters to be installed.

Q755 Lord Broers: I would agree with that but the current situation can be extremely unsatisfactory. A lot of building is done on an estimated basis. I think a lot of individual homeowners do not really have any idea of the real time use of energy.

Lord Whitty: No. I think the relatively low cost of energy is probably fed into that and the higher the bill the more likely you are to be conscious of the energy costs that you are incurring. To some extent that has been true of industry as well. With the price of energy expected to rise and with the squeeze on company income, the biggest return on smart metering and smart billing and display of costs as well as energy use would probably be in the commercial sector where there are relatively few locations to install the meters compared with trying to tackle 20 million homes. The biggest initial return will probably be in those areas and we can establish the market there with relatively frequent changes in capital investment in any case which might mean the additional costs would be less as well. I would focus on the commercial sector, apart from new build, as an area where some of this smart metering could be most cost-effective in the initial stages and then the costs would come down and the experience of using them could be transferred into existing housing stock as well. Where you are introducing a new heating system, which are in new homes already, and also CHP systems introduced into every flat in a block, people can tell how much they are spending in what is a very old building but with a very new heating system. Both at the point of installation and in the commercial sector I can see us moving fast. In the total housing stock, I think it is a much longer process.

Lord Broers: It still surprises me somewhat that if you look at a modern domestic electronic component like a DVD player, that is probably 20 times more complex than a meter needs to be and you can buy it for £100.

Lord Wade of Chorlton: Or less. You can buy one for £20 or £25.

Q756 Lord Winston: You get a pretty bad picture.

Lord Whitty: Clearly Lord Wade has been out on a consumer survey recently.

Lord Broers: A meter does not have quite the glamour. I do agree.

Lord Wade of Chorlton: I think one point might have been missed. What Lord Broers has suggested does not mean that you have got to change the existing metering system on which you pay, you can have an electronic machine in your house that tells you how much you are using, which is a completely different thing from having your metering process changed, which is already there and installed, on which you are paying your electricity bills. This could be quite a cheap electronic unit that you put on the wall which electronically measures the amount of power you are using on a regular basis. That would not be expensive.

Baroness Sharp of Guildford: Just like cars. You can see your real time use of petrol in a car.

Lord Broers: In other words, you need a speedometer, an odometer and a trip meter as well and you have got it.

Q757 Baroness Sharp of Guildford: I think we were a little bit shocked to get some evidence that some of the products and appliances that are on sale here in the UK, and for that matter in the EU, would not meet the standards required in the United States. I pick up also the fact that there is apparently an A++ and an A+ rating which on the whole is being kept quiet, consumers are not being told about it. In effect, this does devalue the value of the A rating at the moment because we really ought to be looking at products that meet the A++ in order to be raising our aspirations. We do wonder whether the Government are really satisfied at the moment with what is happening on product standards. We have had evidence from members of Defra’s Market Transformation Programme but I have to say that, frankly, the programme came across as being rather ineffectual seeming to have relatively limited funding and a low profile and no clear objectives.
We wonder whether you are satisfied with the measures that are currently being taken on these sorts of issues to make sure that the UK and EU do not become a dumping ground for low quality products.

Lord Whitty: I am not satisfied, no. All our product standards and labelling on a mandatory basis are EU standards. It is true that EU standards, in some areas at least, are nowhere near as good as the American and Japanese standards. There is no point in the UK unilaterally adopting anything within the EU and probably the EU going back to beyond the general developed world standard, but it is important that we get up to that standard. The regulatory mechanism is one dimension and we are negotiating strongly within the EU to upgrade the Energy Labelling Directive and the Eco-Design Directive which I understand today or yesterday was adopted by the European Parliament, so we are moving on those. It is true that we have got some way to go and that not all of it is possible to move on a regulatory basis immediately. Some of it, for industrial interest reasons, will require voluntary agreement before we can fully embody that in a regulatory mandatory procedure. It may be that we can get there faster through voluntary measures in some respects than we could through agreed regulatory standards. We are trying to do both. We are trying to negotiate within the EU on the labelling mandatory standards and also to encourage voluntary standards and better information, better signals and logos for the consumer as well. In terms of the Defra effort in this, which is a persuasive effort and it is the enforcement agency in this respect, the Market Transformation budget has been significantly increased this year. It is £4 million now. The impact that we have through that is quite significant. If you are talking about mandatory standards, it does require us persuading all of our European partners, and the industries within those countries who produce those products, to meet improved standards. In some areas you need to go beyond Europe. The main car manufacturers are no longer European, for example, and the same is true of most electronic appliances, so it is important that we have a global strategy as well as a European strategy.

Lord Oxburgh: I think they are just exploiting the sorts of issues to make sure that the UK and EU do not become a dumping ground for low quality products.

Lord Lewis of Newnham: Is there not a further factor here that in addition to your A+ or A+++, there is an energy consumption factor which is also placed on the instrument, if it is a refrigerator, for instance? I think that in the States they are very much more conscious over that factor than they are over the other one. The other one is really a measure of the efficiency of the particular situation but if you have a larger fridge and you are using more energy then there is another factor that comes into this.

Lord Whitty: Yes, but it is also true that in relation to fridges, to take that example, the basic fridge has greatly improved in energy efficiency and the majority of consumers have moved to the top end of the efficiency market without mandatory standards, so it has been market driven. It is true that people are then buying a big freezer as well.

Baroness Sharp of Guildford: It is also true that standards are improving. The A fridge that we are seeing—

Lord Whitty: There is now A++, yes, the standards are improving. The point I am making is that was not achieved primarily through mandatory standards. I am quite a strong believer in mandatory standards but you can get a faster and better market transformation by consumer information and consumer choice.

Lord Winston: Minister, one of the things we have heard is that a huge proportion of appliances are bought by people who are not going to use them, they are not going to be the final consumer and, therefore, the energy efficiency which is in the cost of that appliance is not necessarily to the advantage of the person who is buying it, they will tend to go for the cheaper goods. Do you have any idea of how important a factor that is, for example, in refrigerators and other domestic equipment in, say, rented accommodation, for example, and other places like that? Is there any estimate made?

Lord Whitty: Not to my knowledge. I bow to anybody else's information on this. Of course, that is not a unique situation. By and large buildings are not commissioned by the people who are going to live in them or work in them.

Lord Oxburgh: I think they are just exploiting the lower European standards.

Lord Winston: It is the same principle.

Lord Whitty: Therefore, there is the problem that those who are facing ongoing bills are not the people who make the choice of design or build. I would think it applies slightly less to domestic appliances,
over 70 per cent of properties are owner-occupiers and they are more likely to have to pay the bills.

Q763 Lord Winston: I thought we heard a figure of around 30 per cent. It was surprisingly high. Does not that conclusion to some extent mean that we have got to look at hearts and minds in new ways?
Lord Whitty: I would agree with that. Whatever the figures of who purchases what, it will vary according to the appliance, I am sure. I absolutely agree that the key to this is changing hearts and minds and that is why we are making sure all the economic and cost signals are understood. It is true that Government and other agencies have seriously raised the awareness of the need to conserve energy from time to time, there have been quite big campaigns, and there is a campaign going on now both in industry and with householders, but it has not directly driven a substantial change in behaviour. I think there is still a trick to be addressed in marketing terms, if you like, as to how we change that quite intense view that climate change is a problem, for example, but—

Q764 Lord Winston: Would social science research help, for example, or is that a waste of time?
Lord Whitty: In its broadest sense, yes, but a lot of market research has already been expended by private as well as public interests in this area and we have not yet cracked it. Defra have just commissioned a new £12 million communications campaign on this very issue to see whether we can do it rather than big blockbuster advertising and focus down on how people address their choices which involve climate change and energy-related issues. That is just about starting now. We do need to follow that through with consistent messages if it does show there are other ways in which we can get people to change their behaviour. I suspect it will but it may be variegated ways in different contexts. Miss Jones: Could I add to that, Minister? Basically what we have found is that for householders there are three main barriers to them taking action. Firstly, there is a lack of information and consumer apathy. Secondly, there are high up-front costs to taking action. Thirdly, there is the hassle and disruption of taking action. What the Government is trying to do is to tackle those barriers. On the first one, the lack of information and consumer apathy, through the communications programme that the Minister has outlined we are trying to make consumers more aware of their individual footprints. Through things like the beginning of the Home Condition Report, consumers will be more aware of energy use within their households and how they can improve it. Also, we are trying to provide better information through the Energy Efficiency Action Centres. There are 52 of them throughout the country and they provide advice to consumers and follow up and see how many consumers actually acted on that advice. On the high up-front costs, we are trying to tackle that through initiatives like the Energy Efficient Commitment, getting suppliers to go into households, giving money off energy efficient appliances, money off insulation. On the hassle and disruption, that is a very tricky issue. In the Chancellor’s Budget announcement just a few weeks ago he mentioned the fact that the energy services market in the UK is not very well developed, so he is going to bring together a summit on that. If we can improve energy services to consumers whereby they can go to one place and have an audit of their household and have someone come in and out on the same day and do the insulation for them, we can try to reduce the hassle factor and thereby make it more attractive to consumers to perhaps take action.

Q765 Lord Wade of Chorlton: Is not the bottom line to all this that the only solution, if the Prime Minister is right that carbon emission is ruining the future, is we have got to find other sources of energy? Is it not about time that we faced up to that simple fact?
Lord Whitty: That is absolutely true but it is also important that you act on the demand side as well. Yes, we need to shift the basis of supply of energy more dramatically than we are achieving as yet. We have begun but we are not there yet. As part of that we also need to reduce the demand for energy as far as we can, and as far as we can without being utterly disruptive of economic life.

Q766 Chairman: I think we would agree with that, Minister. I think we have covered the question about the business sector and the DTI’s battle with the EC over the downward revision of the UK’s national allocation plan under the EU scheme. Shall we allow you to escape now?
Lord Whitty: I am happy to come back but this might be an appropriate moment.
Chairman: We have kept you a long time and we are very grateful indeed to you for spending time with us this afternoon. Thank you again.

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1 Defra Secretary of State announced on 16 February 2005 that £12 million over three years would be made available for a new climate Change Communications initiative.
Written Evidence

Memorandum by A Power for Good Ltd

1. The Government’s belief that increases in the efficiency of energy use will necessarily lead to reductions in energy consumption is fundamentally flawed.

2. Increasing the efficiency of energy use is a continuing process. It comes from advances in technology driven by the economic pressure to use any resource to the maximum advantage. Improved appliances or processes which perform a given task with a lower consumption of energy will displace earlier methods as soon as the financial gains in energy saved are judged to outweigh the replacement cost. The reductions in operational cost obtained in this way can then be expected to be invested in an increased output leading to a greater energy usage or spent in other ways which necessarily require some energy consumption. This was pointed out by the Victorian economist W Stanley Jevons in his classic work, *The Coal Question* first published in 1865.

   “It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to diminished consumption. The very contrary is the truth . . . It is the very economy of its use which leads to its extensive consumption. It has been so in the past and it will be so in the future.”

   And he gives an example

   “Now, if the quantity of coal used in a blast furnace, for instance, be diminished in comparison with the yield, the profits of the trade will increase, new capital will be attracted, the price of pig-iron will fall, but the demand for it will increase: and eventually, the greater number of furnaces will more than make up for the diminished consumption of each. And if such is not always the result within a single branch, it must be remembered that the progress of any branch of manufacture excites a new activity in most other branches, and leads indirectly, if not directly, to increased inroads upon our seams of coal . . . It is the very economy of the use of coal (energy) that makes our industry what it is, and the more we render it efficient and economical, the more will our industry thrive, and our works of civilisation grow.”

Saved but not Spared

3. Any increase in the efficiency of energy use is always a desirable economic aim. It is now a part of the Government energy policy. As Jevons correctly points out,

   “There is hardly a single use of fuel in which a little care, ingenuity, or expenditure of capital may not make a considerable saving.”

   But he goes on to draw the conclusion

   “No one must suppose that the coal (energy) thus saved is spared—it is only saved from one use to be employed in others, and the profits gained soon lead to extended employment in many new forms.”

4. To the extent that deliberate energy efficiency promotion measures are successful they will in effect lower the real price of energy. This can only increase the consumption of energy as energy is substituted for other things eg labour; or as the lower energy costs attracts new consumers, or as the income released by cheaper energy is spent on other energy-consuming items.

5. A present example can be taken from the Government calls to improve the efficiency of the domestic use of energy. To the extent that, for instance, improved home insulation will lead to reduced heating bills it would be equivalent to a reduction in the energy cost. If the money thus saved were to be spent on increasing the level of heating, there would be no net reduction in energy use; the energy saved being used to provide a greater level of comfort. If however the savings were put towards a family holiday in the West Indies, or funding some other energy extravagant use, the improved insulation, while desirable and economically sensible, could lead to a greater, not lesser consumption of energy.

6. The same process can be seen in road transport. As the energy efficiency of cars has been improved with more miles per gallon, the oil consumption for road transport has shown a larger increase with an even greater increase in the number of motor vehicles on the road. The gain in efficiency of energy use is outweighed not only by the increased use of fuel but by the energy used in the manufacture of the new cars and at a further stage by the now increased expenditure and economic activity of those employed in the motor industry.
7. The increased efficiency of energy use will always lead to financial savings. Saving energy saves money. Spending this money will promote economic growth and capital investment. All monetary expenditure, all economic activity, attracts some energy expenditure which will inevitably lead to a higher, not lower energy demand.

8. Energy prices are expected to continue to rise, as an ever-increasing world demand faces suggestions that world oil production may be nearing a peak and, for the UK, the actual decline of North Sea oil and gas output. Higher energy prices whether through the market or by a carbon tax on fossil fuels would restrict consumption. Increasing energy efficiency, by reducing the cost of energy usage, will offset the restrictions that higher energy prices would bring and enable economic growth with its concomitant energy consumption to continue. The promotion of energy efficiency measures as a means of achieving a 10 per cent reduction in carbon dioxide emissions by 2010 as hoped for in the Energy White Paper is a dangerous illusion in that it not only diverts attention from other more positive means of cutting carbon emissions but ensures that these emissions will continue to increase.

**Measuring Energy Efficiency**

9. There is no simple way of measuring the overall effects of energy efficiency on the national energy consumption. The commonly used reduction in final energy use per unit of gross domestic product—the energy/GDP ratio—which shows a marked fall in the UK over recent years is misleading as it will be influenced by a change in either factor. There are at least two changes which have occurred over the past 20 or so years which would reduce the energy component:

- a significant change in the structure of the economy with a decline in heavy industry, steel and other metals, heavy engineering, shipbuilding, coal mining, etc, and a rise in the commercial services sector which use less energy per unit of GDP earned.
- product changes within some industrial sectors with a concentration on more specialised products of higher added value with a lower energy content: pharmaceuticals and fine chemicals rather than basic chemicals, electronics instead of heavy electrical engineering and the adoption of computer controlled techniques in manufacture, and the computerisation of commerce.

And at least three which would increase the GDP component:

- to the extent that increases in energy price, driven by the oil price rise, lead to a rise in price for the goods and services provided to the customer this will appear as an increase in GDP.
- the production of North Sea gas and oil which is landed “free” of any energy cost makes a substantial contribution to an increase of GDP. Now however that the North Sea output has begun a slow decline this will, in future, have a diminishing effect.
- The increasing share of final energy use taken by electricity would also increase GDP since electricity is a higher value commodity than coal, oil, or gas.

10. It is then not surprising that over the period 1980–2000 although the energy/GDP ratio has fallen by 44 per cent the actual energy consumption in the UK has risen by 14 per cent. If GDP is measured by purchasing power parity, which gives a more realistic assessment, the growth of GDP over this period is only about twice the energy consumption growth.

11. Improving the efficiency with which primary energy is used either directly or in the generation of electricity is always a desirable economic aim and in so far as it leads to a more efficient use of fossil fuels it will reduce—for that process or application—the unavoidable emissions of carbon dioxide but it is an error to suppose that for the economy as a whole this will lead to lower rather than higher energy consumption.

**Memorandum by Sonia Boehmer-Christiansen**

I would like to make six related points:

**1. LOBBIES**

There is a very large, technology-based lobby out there (in universities, R&D labs, some industries and among green ideological groups) that perceives, wrongly in my view, that energy efficiency (generation, delivery, housing and use by appliances) is directly linked to emission reduction. According to the current “story-line” or rhetoric, emission reduction is a major step on the path to planetary salvation.

These groups will need testing for the validity of their beliefs as well as for their immediate demands on government. They all have “vested interests”. The energy efficiency lobby is “grounded” in physics and will choose its figures carefully, promising much. However these figures often lack hard economic analysis and
testing in the real world of human behaviour, they tend to ignore “transaction” costs and the costs involved in removing so-called “barriers” to the adoption of what experts believe is rational.

Institutional issues and social issues tend to be ignored and ideology (or rather fear of environmental change—a cultural predisposition in our risk averse society) will urge the fixing of mandatory targets. Policy flexibility might in fact be a safer option, making adaptation to change easier.

2. EMISSION REDUCTIONS

The reality of a strong link between energy efficiency improvements (undoubtedly worthwhile if they reduce costs of production etc) and emission reduction is still debated in the academic literature. The most important variable here is total energy consumption, and this is likely to rise as incomes increase. If this increase is brought about by lower energy costs thanks to improved efficiency, much depends on how this saving is spent, how much extra energy might be consumed, and of course its emission characteristics. Improving energy efficiency in the real world as distinct from the physics textbooks can be very costly, and I hope that you can find experts on this field to provide you with details. I have published a whole issue of Energy and Environment on this subject in 2000 (11.5), and another one, also edited by Horace Herring of the Open University on the same subject, is in the pipeline (E&E, 15.6 due towards the end of this year). There the argument is that energy efficiency is not a “green” option at all, but a commercial one. In my view, it should be the latter, and hence it should be used only when it makes economic sense, not when, on paper, it supports sometimes dubious emission targets.

3. ENERGY CONSUMPTION AND PERSONAL INVESTMENTS

Historically at least, energy efficiency improvements have not led to a reduction in energy demand, but have been outstripped by growth in energy consumption.

Apparently the “energy” behaviour of people, once they make savings due to improved efficiency, is not well understood. I personally have not invested in a condensing boiler on the advice of several experts who tell me that what you save in energy costs, you spend easily (and more) on the costs of repair, a calculation the advocates of efficiency ignore. Investing in future energy savings may reduce the money available for, say, an annual holiday abroad. Energy investments are usually not a priority, however desirable in theory. Most people are not likely to organise their spending around the long-term energy savings they might make by investing in efficiency improvements.

One might also mention here that energy efficient houses in Sweden should not become the example for the UK with its very different climate and seasons, and that many “Brits” much prefer an old drafty house (and will spend much to keep such a house habitable) to a new well insulated one. Legal attempts to force old houses into compliance with modern energy efficiency standards, is surely foolish or rather, in the current jargon, “unacceptable” to many British people.

4. ECONOMIC SENSE

I have my doubts that government can be a good judge of which efficiency improvements are worthwhile in the whole economy. This is surely an area that might better be left to “business” decisions and so-called market forces. These are more likely to pick out those investments that make “economic” sense.

I strongly feel that our Government, in spite of past promises and bad experience, is becoming too interventionist in the energy demand sector. The regulation of emissions (the impacts of which remain contested, if not in the UK then certainly in several other countries) is no substitute for energy policy.

All this does not mean that improving energy efficiency along the energy generation and consumption chains is unimportant, but it must make economic and commercial sense in the short and medium term. We surely no longer plan (top down) for the long term? Or is “global warming” the myth that enables our bureaucrats to return to bad habits, pick winners, direct research agendas, subsidise powerful ideological lobbies?

5. GLOBAL WARMING—A CULTURAL CONSTRUCT?

I fear that because of the global warming scare (especially in Western Europe) energy decisions are being based on too narrow a range of considerations. Emission reduction aspirations alone should not dictate energy efficiency measures, just as they should not dictate our energy mix, though this appears to be the way our bureaucracy is currently being “driven” to regulate industry. I hope that you can come to the rescue.

18 August 2004
Executive Summary

BNFL supports the increased development and deployment of energy efficiency measures as part of a strategy to help deliver a reliable and affordable low-carbon energy future for the UK. Reducing demand is potentially the most environmentally friendly of all means of balancing supply and demand. Therefore, cost effective energy efficiency measures have a significant role to play in the nation’s energy future.

However, it is important that expectations for the contribution which such measures can make remain realistic. It is also important that targets for increasing energy efficiency are not pursued in isolation at any price, to the detriment of overall targets for CO\textsubscript{2} reduction.

If the UK is to meet Government targets for energy efficiency, the country must substantially increase its adoption of energy efficient buildings, products and technologies at an unprecedented rate. Significant doubts exist over whether or not this can be achieved without either an unacceptable cost impact or the imposition of unacceptable changes in lifestyle.

The White Paper also sets out targets for renewable energy generation, which are designed to work in parallel with energy efficiency measures to help reduce CO\textsubscript{2} emissions. Like the targets for energy efficiency, these targets are extremely challenging, and similar significant doubts exist as to the likelihood of their being achieved. Both energy efficiency and renewables uptake targets need to be achieved if the UK is to reduce overall CO\textsubscript{2} emissions below the White Paper’s maximum limits.

It is important to establish firm and visible intermediate targets in both of these areas, which can be tracked and, if necessary, used as a cue to introduce additional measures to ensure that the overriding CO\textsubscript{2} targets are achieved.

It is also important to ensure that all means of contributing to CO\textsubscript{2} cuts are encouraged, and to recognise that nuclear power is a proven and reliable means of generating electricity without emitting CO\textsubscript{2}. Steps must be taken now to keep the nuclear option open for future deployment.

BNFL believe that the overall goal of CO\textsubscript{2} reductions is too important to be jeopardised in the pursuit of specific means of achieving it. A balanced approach that properly recognises risks and uncertainties is needed.

Introduction

The Energy White Paper, “Our Energy Future—Creating a Low Carbon Economy”, published in February 2003, made clear the UK Government’s commitment to meeting very challenging targets for reducing the amount of CO\textsubscript{2} which is emitted by the UK each year, whilst also ensuring a secure and affordable supply of energy.

As well as re-stating our Kyoto commitment of a 12.5 per cent reduction in greenhouse gas emissions from 1990 levels by 2008–12, and a national goal of a 20 per cent reduction in CO\textsubscript{2} emissions by 2010, the White Paper also committed the UK to achieving a cut of 60 per cent in CO\textsubscript{2} emissions from current levels by around 2050. This is the target originally recommended by the Royal Commission on Environmental Pollution.\(^{(1)}\) All this against a background of continued economic growth.

To achieve such a dramatic reduction—even on what seems a long timescale—means radical changes in the way we all think of energy. Not just in terms of electricity generation, but also in terms of transport, space heating and industrial energy needs.

The Government identified two key priorities to help meet this challenge—energy efficiency and renewable energy (solar, hydro, biomass and—especially—wind power). A key issue now is how likely it is that each of these will be able to deliver as hoped.

BNFL supports the increased development and deployment of energy efficiency measures, as part of a strategy to help deliver a reliable and affordable low-carbon energy future for the UK. Cost effective energy efficiency has a significant role to play in the nation’s energy future, as reducing demand is potentially the most environmentally friendly of all means of balancing supply and demand.

However, it is important that expectations for the contribution which such measures can make remain realistic. It is also important that targets for increasing energy efficiency are not pursued in isolation at any price, to the detriment of overall targets for CO\textsubscript{2} reduction.

There are also legitimate concerns over the amount of energy efficiency that can reasonably be delivered on what is a very tight timescale. Energy efficiency has been a regular theme of energy policy reviews over recent decades, yet progress to date on implementation has steadfastly been slower than hoped for. Current
indications suggest that energy efficiency measures have not reduced, and cannot in future be expected to reduce, energy demand but may impact on the rate at which that demand is increasing.

These considerations stress the importance of proceeding with all available means of reducing carbon emissions—energy efficiency, renewables, “clean” fossil fuel (i.e. with carbon capture technology) and nuclear power. All have a role to play, and only by making and consolidating progress on all fronts do we have a realistic chance of making a substantial reduction to the causes of global warming, and of meeting our international obligations to help safeguard our climate for future generations. The UK already leads the way internationally in this respect, but this does not mean we can be complacent. The overall goal of CO2 reductions is too important to be jeopardised in the pursuit of specific means of achieving it.

This document summarises the likelihood and practicality of energy efficiency measures achieving the potential currently hoped for in the UK, and goes on to look at other options for delivering a low-carbon future.

Progress to Date

The Energy White Paper recognised that achievement of the targets put in place for 2020 would require roughly a doubling of the rate of energy efficiency improvement seen over the past 30 years. There are a number of indicators which can be used to assess the progress of energy efficiency measures. However, none of them appears to provide great confidence that such an ambitious “step change” in performance is likely to be achieved.

Data on energy intensity (energy consumption per unit of economic activity, e.g. GDP) indicates that some improvements in this parameter have been achieved over several decades. However this is almost entirely due to the fact that GDP growth has been more rapid than growth in energy consumption. Consumption itself has continued to rise. Furthermore:

— In the industrial sector, which has historically showed the steepest reductions in energy intensity, this positive trend has levelled off during the 1990s and since 1996 energy intensity in that sector has actually increased.
— There has been no noticeable improvement whatsoever in energy intensity in the transport sector over the past 30 years, and energy consumption in that sector—a key contributor to overall CO2 emissions—has increased by 95 per cent since 1970.

The first annual report on performance against the Energy White Paper (2) (published in April 2004) concluded that “our environmental targets have become more challenging”, and noted that without improvements in policy it was unlikely that targets would be hit. Yet at the same time the target for the reduction in household CO2 emissions by 2010 was cut from 5 million tonnes to 4.2 million, with the emphasis instead moving to industry, where the target was increased.

In a further indication that current progress on energy efficiency has fallen behind the trajectory needed to hit Government targets, the Environmental Audit Committee report “Budget 2004 and Energy”, (3) published in August 2004 concluded:

“It is unfortunate that the Energy Efficiency Action Plan has had to be produced before a number of key evaluations on which it should have been based—including the Spending Review 2004, the revised DTI Energy Projections, and the review of the Climate Change Programme. As a result, it is impossible to assess to what extent the measures it contains are sufficient to deliver the absolute emission levels required, or even unclear whether the various components of the Plan will indeed deliver their forecast benefits.”

and

“A more imaginative and radical strategy—in particular for transport and domestic energy efficiency—is needed”

with the Chairman of the Committee commenting:

“It is also disappointing that the Treasury has done so little to promote domestic energy efficiency—despite two consultations on this topic in the last two years. There is an urgent need to look afresh at the scale of the challenges we face and develop an adequate response.”

Finally, the latest DTI Energy Statistics (4) published in October 2004 indicate that final consumption of energy in the UK during the second quarter of 2004 was 0.4 per cent higher than a year earlier, with final consumption of electricity being 2.8 per cent higher. Again—despite all efforts—energy usage goes relentlessly upwards.
Commentary

BNFL agrees with the Environmental Audit Committee that the performance to date in delivering energy efficiency improvements leaves substantial doubts over the ability of such measures to deliver the carbon savings hoped for. We believe these doubts are well-founded, for a number of reasons, including:

— Historically, significant improvements in energy efficiency in the building sector (whether domestic, commercial or industrial) come not from the retrofitting of energy efficient technology or equipment to existing properties, but from the adoption of such measures in new building stock. The timescale for turnover of housing and other properties is typically several decades—much too long for rapid improvements in the nation’s energy efficiency to be realised.

— Recent energy prices have been some of the lowest for many decades. This has acted as a deterrent to investment in energy efficient improvements from a cost/benefit perspective. Whilst recent measures to promote the energy efficiency credentials of products such as white goods are a laudable step, the low price of energy can in some cases act to increase rather than decrease overall energy use in households buying a new appliance. An example would be a family who buy a new energy-efficient refrigerator, but then move their current appliance to a garage where it is simply used as additional capacity. The same principle can also apply to the purchase of commercial plant.

— Even if there is a good case for investment in energy efficient technology, there is no guarantee that such an investment will be made. Such expenditure, both domestically and commercially, must compete with a range of alternative possibilities. Concerns over payback time or the prospect of a change in circumstances (for instance moving house, and the possibility that the investment would not then be recovered) will mean that the actual benefit of any measure will be substantially less than that which might have been expected. Major improvements in energy efficiency on a national basis would require a significant proportion of the population to make decisions which they have in the past shown themselves to be reluctant to embrace.

— This in turn links to the next key area of doubt. Energy efficiency measures of various forms have been in place for many years already. This means that the “easy wins” (such as household loft and cavity wall insulation) have already been made. As energy efficiency is promoted more and more strongly as the solution to energy policy tensions, so paradoxically it becomes harder and harder even to keep up with previous performance in this area.

— Finally it hardly needs pointing out that the age we live in is dominated more and more by energy-hungry technology. Our demand for energy—and electricity in particular—continues to rise as we both acquire new technology and place greater demands on established devices. For instance, we now expect many of our electrical devices to be portable, which implies that they are battery rather than mains-powered. Yet the losses associated with regularly charging and using batteries are likely to outweigh any improvements in the energy efficiency of the devices themselves.

Renewables

As noted earlier, if the overall CO2 emission reduction commitments made in the Energy White Paper are to be achieved, it will require both renewables and energy efficiency to meet their individual targets.

The House of Lords Science and Technology Sub-Committee carried out a consultation in 2003–04 into the practicalities of renewables and the likelihood of targets in that sector being achieved.

BNFL’s submission to that consultation explained in some detail why we had major doubts over the ability of renewables to deliver as hoped. Those doubts were shared by a wide range of reputable bodies, including the Royal Academy of Engineering, the Institution of Civil Engineers, the Oxford Institute for Energy Studies and indeed the House of Commons Science and Technology Committee.

The Committee agreed and concluded:

“Uncertainties remain over the technical feasibility and cost of converting [renewable energy sources] into electricity reliably on a sufficiently large scale”

further noting that:

“We found almost no one outside government who believed that the White Paper targets were likely to be achieved”.
ALTERNATIVE MEANS TO ACHIEVE A LOW-CARBON FUTURE

This submission has looked at the practicalities of delivering a programme of energy efficiency measures in the UK, consistent with the aims set out in the Government White Paper on Energy, which itself noted that:

“... simply continuing previous rates of change is not enough. We have to improve energy efficiency far more in the next 20 years than in the last 20 if we are to meet our goals.”

The legitimate doubts and uncertainties which exist around the ability to achieve such an increase in performance on energy efficiency potentially place the overall targets for CO₂ emissions reduction in jeopardy. Yet these CO₂ targets—not specific goals on energy efficiency, renewables, or other means of achieving them—must remain the nation’s overriding priority, as part of a concerted global effort to protect the environment. The UK’s achievement of its long-term emission targets is seriously jeopardised by the absence in current policy priorities of a credible, proven source of reliable carbon-free electricity.

Nuclear power is currently the only realistically available source of such power. Carbon sequestration techniques are largely in their infancy and have yet to demonstrate that they can be applied to fossil fired plants without serious detriment to the overall economics of generation—which ultimately must be passed on to consumers.

However, if the option for nuclear power to make a substantial contribution to CO₂ savings in 2020 is to remain available, steps must be taken now. As things stand, there will be only one UK nuclear power station operating by 2023.

If it were decided immediately to go ahead with new nuclear power in the UK, either because of nuclear’s recognised climate change credentials or to provide baseload carbon-free capacity to underpin renewables, it would be around 2016 before electricity from a new reactor would first be delivered via the grid to our homes and factories. This lead time and the associated regulatory/planning risks are major obstacles to any potential support for building new nuclear power stations. Simple preparatory steps can and must be taken now to minimise these risks, without representing any form of commitment to build. Such steps would ensure that the time interval—between a decision in principle to proceed with a new station and delivery of the first electricity—would be reduced from at least 12 years down to around nine years.

The biggest concern in this respect for the UK, however, is that of maintaining the skill and capability base in the absence of any meaningful programme of research into advanced reactor systems. There has been virtually no government funding of nuclear research since UKAEA R&D ceased to be funded by the then Department of Energy around 1990. Furthermore, the privatisation of Nuclear Electric in 1994 virtually put an end to any funding of R&D on future reactor systems. This huge decline in the overall R&D base has inevitably had a major knock-on effect on the UK academic base. There are now no undergraduate courses in nuclear technology and only Birmingham University offers a postgraduate qualification. Academics with the necessary skills are in general near to—or in many cases, beyond—the point of retirement.

None of the steps proposed to keep the nuclear option open commits the UK to build nuclear power stations. However, they are essential, both to retain and grow the skillbase to do so, and to shorten the lead time for delivery of nuclear electricity to the nation’s grid, should such a decision be taken. Without such a programme, the nuclear option in the UK will close, further jeopardising environmental protection targets.

October 2004

REFERENCES
(1) Energy—The Changing Climate. 22nd report of The Royal Commission on Environmental Pollution; 2000.
Memorandum by Calor Ltd

1. Calor is the UK’s leading producer of liquefied petroleum gas, used as an environmentally friendly autogas and as a fuel for heating and cooking in dwellings beyond the extent of the gas mains. Calor welcomes the invitation to submit evidence to the Sub-Committee’s Inquiry on Energy Efficiency. The decision by the Sub-Committee to investigate the robustness of the Government’s goals—to achieve a 20 per cent reduction in CO₂ emissions by 2010 (half through energy efficiency) and in the longer term, 60 per cent reduction of emissions by 2050—is particularly welcome. The purpose of this submission is to direct the Sub-Committee’s attention to one particular departmental proposal which, Calor believes, will have a directly contrary effect to its declared objective.

2. The Office of the Deputy Prime Minister (ODPM) has published proposals for more demanding energy performance standards for dwellings, which will come into effect at the end of 2005. These new standards are part of the Government’s response to the need to reduce greenhouse gas emissions that are the cause of global warming, as explained in the Energy White Paper and The Action Plan published in April 2004. In summary, the main practical consequences are as follows. First, the energy performance of a new dwelling will need to be about 25 per cent better than the current standard, which itself only came into effect in April 2002. This means that houses built in the second half of this decade should emit approximately half the CO₂ emissions for heating, hot water and lighting than houses built a decade earlier. Second, more work in existing dwellings will now be subject to the Building Regulations, the intention being that, by capturing this additional work, it will become possible to incorporate energy efficient improvements when work is planned. The EU Energy Performance in Buildings Directive, which will begin to come into effect in January 2006, requires calculations of energy performance to be made known to “prospective purchasers and tenants whenever buildings are constructed, sold or rented out”.

3. The Standard Assessment Procedure (SAP), which is also being revised, but which builds on techniques and expertise already available to builders, is the method proposed to assess whether dwellings meet the target performance standard. SAPs are used for two separate, but connected purposes—to provide a rating of a dwelling based on annual energy costs for space and water heating and to provide a Dwellings Carbon Emission Rate (DCER) to assess how good a dwelling’s design is in saving atmospheric pollution by carbon. It would appear that the SAP calculations are to be used to aid the discrimination of the purchaser or prospective tenant in the house purchase or rental procedure. The SAP rating is to be clearly mapped onto an A-G banding scheme and incorporated into the Home Energy Report. The energy certificate will have a potential longevity of 15 years.

4. While the broad intentions are sound and welcome, they will be stultified unless the opportunity is taken to remove the fuel cost element used in the calculation of SAP ratings. Calor has no objection to a consumption indication as a separate measure—like the mpg or kWh rating on cars and appliances, the consumer then being free to do their own cost estimates having been provided with this information. Historic bills could be used in sellers packs and would be more relevant than a theoretical model, as currently the SAPs rating is a dimensionless indicator which gives no real prediction of running costs.

5. In Calor’s view, the inclusion of the fuel cost element causes confusion, and, most importantly, will have greatly damaging environmental consequences. These will be counter-productive to the Government’s environmental objectives, reaffirmed in the Prime Minister’s speech on 13 September 2004. In short, the Government’s energy efficiency targets and objectives may be completely circumvented simply by the choice of a different fuel, allowing housebuilders and householders to give the impression of a highly energy efficient house (through a good SAP score) whilst actually consuming more energy and emitting more CO₂.

6. The following data is taken from a model, based on SAP Worksheet (Version—9.80 draft July 2004), which illustrates how SAP scores are calculated. In comparing four methods of heating (LPG, Oil, Electricity and Mains Gas) Calor found the results charted in the table below, based on a four bedroom house with identical solar, internal and external gains all being constant, with the fuel used for the central heating system being the only variable.

<table>
<thead>
<tr>
<th>Model based on a 4 Bedroom detached house. Fuel used for heating is the only variable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwelling Volume</td>
</tr>
<tr>
<td>240</td>
</tr>
<tr>
<td>Total fabric heat loss</td>
</tr>
<tr>
<td>Ventilation heat loss</td>
</tr>
</tbody>
</table>

7. The data above clearly illustrate that under the current fuel cost based calculation for SAPs, a more expensive fuel such as LPG, producing considerably less CO₂ than both Heating Oil and Electricity, is in fact penalised and given a far lower rating under this system. Based on this model, Electricity actually produces 1,184 kg more CO₂ than LPG each year (an additional 56 per cent of the CO₂ produced by LPG) and yet its SAP rating is still 9 points higher.

8. In fact, according to this model, because cost plays such a significant part in the calculation, a heating oil fuel system could actually produce an extra 2,753 kg of CO₂ per year before its SAP rating was reduced to the same rating as LPG. This is equivalent to the property installing at least another Heating Oil fuel system; even with this, it would achieve a higher SAP rating than with LPG! The consequences of this model, if introduced, would be to encourage people (home owners, developers, builders) to choose a form of heating that would produce more CO₂ in order to achieve a better SAP rating.

9. In data compiled as part of Calor’s submission in 1999–2000 that resulted in a reduction in Climate Change Levy on LPG, we pointed out that for every thousand tonnes of LPG displaced by price signals, such as that intended by the SAP energy efficiency rating, CO₂ emissions would rise by 296 tonnes if kerosene or gas oil were the replacement fuel, and by 3,606 tonnes if electricity were used in preference to LPG (calculations were on a full lifecycle basis). This does not take into account the extra carcinogens benzene and 1,3 butadiene, the extra particulate matter, the extra sulphur dioxide and extra NOx that would be emitted to air by burning of hydrocarbon oils rather than LPG. Insofar as the perverse price signal implicit in energy efficiency ratings altered consumption then it would act to increase emissions of CO₂ in conflict with the Government’s Climate Change policy, and increased emissions of other pollutants in conflict with the Government’s Air Quality Strategy.

CONCLUSION

10. Calor urges that the SAP rating should be based solely on carbon emissions. This would more accurately provide an “energy rating of a dwelling” and encourage the reduction of CO₂ emissions. Rural homes with LPG fuelled energy systems, including cooking, are amongst the most environmentally friendly dwellings that exist beyond the gas mains. Until such time as renewable energy sources become widely available, Calor believes that the LPG industry has an important role to play as the cleanest traditional energy source for the countryside.

Memorandum by the Cavity Insulation Guarantee Agency and the National Insulation Agency

We refer to the call for evidence in relation to Government Energy Efficiency policies, and welcome this important initiative by the S&T Select Committee. On behalf of the Cavity Insulation Guarantee Agency and National Insulation Association we would like to put forward the following points for consideration by the Committee.

1. The biggest energy-related challenges facing UK Government policy are Climate Change, security of supply and fuel poverty. Almost uniquely, energy efficiency can tackle each of these challenges in a positive manner by saving CO₂ emissions, reducing the need for imported energy (particularly natural gas) and cutting fuel bills in a sustainable fashion.

2. When considering the need for greater energy efficiency in the domestic sector, the biggest CO₂ emissions arise from our demand for hot water and heat (over 50 per cent). In delivered energy terms, over 30 per cent of national energy consumption relates to the domestic sector, of which 60 per cent is for space heating, 23 per cent water heating, 13 per cent lighting and appliances and 3 per cent cooking. Furthermore in terms of energy security, direct fossil fuel use by households is over 3.8 times the energy delivered from electricity.²

³ Domestic Energy Fact File 2003, BRE Bookshop.
3. Thus the most important short term activities needing to be undertaken are each insulation related: cavity wall insulation (CWI), topping up inadequate levels of loft insulation, draught proofing and solid wall insulation. Currently, the first two measures are very cost effective but more research needs to be carried out into developing lower cost and/or more effective solutions for tackling the UK’s 7 million solid wall properties. We hope the new UK Energy Research Centre being established by the Research Councils will make this one of its priorities.

4. Whilst the Building Regulations Approved Document L controls standards of thermal performance for new buildings, the very low rate of building stock turnover (around 160,000 houses built, ie 0.7 per cent of the total stock per annum, compared to only around 15,000 homes destroyed annually) means that any net improvement takes many years to impact.

5. The current consultation covering a 2006 review of the Building Regulations part L is welcomed as for the first time contemplating consequential upgrading of existing building fabric during extension works. However, this will inevitably take some time to be felt in the market.

6. The challenge therefore is the retrofit of insulation measures to the existing housing stock. For example for the most important insulation measure, CWI, only one third of all the households with cavity walls have been insulated since the 1970s—there are over 10 million properties still without insulation.

7. Once installed, insulation does not depend on correct adjustment or maintenance, and typically loft insulation is assumed to last for 30 years and cavity wall insulation 40 years, although in practice they might be expected to last the lifetime of a building.

8. It is for these reasons that Government policies recognise the importance of upgrading the standards of insulation in existing housing stock through proven retrofit measures such as loft and cavity wall insulation.

9. The current primary initiative aimed at upgrading the building stock is undertaken through energy supplier obligations, the Energy Efficiency Commitment (EEC) formally delivered via Energy Efficiency Standards of Performance.

10. In addition to energy efficiency aims, improved levels of insulation can also help alleviate fuel poverty, and initiatives such as Warm Front and the equivalent devolved administration schemes also deliver improvements in the thermal performance of buildings.

11. Despite these initiatives, there are around 10 million cavities that are not insulated. In the case of loft insulation the uptake has been somewhat greater, with around 60 per cent of properties having 100mm or greater depth of insulation.

12. The current Consultation on phase 2 of EEC envisages a doubling of current rates of Cavity wall and loft insulation over the period 2005 to 2008.

13. The economic case for loft and cavity wall insulation is strong, and even before discounts or grants, paybacks are typically 2–5 years. However, the primary barrier to increased uptake of insulation is customer apathy and lack of knowledge, which represent a market failure.

14. Because installing insulation is not a distress purchase, as is the case with a replacement freezer for example, and because there are no obvious aspirational benefits, a fundamentally different approach is required from those applied to white goods.

15. The insulation industry maintains (supported by the evidence to date) that this will only be achieved by either requiring insulation by regulation (eg at the time of sale of a property) or by increasing the demand from households (a long term culture change), and, in the short term, by creating a fiscal lever—a carrot or a stick. Our contacts in government have given a clear impression that the fiscal rather than regulatory approach is “preferable at this stage”. Such a mechanism needs to be simple in both concept and operation, preferably built onto an existing revenue mechanism and likely to produce the desired step change in insulation activity; it also needs to focus predominantly on owner-occupiers and yet not penalise those households living in fuel poverty or that have no access to capital. The insulation industry has considered various funding options against these criteria, including adjustments to Council Tax, personal tax allowances and a penalty or rebate of Stamp Duty. Although we noted personal tax allowances have been used in other countries, we believe that a fiscal mechanism based around a Stamp Duty penalty or rebate would best meet the above criteria.

16. Finally, the industry believes that a combination of measures will be required to fully exploit the available energy savings opportunities from improving levels of insulation in the existing housing stock:

\[1\] The Government has already taken welcome steps to improve the energy efficiency of rented dwellings through its “Decent Homes” initiative and via measures announced in the 2004 Budget for private landlords.
— A sustained Government umbrella communications programme focussing on the threat of Climate Change and the role that individual householders have in taking simple steps to contribute to the alleviation of Greenhouse Gas emissions.
— Fiscal incentives such as Stamp Duty to overcome the market failure.
— Implementing the proposed 2006 review of the Building Regulations part L to cover upgrading of existing building fabric during extension works.
— Research and development into cheaper and more efficient ways to insulate solid wall properties.

17. In conclusion, we believe that the above clearly demonstrates that insulation has a central role to play in delivery of a variety of government energy-policy aims, but that achieving the required step change in consumer uptake will require an effective Government communications programme coupled with fiscal incentives to overcome the identified market failures.

18. We hope that you find the information provided helpful and we would of course be pleased to have the opportunity to give verbal evidence before the committee if this was felt appropriate.

25 October 2004

Memorandum by the Energy Advice Providers Group of the Energy Efficiency Partnership for Homes

INTRODUCTION

1. The Energy Advice Providers Group of the Energy Efficiency Partnership for Homes has established a Domestic Energy Efficiency Advice Code of Practice. The Code of Practice offers a clear framework for advice across the whole of the domestic energy efficiency sector, and we commend it to the Sub-Committee for support and inclusion in their findings.

2. This submission addresses the following areas in which the Sub-Committee is interested:
   (i) The behavioural aspects of energy efficiency schemes—the quality and quantity of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings.\(^6\)
   (ii) The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred to applications.

BACKGROUND

3. The Energy Efficiency Partnership for Homes (EEPh) is a network of over 250 organisations from the public, private and voluntary sectors. By working together we aim to reduce energy consumed by UK households as well as the number of people who need to spend more than 10 per cent of their disposable household income on energy (the “fuel poor”), in line with the Government’s commitment to the eradication of fuel poverty amongst vulnerable households by 2010 and amongst all groups by 2016.

4. The EEPh has 19 Sector Working Groups. The Energy Advice Providers Group (EAPG) exists to improve the quality of advice given to the public about energy use in the home.

5. A key achievement of the EAPG has been the establishment of the Energy Efficiency Advice Code of Practice; providing organisations with guidance to ensure they provide high quality energy advice. This submission looks at the supporting evidence for the benefits of providing energy advice, and profiles the Code of Practice.

6. The EAPG defines domestic energy advice as that which is “specific to individuals and their circumstances and aims to improve energy efficiency and achieve affordable warmth”. This can involve some or all of the following activities:
   (i) Gathering information from customers;
   (ii) Diagnosing the customer’s problem;
   (iii) Explaining options to solve the problem(s);
   (iv) Recommending further action that customers can take to improve energy efficiency;
   (v) Accessing information about specific products;
   (vi) Accessing information about specific energy efficiency measures;

\(^6\) We stress the difference here between information and advice. Advice is specific to individuals and their circumstances and aims to improve energy efficiency and achieve affordable warmth, and is more beneficial than mere information.
(vii) Completing home energy assessments;
(viii) Making referrals to other organisations;
(ix) Demonstrating how to use energy efficiency measures to gain maximum benefit; and
(x) Advising customers on energy efficient products.

Energy advice does not include the distribution of leaflets and other general information.

DOMESTIC ENERGY EFFICIENCY ADVICE CODE OF PRACTICE

7. The Domestic Energy Efficiency Advice Code of Practice was developed in response to the Benefits of Advice Research by EAPG (see below), with cross-industry consultation and support. Since April 2004, the Energy Saving Trust has taken ownership of the Code, with EAPG acting as a steering/advisory body.

8. The Code of Practice sets minimum standards for delivering transparent and accurate domestic energy efficiency advice to customers. The standards within the Code of Practice are designed to ensure that an advice organisation/provider is well run and has its own quality control mechanisms in place.

9. Any organisation wishing to be seen as having met the Code of Practice is expected to meet the standards in the Heart of the Code, and one or more of the additional sections depending on the way in which the advice is provided:

   (i) Energy efficiency advice at point of sale: applicable to organisations that give advice about specific products at the selling stage of the supply process, eg retailers.
   (ii) Advice when installing energy efficiency measures: applicable to installers.
   (iii) Face-to-face advice, not in the home: applicable to organisations that give advice on their own premises, at exhibitions, trade shows and presentations.
   (iv) Advice provided in all non face-to-face situations: applicable to organisations that give telephone, written and electronic advice.
   (v) Energy efficiency advice in the home: applicable to organisations that provide home visits for the purpose of giving energy efficiency advice.

10. The Code of Practice was launched on 1 October 2003. In the first year, 58 organisations have demonstrated full compliance, including Energy Efficiency Advice Centres, energy suppliers, local authorities, grant administrators, installers and retailers. A further 64 organisations have expressed an interest in the Code and have begun the sign-up process.

11. A “specifier” category of membership will be introduced later this year. It will be aimed at organisations that don’t give advice directly to the public, but outsource this service to a third party. Specifiers will be invited to commit to the Code of Practice and sign a declaration. Several large organisations have shown their support for the Code of Practice by specifying that their contracted advice providers are compliant, including Defra with Warm Front grant administrators, and the Energy Saving Trust with Energy Efficiency Advice Centres.

12. Promotional activity to date has concentrated on the industry, to build a good base of compliant advice providers before embarking on consumer-facing activities. Consumer-facing promotion, coupled with an easy to identify logo or brand, is anticipated to take place in 2005.

BENEFITS OF ADVICE RESEARCH

13. In 2002, the EAPG commissioned research to identify the most effective delivery mechanisms for providing energy efficiency advice and to discover what actions consumers took as a result of advice. They also wished to identify the benefits that consumers noticed from following advice. It was the first research to apply a common methodology of evaluation of energy advice across all delivery mechanisms and all significant advice providers.

14. The research was carried out through 1,900 telephone interviews with people who had received advice from a variety of energy advice sources (eg Energy Efficiency Advice Centres, fuel companies, local authorities, fuel poverty projects). A small-scale self-completion survey was also carried out among 35 homes where a Home Energy Report had been issued to prospective buyers of homes by the surveyors acting for their mortgage company.

7 Details can be found of the Code of Practice Register on the website at www.goodenergyadvice.org.uk
15. The results clearly show that advice works. The research showed that all types of advice can produce useful financial savings and/or improvements in people’s comfort, warmth, environmental conditions and even health, where people take note of and follow that advice. Key findings include:

(i) 85% of consumers can remember getting that advice and can recall what topics it covered.
(ii) 70% of consumers who receive any advice on measures do install some of the recommended measures within nine to 15 months, sometimes with the aid of grants.
(iii) 75% of all behavioural advice is followed in some way.
(iv) 63% have benefited from warmer and more comfortable homes.
(v) 34% reported lower fuel bills, rising to 47% per cent among those who received written reports and verbal advice.
(vi) 23% report an improvement in health.

16. The research concludes that energy advice can play a major role in changing people’s awareness of the opportunities to save energy and money, and to improve their housing conditions and health. It recommends further expansion (and improvement) of energy advice services in order to enable them to fulfil their potential.8

17. Other recent research supporting the benefits of advice includes:


PRESSING NEED FOR ACTION

18. The EU Directive on the Energy Performance of Buildings, which must be translated into national law by January 2006, will provide a major challenge for the energy efficiency sector.

19. Two of main measures for the domestic sector have a major impact on energy advice provision:

(i) the introduction of an energy performance certificate to be available whenever a building is constructed, rented out or sold; and
(ii) regular inspection of boilers over 20kW and, where systems are more than 15 years old, the provision of advice.

20. The Certificate, combined with the requirement for advice provision to owners of old heating systems, provides an excellent opportunity to highlight the importance of effective energy use. For the energy report to achieve real results it must be trusted by and useful for the customer. Organisations compliant with the Code of Practice will ensure quality advice from trained staff at all levels. Similarly, if the heating advice is provided by advisors following this code, it will be more effective at motivating people to take action and reduce their energy consumption.

21. Defra have also been asked develop a Climate Change Communication Strategy9 to ensure consistency of messages. Given the proper consideration, this strategy could provide a further opportunity to promote energy efficiency advice and facilitate a step-change in consumer behaviour.

CONCLUSIONS

22. The Domestic Energy Efficiency Advice Code of Practice sets minimum standards for delivering transparent and accurate domestic energy efficiency advice to customers. It has cross-industry support and growing number of organisations are compliant with the standards it sets.

23. Research shows that advice works. 85% per cent of consumers remember getting advice, and 70% per cent of them go on to install some of the recommended measures. 75% per cent follow behavioural advice.

24. The introduction of Energy Performance Certificates, as required by the EU Directive on the Energy Performance of Buildings, will inform a much larger proportion of householders about the possibilities of improving the energy efficiency of their homes. The opportunity to capitalise on this by providing good energy

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8 A copy of the Executive Summary of this research (“Benefits of Advice”, Energy Efficiency Partnership for Homes, 2002), and an accompanying consumer leaflet, can be found on the EEPIH website at http://www.est.org.uk/partnership/sector/swg.cfm?group-id = 3.
advice must not be missed. Without properly resourced energy advice services, offering advice to the standards set out in this Code, those households will not be motivated to adopt the energy saving strategies required to achieve the Government’s targets.

25. Improving the energy efficiency in the domestic sector and actively encouraging behaviour and attitude changes to energy use are essential elements for any future energy policy. The best appliances and technology could be installed, but if not used effectively, then the savings claimed by government departments will never accrue. It is in the best interests of the public purse to ensure that energy efficiency advice delivered using the Code of Practice is an integral part of programmes using public funding.

26. We therefore urge the Sub-Committee to adopt the inclusion of customer focussed energy advice and the Domestic Energy Efficiency Advice Code of Practice.

Memorandum by the Energy Retail Association

1. INTRODUCTION

This paper has been produced by the domestic energy suppliers forming the Energy Retail Association (ERA). The Energy Retail Association established in October last year is the only dedicated trade association for UK energy suppliers. All the main energy suppliers operating in the domestic market in the UK are members of the association: British Gas, Scottish & Southern Energy, RWE npower, E.ON Powergen, EDF Energy and ScottishPower.

In terms of energy supply the greatest contribution to energy efficiency is the obligation to achieve energy savings through the Energy Efficiency Commitment, which is currently being re-assessed with a view to doubling the carbon savings targets. ERA members support the principle of extending the Energy Efficiency commitment from April 2005 and have played an active role in the work of the Department of the Environment, Food and Rural Affairs (Defra) High Level Advisory Committee and Target Setting Sub-Groups during the past year.

In addition, we have strongly supported the discussions that have taken place in the past 12 months and have contributed to the debate by producing various reports co-ordinated by the ERA.

We have welcomed the approach taken by Defra to elicit widespread input from the various stakeholders having an interest in energy efficiency and acknowledge that Defra has already made some modifications to its views on some of the key issues.

However, we remain extremely concerned that some of the assumptions made by Defra have not been fully validated and that insufficient consideration has been given to future price trends and the impact on energy costs, particularly for our disadvantaged customers.

Whilst there has been considerable debate about consumer apathy and the commercial reality of a stagnant market, it is apparent that Defra believes that energy suppliers can solve the problem. This is not a view that ERA members share.

2. BACKGROUND

The Energy Efficiency Commitment began in April 2002 and requires energy suppliers to achieve a target amount of domestic energy efficiency improvements by 31 March 2005.

Suppliers are currently required to spend the equivalent of £3.60 per customer on energy savings. This needs to increase by over £10 per fuel by 2008 under EEC2. The Government sets targets on how much energy savings must be achieved through the sale of a range of energy saving measures such as cavity wall and loft insulation, energy efficient light bulbs and heating system upgrades.

The ERA believes that the industry needs the widest flexibility in order to deliver energy savings and that the Government will need to offer fiscal incentives to encourage house owners and landlords to invest in home energy efficiency measures. Recent research shows that there is no consumer interest in insulting cavity walls and lofts at current market prices. The ERA is working closely with government officials to draw up a workable Energy Efficiency Commitment that provides the flexibility for innovation and sets realistic targets for energy savings.

The EEC requires electricity and gas suppliers to achieve targets for the promotion of improvements in energy efficiency in the household sector, with a particular focus on helping low-income consumers. The targets will be met by a combination of measures; however due to the inflexibility of the proposed scheme, the key ones are likely to be cavity wall insulation and loft insulation.
3. **Key Concerns**

ERA members have many concerns about the proposals, which even at this late stage in the statutory process are incomplete, but wish to highlight the following key concerns:

- Consumer appetite to buy products at the assumed costs and volumes required.
- Loss of flexibility.
- Dependence on insulation products, particularly cavity wall insulation and the reliance on the insulation industry (manufacturers and installers) to invest and grow at the required rate.
- Base cost assumptions and exposure to future cost increases.

These are examined in turn in the following pages.

3.1 **Consumer appetite to buy products at the assumed costs and volumes required**

Since the commencement of energy saving programmes what has been confirmed time and time again is the lack of interest from consumers in energy saving products and services. Home owners' latent desire to improve energy saving has had to be targeted by a range of inducements that has seen the price of measures to consumers fall while the cost of delivery and installation has continued to rise. In our collective judgement, this trend will continue throughout EEC2. This view is supported by the Energy Savings Trust in its Response to HM Treasury/Defra consultation on Economic Instruments to Improve Household Energy Efficiency.

The EST study confirmed that whilst consumers recognise the benefits of energy efficiency measures, they are not compelled to act. The reason for this was found to be that consumers believe that it should be the Government and then energy suppliers who should take responsibility for tackling energy efficiency, ahead of them being required to do anything. In particular consumers become disengaged when the issue is linked to wider climate change. Research has also shown that consumers would be significantly more likely to invest in energy efficiency if the Government offered fiscal incentives.

Additionally, the cost of lead generation will face significant upwards pressure as campaigns aimed at target group customers not only have to capture the interest and imagination of customers but also compete with an array of marketing messages that are increasingly sophisticated in order to elicit a positive response. It must be recognised that suppliers will find it increasingly difficult to absorb additional costs and this will need to be passed through to the customer.

The slump in demand during the summer months is characteristic of the market for all forms of household insulation and has traditionally resulted in high levels of unutilized capacity among installers. The ability of contractors more effectively to exploit this potential spare capacity is the key to improving productivity in the sector. The principal instrument to stimulate demand during summer months, and thereby keep crews busy, is marketing.

Addressing consumer apathy is the key to achieving the UK’s energy efficiency targets. We, therefore, strongly recommend that fiscal incentives are developed and introduced during the first phase of EEC2. We continue to support the proposal put forward by the Energy Savings Trust and Association for the Conservation of Energy for stamp duty rebates for households that install energy efficiency measures. This proposal should be incorporated into the Home Information Packs currently being developed by the Office of the Deputy Prime Minister.

3.2 **Loss of flexibility**

Why have suppliers always met previous energy efficiency targets?

Flexibility has been a key factor towards success and suppliers must continue to be able to innovate. At the time EEC1 was introduced the market conditions and policy environment were different. For example,

- Earlier programmes were significantly smaller, focussed initially on electrically heated homes and insulation represented a much smaller proportion of the earlier schemes eg EESoP1 and EESoP2.
- Emerging opportunities using energy efficient appliances and low energy lighting presented significant and viable alternatives to insulation products.
- Earlier programmes included working with some business customers (up to 100kW ie not SME’s) which widened the scope for products and customer targeting.
- Timescales were more flexible allowing suppliers to take longer than the programme timescales if necessary and many suppliers needed to take advantage of this.
— Within a notional/assumed mix of measures suppliers had much greater flexibility to develop a wide range of schemes.
— EESoP3 included gas customers for the first time widening the choice for suppliers to develop boiler schemes and more insulation work. Even greater interest was developed in appliance schemes and lower lamp costs meant greater volumes were delivered.
— In later programmes Local Authorities became much more interested which has opened up opportunities for greater volumes through joint working in social housing.
— Availability of social housing has been a key factor in ensuring targets for EEC1 will be met.
— In all previous programmes, suppliers felt able to endorse the targets because realistic assumptions had been made.

In summary, earlier schemes gave plenty of choices for suppliers via an array of new product options, a growing commitment from appliance manufacturers, retailers and social housing providers, a wider audience after gas homes were included and suppliers felt able to endorse the targets.

Flexibility was the key to success and this was verified at completion of the scheme, which showed that programmes were achieved but with a mix of measures that was very different to that envisaged in the original target models.

EEC2 is also the first programme that is greater than the current capacity of the energy efficiency industry.

Why EEC2 is a different case?

Apart from the obvious difference of scale between EEC2 and earlier programmes the loss of flexibility and over reliance on cavity wall insulation are the main concerns.

There appears little prospect that anything new will be added to the product portfolio and some of the previous measures are unlikely to feature in EEC2 despite being included in Defra’s target model.

The following factors illustrate loss of flexibility and increased challenges imposed by changes in targeting and accreditation:

In particular;
— Some 82 per cent of EEC2 target is anticipated to come from insulation products.
— Some 2 million appliances are expected to deliver about 1 per cent of target but the removal of the uplift factor and the inclusion of the heat replacement effect will seriously affect this channel as a viable option to suppliers.
— Lighting schemes have become less attractive through the imposition of the heat replacement effect and additional constraints on targeting and verification currently being considered by Ofgem make direct mail and charitable schemes unattractive.
— Boilers, whilst still included, are less attractive and at this stage the details of the 1 million “exception boilers” is unknown. Additional monitoring requirements proposed by Ofgem (testing of boiler interlocks) are also likely to close this channel as a viable option due to the increased cost.
— Additional verification requirements and correction factors make DIY loft insulation less economic.
— Heating controls are less likely to be delivered unless linked to boiler upgrades.

In summary, there will be too strong a dependence on Cavity Wall Insulation and little flexibility to make a contribution from other products.

3.3 Dependence on insulation products, particularly cavity wall insulation and the reliance on the insulation industry (manufacturers and installers) to invest and grow at the required rate

There can be no doubt that the high dependence on cavity wall and loft insulation poses a serious risk to the delivery of the energy savings target and also to the programme cost.

We have valid concerns about the capability of the insulation industry to grow at the required rate and are not convinced that sufficient infrastructure exists, as claimed. The insulation industry’s position that 1,000 machines is enough, so long as the demand can be lifted for delivery evenly throughout the year is in our view an implausible argument.

We do not believe it will be possible to smear demand in the way we would all wish, at the national volumes required.
Equally, we do not believe that the industry would have previously invested in a capacity capable of delivering annual volumes of some 600,000 installations when historically the annual demand has never exceeded about 300,000.

The ERA commissioned an independent study of the insulation industry. We understand that this is the only in depth assessment of the industry’s ability to deliver at the rate anticipated by the targets.

The number of installations currently achievable using currently operational machines at full productivity is insufficient to fulfil the target number of installations. Even at maximum productivity, only around 70 per cent of the required installations could be filled using the machines currently operational.

Assuming that capacity remains static, it is estimated that the productivity of existing crews would have to increase from 2.14 installations per day to 4.44 installations per day over the three years from 2004-05 to 2007-08 in order to achieve the EEC2 targets. This is significantly greater than 2.5 installations per day, the estimated maximum number of average daily installations. There appears to be only modest scope for achieving productivity improvements over the coming years (say 5 per cent per year), unless there is a significant smoothing of demand across the year.

Assuming, conservatively, that there is no growth in the number of non-EEC installations (including new build and domestic non-EEC) over the period between 2005-06 and 2007-08, the EEC targets imply that some 2.1 million cavity wall installations must be carried out of which 1.7 million (more than 80 per cent) will comply with the requirements of EEC2.

Whilst the sector expresses confidence in its ability to meet the EEC2 targets, it is unclear how the scale of change can be achieved given the challenges faced. Assuming that the contractor sector achieved annual growth in capacity and productivity of 10 per cent and 5 per cent respectively over the period between 2004-05 and 2007-08, it is estimated that the shortfall in installations compared with the EEC2 targets would be in the region of 400,000.

3.4 Price trends and risk to energy prices

As expressed previously, we are concerned that the base cost assumptions included in the EEC2 model prepared by Defra are vastly different from those experienced in the market place. Assumed future cost trends do not sufficiently take account of the investment that will be necessary in the insulation industry in particular.

The recent imposition of a 20 per cent increase in the cost of loft insulation is a clear example of the volatility of the insulation sector and in our view this scale of increase is likely to be repeated on a frequent basis in the future.

There appears to have been of the order of 4–5 per cent increases in the costs of cavity wall insulation in the space of around a year, in both the social and private segments of the market.

Loft insulation costs appear to have risen by even more (between 5 per cent and 10 per cent depending on grade of insulation) in the private segment, but there has not been a material change in cost levels in the social segment. ERA members have recently re-tendered for supplies of both CWI and LI for the EEC2 period—we understand that the tender prices received range from 10 per cent to 35 per cent above current EEC1 costs depending on the material and intended use.

4. Key Factors for Success

ERA members believe that for EEC2 to be successful in delivering its environmental target other factors must be taken into account:

— Meeting the energy savings target.
— Mitigating the effects of fuel poverty.
— Developing an efficient manufacturer/installer infrastructure.
— Delivering high quality & safety standards.
— Transforming the market for energy efficiency products & services.
— Delivering good customer experience & supplier branding.
— Within the budget forecasts.
5. **Actions/Recommendations**

— Defra should urgently review its target setting model in light of the comments noted above and in particular come forward with more reasonable target savings that can be met for the costs envisaged.

— We have indicated that the industry can achieve a maximum of 1.3 million cavity wall insulation installations. We must either increase the spend to over £10 per customer per fuel or reduce the overall target.

— ERA members support the proposal to expand the initiative by energy suppliers to commission an independent review into the insulation industry with a view to provided Defra with more accurate information to inform its target setting.

— Further consideration needs to be given to the proportion of savings targeted at the priority group. Indeed, we do not believe that the current proposals are realistic and may not represent the most effective means of targeting priority customers.

6. **Other Issues**

*Disability Living Allowance and Attendance Allowance*

We believe that customers in receipt of the DLA or AA should be included within the definition of the Priority Group. It is very difficult to define the factors that contribute to fuel poverty, but low income is not the only symptom. Any improvement for vulnerable customers must be welcomed and the current qualifying criteria should be sustained. The less attractive option would be to reduce the priority group share in line with the number of households no longer eligible because otherwise the 50 per cent target is unrealistic.

*Interaction between EEC2 and Warm Front*

ERA members are generally supportive of closer working so long as this is optional for individual companies and have contributed to recent discussions to establish suitable arrangements

*Energy Service Enhancements*

ERA members support Government’s proposal to provide an incentive for energy services for the first year of EEC2 but believe this should be extended for the whole of EEC2. It is not yet clear to what extent energy services will contribute towards achieving EEC2 targets. Energy service packages require sustained investment by suppliers and any extension to the pilot allows time for the impact of the initiative to be properly assessed.

— Defra and Ofgem should urgently review their proposals to ensure consistency. In particular, Ofgem’s proposals for additional monitoring, targeting and verification will, if implemented, effectively remove a number of measures from EEC2 that Defra have included in their target model. Clearly, this does not represent a coherent approach to setting reasonable targets on suppliers for EEC2.

— We welcome the proposal for a high level advisory group to be established with the necessary powers to intervene and review EEC2 if necessary. ERA members look forward to playing a constructive part in defining the scope of the high level advisory group and setting realistic review implementation levels.

*October 2004*
Memorandum by Environmental Industries Commission Climate Change Group

With over 240 Member companies, including over 70 providing products and services related to energy efficiency, EIC has grown to be the largest trade association in Europe for the environmental technology and services industry. It enjoys the support of leading politicians from all major parties, industrialists, trade union leaders, environmentalists and academics.

We appreciate the opportunity to participate in this inquiry. Our comments concern a number of measures for promoting energy efficiency that are already in place or under consideration.

1. **Enhanced Capital Allowance Scheme**

The Enhanced Capital Allowance Scheme to incentivise energy efficient technology has now been running for some time. EIC was instrumental in promoting the introduction of fiscal incentives for companies purchasing environmental technologies and our Members provide many of the items of equipment on the Energy Technology List.

EIC Members’ experience is that the scheme has been a success in the construction sector but has had much less impact in the commercial buildings sector. The procurer of plant items for commercial construction projects is invariably NOT the end user but an installation contractor or design consultancy practice who receive no gain for using the scheme. The procurer is also usually capital cost driven, consequently the take up of these allowances, and the subsequent use of energy-efficient equipment is limited. In addition the financial advantage for 100 per cent capital allowances adds up to a relatively modest incentive in most cases.

Furthermore a complete sector of the economy, namely any organisation not paying corporation tax, eg NHS Trusts, Local Authorities and other non-profit organisations, cannot claim ECAs, and consequently have no incentive to use equipment on the Energy Technology List.

EIC is therefore recommending to Treasury, Defra and the Carbon Trust the following measures to develop the scheme:

- Increase the allowance for the most energy efficient products to 150 per cent. This will undoubtedly stimulate end users much more to insist on ECA listed equipment being used as part of an overall building specification.
- Provide an Inland Revenue certificate to accompany sales of ECA registered equipment to be sent to building owner in order to address the problem of information being transferred along the sales chain by simplifying the documentation required.
- Incorporate the requirement to use the Energy Technology List into public procurement policies (see below).

2. **Public Procurement**

The Energy White Paper commits the Government to encouraging energy efficiency through public procurement. EIC greatly welcomes the fact that the “Quick Wins” for environmental procurement in the public sector, developed by the Office of Government Commerce, include reference to the Energy Technology List. To ensure this has the maximum impact we recommend that:

- The Government monitors and reports on whether Departments are choosing items on the Energy Technology List.

One area where EIC Members have found little attention is paid to energy efficiency is in PFI contracts (which are often major projects). They have informed EIC of a number of occasions when the most polluting equipment has been purchased, for example in schools and hospitals, because the PFI contractor is not responsible for energy bills and therefore has no incentive to consider the whole life costs of equipment in terms of its energy use. There is no shortage of guidance recommending consideration of whole life costing and energy efficiency, but it appears to have little effect in practice. Given that the Prime Minister has pledged in his recent speech on Climate Change to make all new schools “models for sustainable development”, EIC recommends that:

- The Government moves beyond guidance and suggestion to set and enforce challenging energy efficiency criteria for all new PFI contracts.
3. **Climate Change Agreements**

The Climate Change Agreements under the Climate Change Levy have incentivised energy efficiency measures in some sectors. However, the low price of carbon in the UK emissions trading scheme demonstrates that the level of greenhouse gas emissions reductions required have been set too low and many sectors have been meeting these emission levels, and gaining their 80 per cent discount on the Levy, with little effort. EIC therefore recommends that:

- The current review of Climate Change Agreements, as well as the negotiations for the extension of the Agreements into new industry sectors, ensure they are set to drive challenging reductions in greenhouse gas emissions.

4. **Enforcement of Building Regulations**

The Government is now reviewing Parts F and L of the Building Regulations, which, with the implementation of the Energy Performance of Buildings Directive, could serve as an important driver for efficiency measures in existing buildings. However, the country is suffering from a shortage of properly trained inspectors, and our Members’ experience is that inspectors place a low priority on energy efficiency when enforcing the existing Building Regulations. This risks undermining the impact of these important measures. EIC therefore recommends that:

- The enforcement of Building Regulations be given a high priority.
- The verification of a building’s energy performance be made a prerequisite for registration of interest with HM Land Registry.

5. **VAT**

EIC has responded to the Treasury consultation on home energy efficiency identifying reduced rates of VAT as the most effective economic instrument for encouraging energy efficiency. This should be applied to: DIY energy saving materials; commercially installed energy efficiency products or materials in non-grant schemes; and to energy efficient equipment. EIC therefore recommends that:

- The UK engages with other EU Member States to work for an extension to the list of goods and services which Member States are allowed to apply reduced VAT rates to include these energy saving products.

6. **Emissions Trading**

EIC has supported the EU Emissions Allowance Trading Scheme (EATS), in principle. However the UK and other EU National Allocation Plans (NAPs) have over-allocated allowances and damaged the scheme. The EATS will limit the scope of the Integrated Pollution Prevention and Control (IPPC) regime in regulating emissions of the basket of six greenhouse gases. It will therefore weaken existing EU environment regulation as it does not match the IPPC regime requirement for “best available techniques” to be used.

We are disappointed that greater effort was not made to ensure that the UK NAP contributed significantly to our domestic target to reduce carbon dioxide emission by 20 per cent from 1990 levels by 2010. We are even more disappointed that the UK’s route to achieving its Kyoto target now even looks to be in doubt.

As Table 1 of the NAP submitted to the Commission clearly shows, the emission reduction for the first trading period is only 0.5 MtCO₂, a target of just 0.2 per cent, as opposed to 5.8 per cent in the draft NAP.

An undemanding NAP means either:

(i) unrealistic reliance is being placed on alternative emissions reductions measures; or

(ii) the cuts to be delivered by the UK’s NAP for the first five year period in the second phase of the EATS will have to be much harsher.

The ground given in response to pressure in respect of the first phase NAP gives no confidence that a second phase NAP will be able to make up the lost ground.

EIC therefore recommends that:

- The Government now makes a firm commitment that the second phase of the EATS will deliver emissions reductions in line with the domestic target to reduce carbon dioxide emission by 20 per cent from 1990 levels by 2010.
The UK work urgently with the Commission and other EU Member States to ensure tight and challenging National Allocation Plans, wide participation in the scheme, and enforcement of non-compliance.

We hope you find our comments useful and would be happy to provide further information if required.

25 October 2004

Memorandum by Ms Tina Fawcett and Dr Mayer Hillman

Scope

This evidence concentrates on household energy use and personal transport, with only minor mention of the commercial and industrial sectors.

Summary

1. A new policy approach is needed to deliver carbon dioxide savings in the UK. Energy efficiency has not delivered energy savings in the domestic sector, with energy use rising by 30 per cent since 1970 despite substantial improvements in efficiency. There are many flaws in the way potential energy and carbon savings are estimated, and real-life savings have been consistently lower than those promised on paper. The scale of carbon savings required is far greater than currently assumed, firstly because international air travel produces considerable emissions which are not presently included in targets. When international air travel emissions are included in the UK total, carbon equivalent emissions have not actually fallen since 1990. Secondly, the Government’s target of a 60 per cent saving by 2050 is based on an insufficiently risk averse ceiling for carbon concentrations in the atmosphere. Instead of relying on energy efficiency alone, carbon rations for household energy use and personal transport are proposed as the only assured strategy for achieving the essential reduction in emissions. Rations would be equal, tradable, mandatory and would decrease year-on-year down to a level that would prevent serious destabilisation of the world’s climate. The aim would be to make guaranteed carbon savings in an egalitarian way. Energy efficiency would make its contribution within a carbon cap.

Energy Efficiency in the Domestic Sector

2. Energy consumption in the UK domestic sector is rising. Final energy demand in the domestic sector has risen by 30 per cent between 1970 and 2003 (DTI 2004). Despite many changes in technology and ownership of household equipment since 1970, patterns of energy use by end use have changed relatively little and the average energy consumption per household has remained about the same (Shorrock & Utley 2003). Considerable improvements in energy efficiency have not led to net energy savings per household because other factors, such as higher ownership of central heating and increasing indoor temperatures, have led to increases in energy services over the same period. An additional major influence accounting for rising consumption overall has been the increase in household numbers associated with a marked decline in household size.

3. Despite the poor record of energy efficiency in delivering energy savings, there are many studies which have identified possible energy and carbon savings from domestic energy efficiency (Fawcett, Lane, & Boardman 2000; Epple 2001; Shorrock et al 2001; and ICCEPT 2002). The methodologies of the studies differ to some extent, but the overall conclusion is that a range of potential energy savings from the domestic sector between 1995–2000 and 2020 of between 13 per cent and 25 per cent has been identified.

4. However, similar estimates of potential savings were produced in earlier decades. Data from two well researched studies by Leach et al and by Olivier et al are shown in Figure 1. Both use very similar approaches and techniques to those used in current studies. But the savings calculated did not materialise: energy consumption in 2000 was 26 per cent higher than in 1975, whereas Leach et al calculated that a reduction of 36 per cent could be achieved by then. Previous experience with modelling such as this should give pause for thought when faced with optimistic, technologically-based, assessments of potential savings.
5. There are key problems which tend to lead to exaggeration of the extent of future savings from efficiency, including:
   — Fallacious assumption that energy efficiency and energy savings are identical objectives.
   — Over-optimistic assumptions about the future take-up of existing efficient technologies.
   — Over-optimistic assumptions about the development of new efficient technologies.
   — Under-estimation of the capacity of new, not-yet-developed or widely-owned technologies to lead to increases in energy use.

6. Research shows that expected savings from energy efficiency have often been over-estimated in comparison with subsequent monitored savings (e.g. Henderson et al. 2003; Oreszczyn 2004). Indeed, the authors of this evidence for the Committee do not know of any research which shows unexpectedly large savings from energy efficiency schemes or policies.

7. Overall, “Energy efficiency: the Government’s plan for action” (Defra 2004b) suggests that there is a “medium” risk that energy efficiency measures will not deliver the required carbon savings. Instead, experience over the past 30 years points strongly to a conclusion that in reality there is an extremely high risk that energy and carbon savings will not deliver the level of reduction through efficiency alone that climate scientists consider essential to avoid serious climate change.

THE REAL CHALLENGE OF CARBON DIOXIDE EMISSIONS REDUCTION

8. In spite of rising energy demand, UK carbon dioxide emissions have fallen in recent years, both in the economy as a whole and from the domestic sector (Figure 2). However, only limited encouragement can be taken from the decline. Firstly, much of the reduction since 1990 is due to a switch towards lower carbon content fuels (primarily gas) which cannot be repeated in future, rather than to a fundamental transformation towards a lower carbon economy (Eichhammer et al. 2001). Secondly, when international airline emissions are taken into account, UK emissions have not actually fallen since 1990.

9. Figure 2 shows two sets of official carbon dioxide emissions data. For earlier years, the only UK figures available are calculated on an UNECE basis (UNECE/EMEP 2001). However, current official UK estimates of greenhouse gas emissions are calculated in line with IPCC reporting guidelines, and figures on this basis are available from 1990 onwards (Houghton et al. 1996). The difference between the two methods of calculation is relatively small—but neither methodology includes emissions from international aviation.
10. To add in emissions from international aviation, carbon dioxide data from 1990 onwards can be used (ONS 2004). Importantly, aircraft emissions add more powerfully to the greenhouse effect than the carbon dioxide component alone. The current best estimate is that they have three times the effect of carbon dioxide per tonne of CO₂ emitted (RCEP 2000). When international airline carbon equivalent emissions are added to UK carbon emissions (IPCC methodology), there is little difference in total emissions for 1990 and 2002. This gives a less rosy, but more realistic, view of the UK’s progress on reducing carbon dioxide emissions. It also highlights the importance of international airline emissions.

![Graph](image)

**Figure 2: UK total carbon emissions and carbon equivalent emissions including international air travel, MtCe, 1990–2003**

*Sources:* Defra 2004a; Defra 2003; ONS & NETCEN 2004

11. The current 60 percent reduction target for 2050 must be assumed to include aircraft emissions if it is to have real meaning. Although this enquiry does not include transport, the issue of airline emissions is important in order to understand the real scale of the challenge to other sectors of the economy.

12. Furthermore, the 60 percent reduction target assumes that damage to the climate caused by an emissions ceiling of 550ppm will be acceptable (RCEP 2000). It may very well not be. Recent evidence from the UK Hadley Centre suggests that increased carbon dioxide concentrations in the atmosphere may lead to higher temperature rises than those reported in IPCC’s work, on which the 550ppm target was based (Clarke 2003; Murphy et al. 2004). Murphy et al. indicate that a doubling of carbon dioxide in the atmosphere would lead to range of temperature rises of 2.4–5.4°C, almost one degree Celsius higher than the 1.5–4.5°C range reported by IPCC (2001).

A New Framework for Achieving Carbon Savings: Personal Carbon Rations

13. The solution that the authors of this evidence propose in order to guarantee carbon reductions from the domestic sector is personal carbon rationing. Personal carbon rationing would be a UK-wide allowance system covering carbon emissions generated from fossil fuel energy used by individuals within the home and for personal transport, including carbon equivalent emissions from air travel. It would account for around half of current UK carbon emissions from energy, including air travel. The primary aim of the scheme would be to deliver guaranteed levels of carbon savings in successive years. It could be used to achieve the Government’s current target of 60 per cent reduction by 2050 or whatever alternative targets are deemed necessary as time progresses. (Carbon rations could equally well be described as “allowances”, “entitlements” or “quotas”, but the word “ration” is used for clarity and consistency.)
14. Personal carbon rationing emerges from the key proposal for a global solution to climate change—“Contraction and Convergence” (C&C). It was first proposed by the Global Commons Institute in 1990 (Meyer 2000). C&C is founded on two fundamental principles: first, that the global emission of greenhouse gases must be progressively reduced; secondly, that global governance must be based on justice and fairness. Its two components are:

Contraction: An international agreement is reached on how much further the level of CO₂ in the atmosphere can be allowed to rise before the changes in the climate it produces will become totally unacceptable. Once this limit has been agreed, it is possible to work out how quickly current global emissions must be cut back to avoid exceeding the limit. This cutting back is the contraction part of contraction and convergence.

Convergence: Global convergence to equal per capita shares of this contraction, by an agreed year.

15. C&C is considered by a rapidly increasing body of informed opinion around the world to be the framework which should succeed the current Kyoto agreement. It has many influential supporters, including the UN Environment Programme, the European Parliament and the Royal Commission on Environmental Pollution. The UK Government has so far refused to endorse C&C, but it has not yet identified another preferred post-Kyoto framework.

16. The main features of carbon rationing are:

— Equal rations for all individuals.
— Tradable rations.
— Year-on-year reduction of the annual ration, signalled well in advance.
— Energy used in the household and for personal transport are both included.
— A mandatory arrangement, with Parliamentary approval, not a voluntary arrangement.

17. Rationing will be based on equal carbon rations for all adults. Children would probably receive somewhat less than the adult ration because their emissions are likely to be lower on average. Within a scheme of equal rations, it might be thought necessary to give additional rations to some classes of vulnerable people (e.g., the elderly or fuel poor). However, in the longer term it would make far more sense for the Government to subsidise efficiency and/or renewable energy measures for such individuals rather than grant them extra allowances. The more exceptions that are made, the lower will be the available ration for everyone else.

18. The carbon ration necessary to cover current consumption will vary considerably between individuals. Those who lead lives with a lower energy input by investing in household efficiency, renewables, and by travelling less will not need all of their ration and will therefore have a surplus to sell. Those who live in large or inefficient homes or who travel a lot, will need to buy this surplus to permit them to continue with something like their accustomed lifestyle. Thus people will want to trade carbon and trading will be an integral part of a carbon rationing scheme. In addition, by incorporating trading within the rationing scheme, economic theory says that savings should be made at least overall cost.

19. Personal carbon rations would cover all household energy use and personal transport energy use including air travel, that is, all direct use of energy by individuals. There are a number of good reasons for including personal transport as well as household carbon emissions. Firstly, by including both, half of the energy-related carbon and carbon equivalent emissions in the UK economy would be covered (Hillman & Fawcett 2004). Secondly, reducing emissions in the transport sector is unlikely to be any easier than in the residential sector and a mechanism to cap and reduce emissions in this sector will certainly be required: rationing is relevant to both sectors. Thirdly, combining energy use in the household with personal transport in a single scheme would give people flexibility in how the ration is used.

20. Carbon rations will have to decrease over time in response both to the need to reduce global emissions and to allow for the expected rise in national population. The level of future rations depends on what cuts need to be made to ensure that the agreed level of carbon dioxide emissions in the atmosphere is not exceeded. It also depends to a lesser extent on the date chosen for global convergence on equal emission rights. A national reduction of 60 per cent by 2050 (designed to stabilise concentrations at 550ppm) would result in personal rations falling by a little more than 60 per cent from today’s average, to allow for the expected growth in the UK population. If a more risk-averse target for maximum atmospheric carbon dioxide concentration of 450ppm were chosen, then the reductions needed by 2050 would be around 80 per cent. In order to be effective, carbon rationing would have to be mandatory. A voluntary approach would not succeed: the “free-rider” would have far too much to gain.

21. Other researchers are proposing a similar scheme across the whole economy called “Domestic Tradable Quotas” (DTQs)—where domestic indicates a national as opposed to an international scheme. This work is being developed under the Tyndall Centre “Decarbonising modern societies” programme by Anderson and
Starkey (2004). It has attracted some political attention: on 6 July 2004, Colin Challen MP introduced a private member’s bill entitled “Domestic tradable quotas (carbon emissions)” (Commons Hansard Debates [online] 2004). The aim of the bill is to introduce a national trading scheme for carbon emissions and to set a national ceiling for the emissions.

22. In conclusion, the authors of this evidence refer the Committee to their book “How we can save the planet” (Penguin Books, 2004). The summary of its Chapter 6 discusses the role of technology in combating climate change and, within that, the scope of energy efficiency. This states on p.116 that:

“What is required is a reducing limit on the amount of carbon dioxide we in the UK are permitted to emit. Then all the technological options would play a strong role in helping the country to live within its carbon budget while protecting the environment. Energy efficiency and renewable energy will only be able to play their full role in supplying energy services with lower impacts under a regime of reducing energy demand. Otherwise their notional energy and carbon savings will continue to be largely irrelevant against a background of ever-increasing energy use and carbon dioxide emissions.”

21 October 2004

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Energy Efficiency: Evidence


Memorandum by Fells Associates

The House of Lords Select Committee on the European Communities examined “Energy and the Environment” during the session 1990–91. It published its findings as the 13th report of that session on 25 June 1991 (HL Paper 62-1). It devoted much of its attention to the question of Energy Efficiency. The opinion of the Committee is well worth examining; little seems to have changed, topics such as CHP, energy performances of houses, the important distinction between technical potential for saving and economic potential, labelling of appliances and so on (see pages 25 to 28 of the report). I was the special advisor to the committee.

— The fundamental measurement of energy efficiency is the proportion of chemical energy in the fuel which is converted into useful heat, electricity, kinetic energy of motion in a car or whatever. So that in a condensing boiler for example, 93 per cent of the chemical energy in the gas appears as heat in the circulating hot water in the central heating system. The carbon dioxide emissions associated with the system vary depending upon whether the fuel used is gas or coal or wood.

— The general public, commerce and industry are flooded with many pamphlets on energy savings from many different government departments. The effect of this overkill is that they are disregarded. A more focussed approach is required. Changing social attitudes to encourage energy savings is extremely difficult, children seem to understand the problems better than their parents, so that a schools programme will eventually reap the most dividends. But the lead-time is long, as is the solution to most energy problems.

— Energy Efficiency has been seen as the panacea for our energy problems since 1975 and the first of the oil shocks. The solution then was CoCoNuke, ie coal, energy conservation, and nuclear power. Now, as then, energy conservation/efficiency is seen as having great potential. There was some confusion as to what is technically possible and what is economically possible. The Green movement and even government officials currently quote savings of 30 and 40 per cent. Why are these savings not being achieved? Because they are the technical potential for saving rather than the economic potential. In industry there are always calls on capital other than energy savings, launch of a new product, redundancy payments, advertising to increase sales etc. The price of energy, except for very energy intensive industries, is so low that it rarely makes it onto a board meeting agenda. In the domestic sphere the average stay in a dwelling is seven years, this makes it unattractive to spend much on energy saving other than perhaps insulation, as payback times of, say, double glazing is twelve years and a solar electric roof double that at least. As the price of energy rises the payback time will come down.

— A possible way ahead would be to set an annual carbon emission cap for, say, domestic households. The cap would cover emissions from heating, electricity and perhaps be extended to include domestic transport. Emissions could be calculated on an annual basis depending on mileage for the domestic cars, using standard emission factors, and for electricity and gas (or oil or coal) could be stated on bills. Local Authorities would administer the scheme; carbon emissions could be reported on an annual basis by return from households. Investment in energy efficiency technologies could be encouraged by using a system similar to the enhanced capital allowance scheme, where investment in accredited technologies could be written off against household taxes (community charge). Imposing a “buyout” or penalty, payable to the Local Authority where excess carbon dioxide has been emitted, could enforce the cap scheme. Eventually a domestic emissions trading market could be set up. To encourage progress on reducing emissions the cap could be reduced downwards on a
regular basis. It is not as complicated as it sounds and would encourage people to improve the energy performance of their homes or just turn down the thermostat.

- There are many technical improvements, already available, to improve the energy performance of new buildings, micro CHP, heat pumps, condensing boilers. They cost money but are economic in the long run. Unfortunately most developers will not install them unless forced to by legislation. Keeping the capital cost down is their imperative when it comes to sales. But new houses only represent two percent of the housing stock. Improving old houses is more expensive and often less effective, the problem is compounded by plumbers, for instance, who do not want to install condensing boilers or complex energy management systems, because they have not been trained to do it.

- Labelling of consumer goods with their energy performance must be further developed. Unfortunately interior designers and architects are more concerned with style and appearance.

- Unfortunately current government electricity trading policy has made CHP financially unattractive and closed down CHP companies, just as the regulator has forced down the wholesale price of electricity and nearly forced British Energy into bankruptcy. More joined up policy is required, having energy under both the Defra and DTI banners does not help matters.

- More research is a good thing but the real problem is getting available technology into housing and industry and that is where the main thrust should be directed. This requires generous fiscal incentives, backed up by legislation, not like the rather mean incentives for biodiesel for example where the reduction in duty is not quite enough to grow a viable business.

**Memorandum by John Field**

My submission relates to the potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented.

**Summary:** there are many new technological improvements that could be used to reduce energy usage. At present, various incentives such as the DTI Clear Skies scheme encourage the use of renewable energy. However, their overall impact has been limited; this is probably due to the high costs and low returns or savings associated with renewables compared to existing fossil fuels. A way must be found to break out of this impasse to promote the use of renewables thereby increasing volumes for manufacturers and so reducing costs. A useful example of how this can be achieved can be seen in Spain’s use of building regulations that stipulate the use of renewables. An initial scheme piloted in Barcelona has caused something of a chain reaction and their example has been followed by 35 other Spanish towns. A similar scheme is both feasible and practical for the UK and if implemented would push renewables firmly into the mainstream of the construction industry.

1. **BACKGROUND**

As an example, it is useful to review the status of solar thermal heating; this is an existing technology that is well developed and available from a number of suppliers and so subject to the pressures of a commercial market.

Stephen Timms, the Energy Minister, was asked a series of parliamentary questions in January 2004 on solar heating. In his reply he used figures from the Building Research Establishment stating there are about 60,000 solar thermal installations in the UK. He went on to explain the Clear Skies initiative and noted 1,368 grants had been made totalling £684,000. A further 90 applications have been received for the installation of solar water heating systems from the community and not-for-profit organisations. 67 have been granted totalling £955,766.02.10

This sounds quite promising until a comparison is made with the rest of Europe. Since the beginnings of the 1990s the European solar market has undergone considerable development. Figures given by the IEA11 confirm sales of flat plate collectors recorded a yearly average growth of 17 per cent between 1994 and 2000.

The main European markets are Germany, Greece and Austria and they account for nearly 80 per cent of the total market in spite of being situated in regions, with the exception of Greece, with only moderate levels of sunshine. A breakdown of the market growth in Europe by country is given in the table below.

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11 International Energy Association Solar Heating and Cooling Programme (Weiss and Faninger, 2002) and the figures have been confirmed by the German Solar Energy Association (Stryi-Hipp, 2001).
Country | Newly installed 1995 (m²) | Newly installed 2000 (m²) | Average annual growth 1995–2000 %
--- | --- | --- | ---
Spain | 9,800 | 40,487 | 33
Germany | 193,000 | 620,000 | 26
France | 7,700 | 23,500 | 25
Italy | 17,850 | 45,249 | 20
Netherlands | 12,706 | 27,661 | 17
**United Kingdom** | **7,596** | **11,850** | **9**
Greece | 169,000 | 181,000 | 1
Austria | 160,660 | 152,944 | -1

Figure 1. Market growth in the major European countries.\(^{12}\)

It is interesting to compare the UK and the Netherlands; broadly similar climates and are both densely populated, yet the Netherlands has more than twice the UK’s installed capacity although the population is smaller. A similar difference was observed a few years ago when the uptake of condensing boilers was compared. The implication is that cost effectiveness, the balance between initial outlay and running costs, is of the utmost importance to UK consumers, and perhaps suppliers.

Spain faced a similar dilemma; subsidies, incentives and public awareness schemes all failed to encourage the use of solar thermal systems. This is despite the obvious potential for solar energy in a country with a sunny climate.

2. **Energy Usage**

The energy used by a typical residential building is shown below. Solar heating is attractive because of the high percentage of energy used for water and space heating. And the widespread adoption of solar collectors for hot water and heating is recognised as one the main methods for reducing the consumption of fossil fuels. A paper from the European Commission calls for a yearly increase in the installed solar collector area of 20 per cent.

![Residential Buildings](image)

Figure 2. Breakdown of energy consumption in residential buildings in the EU, 1998. Published by the European Commission 2000.

In the UK, and as was the case in Spain, solar thermal systems are not viewed by the public as a mainstream solution to heating and hot water supply because the high capital costs combined with the current performance mean long pay-back periods. Existing commercial systems cost between £2,400 and £3,000 for a single panel system.\(^{13}\) There are grants available; up to £500 from the DTI’s Clear Skies programme. But, this is still more expensive than conventional systems and the annual savings, based on present energy prices, are too long to justify the investment on anything other than green issues.

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\(^{13}\) Solar for London advertise a single panel system for £2,400 without installation. Imagination, a local Bristol company, quote a similar system for £2,966 installed.
3. The Spanish Example

The problem of encouraging the use of solar thermal systems was tackled head on in Barcelona through the use of municipal ordinance that obliges construction companies to fit solar panels sufficient to supply 60 per cent of hot water consumption in new and fully refurbished residential blocks containing 14 or more housing units. The rule also applies to swimming pools, hospitals, clinics, schools, shopping centres and hotels. The effect over the four years since its introduction in July 2000 have been dramatic; Agencia d’Energia de Barcelona report that 232 new building projects have been processed since the obligation came into force resulting in 19,539m² of new solar collector surface area.

4. A Scheme for the UK

Could the Spanish scheme be adopted in the UK? Clearly, the solar resource is less in the UK compared to Spain, but with different levels of contribution from renewables to take into account our climate a similar system could be introduced.

The Spanish scheme does concentrate on solar thermal and whilst this is clearly useful and appropriate for the Spanish climate it does disadvantage other forms of renewables. Given that the market and many aspects of the technology are still emerging it would seem better to require that a percentage of energy is supplied from a renewable source, or from a system that is recognised as energy efficient, for example Combined Heat and Power (CHP), rather than specify the type of system.

A scheme could be imagined where (say) 40 per cent of hot water consumption must be supplied from a recognised renewable or energy efficient source for all new builds or large scale refurbishments. The developer would then have the choice on whether to fit solar thermal, photo voltaic arrays that provide the equivalent level of electrical power, biomass heating, ground source heat pumps, or CHP units.

An obvious extension would be to allow developers to make a contribution to the build costs of (say) wind turbines to a value that is equivalent to the cost of the renewable installation in each building. This would help to build the generation capacity, which is beneficial, but it does not help with the supply side and so its impact will be reduced.

By requiring developers to ensure a certain percentage of energy used is delivered from renewables or other high efficiency systems that are part of the building will raise the public’s awareness and engage people at an immediate level. A scheme that is effectively a tax to help pay for Wind Farms may feel like the right thing to do from an environmental point of view but it will still feel like a tax. Conversely, a scheme that delivers renewable energy systems into new and refurbished buildings will give a sense of ownership and the lasting effect of reduced energy bills.

22 September 2004

Memorandum by George Wimpey UK

1. Introduction

George Wimpey UK [GWUK] received a panel of possible questions and a “Call for Evidence” to the House of Lords Select Committee inquiry into Energy Efficiency on Thursday 11 November and has elected to give a written response to the “Call for Evidence” (and where also relevant offer opinion on the panel questions on policy).

Each “Call for Evidence” question is answered under it’s own heading, although cross reference to other answers is made in several of the answers. The panel of possible questions as received are answered where indicated.

The “Call for Evidence” questions received were as follows:

— The most appropriate measure of energy efficiency, and the relationship between improvements in energy efficiency and overall energy use and carbon emissions.

— The behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings.

— The scope and incentives for improving energy efficiency and reducing waste, across the economy, in both private and public sectors.

— The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented.
— The development and promotion of energy efficient consumer goods.
— Innovative schemes to use district heating or combined heat and power in order to reduce overall energy demand.
— The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications.

The panel questions were as follows:

Question 1: How have you replied to the consultation on proposed changes to Part L of the Building Regulations? Do you think the eventual changes will lead to a major step change in energy use?

Question 2: What are your thoughts about the proposed Code for Sustainable Buildings, that came from the recent report by the Sustainable Buildings Task Group?

Question 3: What work do your companies undertake, or fund, to find ways of reducing energy demand in buildings?

Question 4: What are the barriers to constructing buildings with greater energy efficiency, and how can they be overcome?

Question 5: Are the skills in the construction industry available to design and construct buildings to higher energy efficiency standards? What is being done to address any skills shortages, and is it enough?

Question 6: How well informed is the public about the full life-cycle energy cost of their homes, and how can they be encouraged to use this information when considering a purchase?

Question 7: What demand do you see for buildings with relatively high standards of energy efficiency? What is the prospect of "EcoHome" pilot projects becoming the norm for new build in the United Kingdom?

Question 8: Do you think that district heating schemes could be used more widely in the United Kingdom? What barriers are there to implementing district heating into new developments?

Question 9: Climate change may result in a warmer climate for the United Kingdom in the future. Have you considered how the potential demand on energy from cooling could be reduced? Given the long lifetimes we expect of our buildings, should features be incorporated now in anticipation?


We are answering as to the most appropriate measure of energy efficiency for new housing, as it is beyond the remit of our business to answer for other products. Part L of the Building Regulations (Part L.1 Conservation of fuel and power in dwellings), which may be viewed as a “how to manual”, largely dictates the standards to which the industry in general must adhere, which results in a large degree of standardisation.

We answered the consultation for Part L through the House Builders Federation [HBF], as we believe in a co-ordinated and unified industry voice in such matters.

We believe, as do the HBF, that the changes to Part L, if fully implemented will result in a significant step change, particularly for some of the smaller builders and we would agree with them that the skill level needed to fully implement all of the recent changes to the building regulations (not just Part L) may not be universally available due to a shortage in experienced site based labour. Changes in government policy to encourage more people to choose construction and other trades as a career with equal value as a university education would help in this area.

At present the SAP (Standard Assessment Protocol) rating is used to calculate energy efficiency for new dwellings. Whilst we are able to calculate this for our design and build we are concerned that the scheme, scaled as it is on a 1 to 120 scale is neither well known or understood by the general public (in the way say the alphabetic rating for Eco Labelling of appliances is) nor easily applied for the purposes of comparison to existing housing stock. SAP is a useful tool, but we feel that it is a component tool rather than representing the definitive energy efficiency of a property.

The Carbon Index Method can and often is also used, but this is poorly understood by the public, though it can be used to calculate carbon emissions. We feel that one of the most important things to be sought for any measure of energy efficiency is consistency and communicability. Not only should one be able to consistently
measure the energy efficiency of any dwelling both new as built and existing houses but we need to be able to do so in a fashion consistent with the rest of the industry and with other sectors.

GWUK recently commissioned an internal report from the board on this issue and has established that of all the tools on the market available to us at present, the BRE EcoHomes assessment criteria, which we have used on several developments, is favoured by planning authorities as the most visible and viable method of assessing and demonstrating our sustainability credentials as a business. There is a significant cost implication attached to this however and we are conducting further research into the commercial and practical viability of the standard.

EcoHomes has the additional advantage of covering social as well as environmental issues. It considers the lifetime energy use of a property and has specific calculations for energy efficient appliances so considers the home as part of a community (which SAP as a unit measure cannot). The difficulties generally with EcoHomes are that it can sometimes be over simplistic with subjective pre-defined weightings; though specific to our business the lack of national uptake of the scheme and availability of trained assessors is also of concern.

3. THE BEHAVIOURAL ASPECTS OF ENERGY EFFICIENCY SCHEMES—THE QUANTITY AND QUALITY OF INFORMATION AVAILABLE ON ENERGY EFFICIENCY, AND WHETHER THE PUBLIC IS SUFFICIENTLY KNOWLEDGEABLE AND MOTIVATED TO ACHIEVE ENERGY SAVINGS

Although resources such as the Energy Saving Trust and the Community Renewable Initiative are available to the general public and local authorities there is a comparatively low level of awareness of measurements of energy efficiency (such as SAP) amongst the general public. We would refer to our earlier answer and suggest that an energy efficiency indicator that informs the public of the pounds, shillings and pence cost of energy efficiency would be the most appropriate motivator to drive public consideration of these issues.

As a volume house builder we want to meet the Baker Report Targets for volume growth and affordability. The measures required to be emplaced to increase the EcoHomes and SAP rating of a house or to add Lifetime Homes features add additional costs which the general public is typically reluctant to pay as they add a significant premium to the cost of a new home when compared to less efficient existing housing stock. Anecdotal evidence from our developments indicates that the public in practice are unwilling to pay a premium for measures such as grey water recycling and solar panels and in fact there is a general negative association with the maintenance issues that attend them by the public and the Highways Authorities.

It has been acknowledged by the Government that it is not the new, energy saving housing stock, which is most problematic, but rather the majority of existing housing stock, which is largely responsible for the wasted energy. Houses with no loft insulation, old draughty windows, inefficient electric fires etc. will account for this biggest element of such wastage. We would suggest it is Best Available Technology Not Entailing Excessive Cost [BATNEEC] to improve existing housing stock than to load new homes with even more targets, which will achieve minimal gain at significant cost loads, which is not compatible with the Baker Report.

The public will only be genuinely interested in energy efficiently if it can see ‘pounds’ savings, or improvements, on its own investments. As many improvements to efficiency are expensive to implement, a system is needed to subsidise such improvements. Better information, and a wider dissemination of knowledge would greatly help this. We would suggest using energy companies to pass the message with their bills. We already include energy efficiency information packs with our houses on many developments and we have found this to be quite effective.

4. THE SCOPE AND INCENTIVES FOR IMPROVING ENERGY EFFICIENCY AND REDUCING WASTE, ACROSS THE ECONOMY, IN BOTH PRIVATE AND PUBLIC SECTORS

Many technologies exist to improve efficiency. Their use in existing, inefficient buildings would have a far more beneficial effect than only having them in new ones which are already very well insulated (for reasons we have previously discussed).

We would comment that the conflicting guidance and standards set by various government and regional policies does not aid the reduction of waste or increase in energy efficiency.

Conflicts in production volumes demanded by government; drives towards developing brown field land; achieving densities; different standards of build and conflicts within the Building Regulations and Lifetime Homes standards have led to industry confusion and an un level playing field.

For example though the changes to Part L have been published there is general agreement within the industry that some need a great deal more thought and clarification before they can be implemented. There was also concern that the Government is expecting industry to do much of the development without supplying the
resources and funding needed to achieve this, or that the requirements of each section of the Regulations has not been cross referenced with the others, or with the Lifetime Homes Standards. For example Part L requires that window size on south facing windows be minimized, however the Lifetime Homes Standard specifies larger size windows (though the sill height may be taken to contravene Fire Regulations). Extra thermal efficiency in the fabric of the building itself will also mean that once it has heated up it will be harder to cool down again. Large windows allowing maximum through ventilation is the only way if electric means are not to be employed, but again this flies in the face of the new Part L.

We would suggest that there would be greater scope for these issues, were a “How to” manual similar to the Building Regulations produced as definitive government minimum standard to level the playing field, but where all sections cross referenced the Building Regulations and Government Policies such as sustainable communities and lifetime homes.

5. THE POTENTIAL FOR TECHNOLOGICAL IMPROVEMENTS TO THE ENERGY EFFICIENCY OF NEW AND EXISTING BUILDINGS AND HOW THESE SHOULD BE IMPLEMENTED

We feel this has already been answered by previous questions.

6. THE DEVELOPMENT AND PROMOTION OF ENERGY EFFICIENT CONSUMER GOODS

This question is largely answered in sections 2 to 4 of this response. We would like to make a few additional comments however.

GWUK has recently expanded its core business to customer option centres to mirror the groups long standing practice in America. As part of these option centres we provide a choice of energy efficient appliances for customers, on several of our developments we have committed to providing ‘A’ rated goods packages as an option or providing only washing machines with an ‘A’ and ‘B’ rating. At present consumers tend to be limited by their budget as to their choice of appliance. It is anticipated that as the technologies progress they will become more affordable.

Use of solar panels and grey water recycling are largely being held in abeyance by consumer preference and the reluctance of local and water authorities to adopt SUDS due to concerns over long-term maintenance. As previously mentioned we believe that consumer education, as to the monetary value of energy saving technology, combined with consistent regulations which provide uniform minimum standards for old and new build will be the most effective way to promote adoption of energy efficient consumer goods.

We would also consider our homes to be an energy efficient consumer good, although the energy efficiency of a home is rarely seen as a selling point for our customers, and evidence from our research indicates a general lack of awareness of the relative energy inefficiency of existing compared with new housing stock. We build structures with low lifetime embodied energy, features such as Western Red Cedar and recycled and secondary aggregate have been incorporated into designs and we have commissioned an internal Waste Minimisation working group who consider issues such as minimising the number of lorry movements required on developments and lifetime waste from our products.

We elaborate further on our research and development initiatives in the answer to question 8.

7. INNOVATIVE SCHEMES TO USE DISTRICT HEATING OR COMBINED HEAT AND POWER IN ORDER TO REDUCE OVERALL ENERGY DEMAND

The technology behind district heating and combined heat and power (CHP) has improved significantly over the last 40 years. CHP plant are however still a long term payback, capital intensive project, and require considerable amounts of long term capital funding and specific skills to install. There is generally low awareness amongst the public about CHP and district heating and where awareness exists it tends to be associated with poorly designed or maintained social housing projects from the 1970s. As such negative public perception of the technology and the mental association with “tenement tower blocks” is a considerable barrier.

From a developers point of view, initialization of CHP and district heating are only viable on large, dense schemes where the local authority or a private contractor is prepared to absorb a significant part of the considerable capital costs associated with establishing and maintaining these plant; or on smaller schemes where there is an existing district heating or CHP network to connect up to. A further barrier is that the concept of district heating is much simpler on developments like social housing where an RSL (registered social landlord) can be the “name” on the energy company bill as the logistics of making many individual
householders pay their share of a large, wider bill are very difficult and initial feedback indicates public resistance to this concept as the wider public do not wish to be held responsible for “others” who do not pay their share of a district bill.

It is generally acknowledged that CHP and district heating work best in very dense housing: high or low rise apartments. When calculating SAP ratings for a dwelling there is a considerable bias in favour of apartments and terraces for insulation calculations. This favours densification, as do PPG 3 and the drive towards remediation of brown fields sites (where remedial targets for an apartment building with hard standing may be considerably more achievable than those for residential with gardens). The difficulty faced by developers is that there is a traditional preference and aspiration in the UK for detached or semi-detached living. We have consulted with the HBF on this matter and this would appear to be a consensus opinion of HBF members. However we consider it likely that a knock on effect of the landfill directive will be an increased need for municipal incinerators, and it is likely that Local Authorities may prefer the choice of Energy from Waste (EFW) plants, which may also be used to provide district heating. For this reason and for reasons of general government policy we anticipate that more Local Authorities will be looking to incorporate some form of CHP or District Heating in their Local Plans, which leads us to anticipate that CHP or District Heating schemes may become integral in the pre-qualification processes in future for larger land parcels.

On a purely practical issue there can be issues with the heating company laying their distribution pipes under adoptable footways as they may not be/are not, statutory undertakers and therefore do not have the rights to do. This could be a significant barrier.

8. THE FUNDING AND CO-ORDINATION OF RESEARCH INTO ENERGY EFFICIENCY MEASURES IN THE DOMESTIC AND INDUSTRIAL SECTORS, AND HOW WELL RESEARCH IS TRANSFERRED INTO APPLICATIONS

George Wimpey UK has traditionally funded research internally (through funding research interests of our staff and through our Group R&D Manager) and from specialist consultants for particular applications, such as prototype modular housing, the results of which have been commercially sensitive. In the public domain we work closely with the HBF and BRE to push best practice in this area.

A degree of natural evolution in sustainable design/modern construction techniques has taken place at a local business level (eg the “Staiths”, GW North East/the “Metro”, GW West London) but it was decided that a more formal commitment to R&D was necessary, with the impetus coming all the way from Board Level.

On Group review of recent R&D research we established two things; firstly that there wasn’t much going on that we weren’t already aware of in terms of innovative build techniques, and secondly that experimentation with such techniques was risky and potentially very costly.

In order to minimise duplication of effort and the risk element we decided to promote group R&D through partnering with leading universities. We started a process of assessing the competencies of various Universities with a view to establishing a relationship; however the initial approach for the relationship we are now developing came from Professor Saffa Riffat (head of the “School of the Built Environment” at Nottingham University). It quickly became apparent that Nottingham stood head and shoulders above the vast majority of other universities in the UK in this area.

They are ranked no.1 in the UK for the study of Architecture and Building Technology, offering courses on Sustainable Development, Planning, Environmental Design, and Renewable Energy and Architecture. The School receives around 18 applicants per undergraduate place and has a student body of c700, including 50 research students and 43 MA students. Regional Directors and representatives of the UK Board visited the school on a couple of occasions and were impressed with the facilities and the quality of the research that is taking place there. They already have strong links with companies in the UK and overseas, including Pilkington, Baxi and others.

It was agreed that a sensible first step in a relationship with the University would be the sponsorship of a Lecturing post; having the benefit to George Wimpey UK of being a relatively safe/controllable and identifiable cost. It is a longer-term commitment to the University than a one-off project would be and is definitely viewed as the first step in an ongoing relationship. For example the school are keen for George Wimpey UK to be involved in the construction of a number of “Creative Energy Dwellings” on the University campus which would act as a working/living laboratory for the latest research.

To date, we have committed to the sponsorship of a Lectureship at the University for a minimum of two years. This will give us access to the pool of knowledge and cutting edge research. It will enable GWUK to contribute to the direction of the research and offers a potentially valuable conduit for new products into the market place, increasing their commercial viability.
From GWUK’s point of view key areas of research will be sustainable and renewable energy technologies as well as modern construction methods, innovative design etc.

Aside from this initiative at present we have internal working groups and commissioned external work in progress reviewing such diverse areas as the application of the EcoHomes standard to our build; and the feasibility of using solar panels on various developments. We have annual house type reviews that examine the components and whole of each house type for energy efficiency and review the SAP rating. Internally we share knowledge on our intranet and through specialists meetings.

18 November 2004

Memorandum by the Institute of Physics

The Institute of Physics is a leading international professional body and learned society, with over 37,000 members, which promotes the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied.

The Institute welcomes the opportunity to submit evidence to the House of Lords Science and Technology Sub-Committee II’s Inquiry into Energy Efficiency.

Energy Efficiency

The Institute wholeheartedly agrees with the Energy White Paper, *Our energy future—creating a low carbon economy*, that energy efficiency could play a major role in lowering carbon dioxide emissions, if the problem of waste in energy usage could be tackled with changes in the style and use of energy. Reducing energy demand by increasing energy efficiency may in the short-term appear to be a more viable option than the implementation of low carbon energy sources. There is a need for a step change in the manner in which we create and use energy and materials, in order to limit further catastrophic effects on the environment. However, it must be understood that such changes in energy usage will require a significant cultural change.

The Energy White Paper placed an emphasis on the implementation of a low energy culture, not just in the public and private sector, but also on households. With the public and private sector, regulation such as the EU emissions trading scheme, will be the main driver. But with households, it will be through public understanding, coupled with incentives and taxes. A low energy culture could be brought about by:

- Home improvements, including improved insulation.
- The usage of energy saving electrical appliances, including better insulated refrigerators.
- The usage of more efficient lighting.
- The usage of more efficient vehicles, such as hybrid vehicles, and a greater emphasis on the use of public transport, especially for local trips.
- The introduction of a general carbon tax, based on the quantity of carbon dioxide emitted per unit of energy supplied.
- The introduction of taxes (where there is a choice for the public) and subsidies (where there is not). Higher taxes, eg to discourage the usage of gas-guzzling 4x4 vehicles, and short-haul flights, and subsidies, eg for the substitution of light-emitting diodes for light bulbs, and for video conferencing technology to limit unnecessary short-haul flights.

The problem with most of the measures listed is that they require a large capital cost, although the returns over a lifetime are better. People tend to buy on capital rather than lifetime costs, thus, the Government needs to promote a change in thinking, coupled with changes in technology. In addition, the role of information technology needs to be developed further in energy efficiency, as it has an important role to play as a control method for the better use of energy. It must be noted, that measures towards reducing energy demand and promoting efficiency must recognise the particular needs of vulnerable citizens, such as, the poor and the elderly.

Carbon Tax

It has been suggested that a reduction in the use, and particularly wastage of energy could be brought about by the implementation of a general carbon tax. The carbon tax would be based on the quantity of carbon dioxide emitted per unit of energy supplied, and would be levied at source as a direct charge on the amount of carbon emitted per unit of energy supplied. This would result in higher prices to the consumer and a greater variety of supply (ie natural gas, renewables or fission), but would stimulate efficiency improvements and
reduce consumption. The revenue from the carbon tax would be used to fund R&D into low carbon energy sources and into measures for mitigating the effects of climate change. If a carbon tax was to be introduced in the foreseeable future, it would need to be well formulated and based on good scientific grounds.

**Energy Efficiency and Security**

Energy efficiency combined with diversity represents a key issue for energy security. Some in the energy policy area call this “optionality”. The essential point is that an efficient user dependent upon a single utility suffers as much as an inefficient user if the utility removes the supply. What the user seeking security actually needs is another option of supply that may be drawn upon in times of need. In the short term, efficiency of use will lead to greater capacity in the system and a decreased likelihood of a blackout. This will represent a short-term improvement in security. In the long term, however, suppliers would reduce capacity to meet demand and without oversight and regulation the short-term security benefit would be lost.

If the electricity supply were to be stratified according to “quality” (reliability) then there would be certain benefits for security of supply. Users who do not require high quality electricity would not be drawing upon the system in times of short-term supply difficulties as they do at present. Users who require very high quality electricity (such as silicon chip manufacturers or metal smelting operations) or reliable electricity (vulnerable old people with electric heating) could then be guaranteed the supplies they require. The key issue is how to achieve appropriate differential prices for quality differentiated electricity while protecting vulnerable consumers by proper regulation.

**Combined Heat and Power**

Combined heat and power (CHP) needs to play a more significant role in terms of increasing domestic and industrial energy efficiency, as CHP systems allow the on-site generation of energy, by converting low cost fuel (ie natural gas) into electricity, which is an efficient method of electricity generation. In addition, sophisticated heat recovery systems within the CHP collect the heat generated, which can be also used on site. CHP to date has been deployed in hospitals, high rise flats, hotels, sports centres etc, but further R&D is required to further improve efficiency, and the creation of an infrastructure necessary for distributing low-grade heat needs to be considered.

**Storage of Electricity**

One point that needs to be taken into consideration when discussing energy efficiency is the difficulty of storing electrical energy. On the large scale we have pumped storage schemes, such as the Dinorwig Power Station in North Wales; on the small scale we have batteries, which are heavy and expensive. The issue of storage is relevant in two areas: first, transport, for example electric motor cars, and second renewable energy sources, such as wind generation and solar power. Societies will expect electricity to be available at all times, irrespective of the weather. A major breakthrough in energy storage would help alleviate the problems associated with the storage of electrical energy. To enable this, greater R&D in battery related technology is needed.

**The Role of Physics**

Science and technology itself can be a major driver for change. For instance, developments in information technology, providing e-commerce and communications infrastructures, can alleviate pressures arising from the transport of people, documents and products. The invention of the jet engine transformed intercontinental travel; technological developments in clean vehicle technologies could transform the quality of life in our cities.

Physics provides energy efficiency solutions for the transport, building and construction industries to lower their carbon outputs, all of which are major carbon dioxide emitters. In particular, physics is playing a pivotal role in improving domestic insulation, the development of super-conducting power transmission cables for high current applications, the understanding of energy flows in structures, and the incorporation of renewable technologies into building design.

Environmental concerns have been driving the search for more energy-efficient lighting for offices and factories, which in the United States alone, consume a massive 15 per cent of electricity. Physicists are teaming up with lighting companies to find new lamps that emit more light and give off less heat. Light-emitting diodes could lead to electricity savings equivalent to the output of 25 power stations in the US alone if their many
technological hurdles can be overcome. Physicists have also been active in discovering a phosphor material that emits almost twice as many photons as it absorbs, which may lead to a new generation of highly efficient fluorescent lights and plasma displays that are also environmentally safe.

Supply of Scientists
Without a good supply of highly skilled and trained science graduates, especially physicists, being nurtured and supported, the UK could end up in the position of either having to import the skills needed to help create the much coveted low carbon society, or risk being left behind as its main competitor nations press ahead with the advancement of low carbon technologies. For instance, the UK has a world leading scientific community in the field of climatic and environmental modelling, which is predominately peopled with physicists, who can play a crucial role in influencing the international scientific community and through them, global behaviour. With the recent number of low entries to A-level physics and undergraduate physics degrees, coupled with university physics department closures, there is a genuine concern that the UK’s ability to provide the number and quality of physicists needed to help deal with the low carbon challenges that lie ahead, will be adversely affected.

Public Education
A key component in any policy that needs public support or attempts to influence human behaviour is the need to enhance the public’s understanding of science and technology. Individuals must be able to understand in a broader sense what terms like “global warming” mean and also comprehend the issues relating to matters such as energy efficiency. Only with such understanding are they likely to change their actions and behaviour in respect to the environment and climate, both directly and indirectly. It is essential that education and information in this area is provided in a co-ordinated way, spanning primary education through to the adult population. It is vital to include those involved in legislation in order to ensure that decisions are based on a proper understanding of the issues.

25 October 2004

Memorandum by the Institution of Electrical Engineers
The IEE’s 130,000 members are drawn from a broad range of engineering disciplines. The IEE’s membership represents a wide range of expertise from technical experts to business leaders. Many of the most experienced members of the IEE, and their sector peers, voluntarily participate in a variety of IEE policy guidance groups. To these groups they bring their wealth of personal experience and knowledge, independent of commercial interests, to address the policy issues of the day and give the IEE independent and authoritative views of trends in technology and engineering. This response has been prepared on behalf of the IEE Trustees by the Environment and Energy Policy Advisory Group. Input from the IEE Membership was requested in preparing this response.

The current inquiry seeks comments on the Government’s current policies on Energy Efficiency, and on any other practical steps necessary to achieve the Government’s targets. The IEE’s response addresses issues raised in the call for evidence where the IEE feels able to contribute to the consultation process.

Introduction
1. The IEE welcomes the opportunity to respond to the House of Lords Select Committee on Science and Technology (Sub-Committee ii) call for evidence on the Government’s policy on Energy Efficiency. We understand that the purpose of the inquiry is to assess policies already in place, and to examine other practical steps that might be taken to achieve the Government’s targets of CO₂ emission reductions by 2020 through improved energy efficiency measures.

2. The IEE welcomes the Government’s attention to energy efficiency as a means for reducing greenhouse gases, and recognises the urgency of the ultimate goal of creating a low carbon economy. As an institution devoted to the promotion of technology, the IEE has long recognised the technological potential for more efficient energy use. However, we also acknowledge that when it comes to achieving energy efficiency, technology is in many senses the easy part. What is less well understood is how this increasingly sophisticated technology can be best integrated into practice, whether in the home, in business or in the public sector. Furthermore, disentangling the relationship between energy efficiency, overall energy demand and greenhouse gas emissions on which current Government policy rests in itself a worthy endeavour.
**Main Points**

3. The IEE’s position on the issue of Energy Efficiency can be summarised as follows:

   — Energy efficiency is a very complex issue, which encompasses many sectors and many areas of expertise, and where the relationship between means and ends is not as straightforward as it may appear;

   — From a purely technical perspective many energy efficiency measures are possible; much of the technology to provide greater efficiency is already available; the question is how to adopt such measures, i.e. by information or regulation;

   — From a business perspective, although more expensive new energy efficient equipment may be cost effective measured in terms of capital recovery periods achievable through energy saving, initial capital costs tend to be a dominating factor in investment decisions that mitigates against an extensive take-up (energy efficient motors are an example);

   — The Government and the Public Sector have a role to play in encouraging more efficient energy use through regulation, incentives, information, and leading by example, e.g. by the use of energy efficient equipment, energy audits of public buildings and assessing their energy control systems;

   — There is a need for sensible and measurable standards for efficiency;

   — In order to maximise the efficiency of Government measures, care must be exercised in choosing appropriate policy vectors, effectively choosing the right tools for the right job; some confusion is evident in this respect in current policy proposals that could result in less than efficient use of resources.

4. The IEE has for some years maintained a Fact File on its website that provides simple advice on how consumers might benefit from more efficient energy use in the home.\(^{14}\) Below, we make some supporting observations and recommendations with reference to the role of energy suppliers, building standards and the wider context for energy efficiency policies.

**The Role of Energy Suppliers**

5. The proposed Energy Efficiency Commitment for suppliers due to be introduced by Defra in April 2005\(^ {15}\) will place the onus on energy suppliers for improvements in domestic energy efficiency, primarily through building improvements like insulation. The IEE believes that the most direct and cost effective way for energy suppliers to contribute to energy efficiency in both domestic and business settings would be through measures concerning the use of energy rather than improvements in building standards. These could be based on better engineering solutions enabling demand management, such as intelligent metering, improved telemetry and switching of a customer’s electricity load. Placement of an obligation on suppliers for research into such systems would be a better directed policy than obliging them to contribute to building standards over which they have little or no direct control.

6. In another example, the proposed amendments to Part L2 of the Building Regulations call for the installation and use of metering for the monitoring energy use for different services (heating, lighting, air conditioning, ventilation etc) in non-domestic buildings. However, the proposals for L2 give the requirement for submetering of energy consumption a supporting rather than a primary function in the legislation. Given the prohibitive cost of the equipment and software for automatic meter reading, it is feared that the ambiguity in the proposed legal framework will encourage designers to seek alternatives or avoid providing the facility where they can. Solutions that would alleviate the financial burden to the consumer could include metering by the energy provider (as adopted in California) or the development of cheaper software solutions.

7. Similarly, due to their direct involvement in energy use, providers would be a more effective vector of communication with the public on issues relating to energy efficiency, compared to direct government information campaigns. We would suggest that approved programmes designed to change consumer attitudes and behaviour could be made to form part of the suppliers’ commitment.

\(^{14}\) [http://www.iee.org/Policy/Areas/EnvEnergy/saveit.cfm](http://www.iee.org/Policy/Areas/EnvEnergy/saveit.cfm)

\(^{15}\) The IEE’s response to the consultation on the Energy Efficiency Commitment can be found at: [http://www.iee.org/Policy/submissions/annual.cfm?displaymethod=display_teaser&objectID=6FBBA19EF9A9-88F8-7EFFC8AD8BE45510](http://www.iee.org/Policy/submissions/annual.cfm?displaymethod=display_teaser&objectID=6FBBA19EF9A9-88F8-7EFFC8AD8BE45510)
Cost-Effectiveness in Building Standards

8. While there is almost unlimited opportunity for increasing the energy efficiency of buildings, their practical feasibility is restricted by the bounds of cost-effectiveness, reasonable practicality and user acceptance. Speculative risk is the major consideration of the building developer. In a business environment where every expenditure is a risk, capital investment and length of payback time are the defining parameters of that risk, and issues like running costs (including energy consumption) come lower down the scale of consideration. There may thus be a conflict of interest between the developer or the landlord and the tenant, as a result of which opportunities to incorporate energy-saving systems will be crowded out, if not actively designed out.

9. In the domestic housing market, an ageing building stock and a low demolition and replacement rates are combined with a high turnover of occupancy: a high proportion of dwellings likely to be inhabited in 2020 has already been constructed, with over a third dating to before 1935; however, the average occupancy of a house in the UK is seven years. On the one hand this means that there is little scope for large scale changes through new build; on the other hand, there is little incentive for occupants to invest in retrofitting existing building stock since their time horizons are generally shorter than the potential payoff period, and more obvious and attractive ways exist to increase value of a property (eg refitting the kitchen or bathroom).

10. In terms of setting efficiency standards for buildings, there exist instruments, statutory or otherwise, which can be adjusted to provide sensible measures of efficiency. BREEAM, the Building Regulations and the IEE Wiring Regulations are such standards. Requiring the application of such metrics could increase the flow of information and provide an incentive for improvement in standards.

Macro Concerns

11. In the previous sections we have discussed potential areas for energy efficient measures; however, we would like to close our submission by considering some of the wider issues of Energy Efficiency policies. From a broader perspective, it cannot be automatically assumed that an increase in energy efficiency at the microeconomic level, while leading to a reduction in energy demand at this level, translates into an aggregate reduction in energy demand at the macroeconomic level. Reduced energy intensity (the amount of energy consumed for each unit of GDP) has been achieved in recent decades in the UK and most of the developed world, indicating that there need not be a trade-off between energy savings and economic growth. Paradoxically, however, overall demand for energy has grown.

12. One key reason may be that consumers chose to “cash in” the savings on their energy bills to increase their comfort level by installing more electrical equipment (air conditioners, electronic goods). The same message was delivered by Scottish Power’s chief executive at a London lecture organised in 2003 by the New Statesman magazine, who noted that despite some £40 million spent on demand-side measures with respect to the company’s customers over the past ten years the demand for electrical energy had remained about the same, the savings being taken in increased comfort benefits.

13. The relationship between energy efficiency and CO₂ emissions is also debatable. In the UK, CO₂ emissions showed a decreasing trend over the 1980s and 1990s. However, this can be largely attributed to the power generation sector, where coal-fired power stations have been gradually displaced by combined cycle gas turbines (CCGT), and the more gradual decline of manufacturing and raw materials processing (eg steel).

14. These are larger issues that go beyond the engineering expertise of the IEE. However, we believe that they deserve close consideration in the context of an inquiry into the efficacy of government policy on Energy Efficiency.

15. In this and in other sectors the technical, economic, financial and institutional barriers to successful implementation of energy efficiency are many. The technical barriers include lack of information on either technology options or on benefits and costs, non-availability of suitable energy efficient equipment, sound technical advice and an inadequate availability of management skills to address energy saving, especially in small and medium size companies. Among economic barriers are energy pricing below economic costs, cost-plus pricing for certain manufactured goods and power utilities, and lack of market forces and accountability. Financial barriers include lack of domestic financing and lines of credit. Institutional barriers include organisational and regulatory disincentives, lack of effective agencies dealing with energy efficiency, bidding procedures, import restrictions, information gaps, and insufficient standards and codes.

16 This section summarises an argument pursued in an article by Professor Michael Laughton entitled “The Limits of Energy Efficiency” (Oxford Energy Forum, Issue 54, August 2003).


Memorandum by National Energy Action

Introduction
National Energy Action (NEA) welcomes the opportunity to submit evidence to the Science and Technology Committee to inform its inquiry into the Government’s policies on energy efficiency.

For more than 20 years NEA has been actively involved in the campaign to eradicate fuel poverty in the UK. Throughout this period the emphasis of our practical demonstration programmes, and the campaigning activity which advocates their wider replication, has been on improving standards of insulation and heating in properties occupied by those most at risk. We believe this to be the most cost-effective and environmentally sustainable solution to a widespread problem.

Whilst we understand the Committee’s interest in the contribution that energy efficiency can make to the achievement of CO₂ reduction targets the Energy White Paper gave equal priority to the objective of ensuring that “every home is adequately and affordably heated”. In NEA’s view it is particularly important that affordability is addressed as a matter of urgency if the poorest households are not to be further disadvantaged by pursuit of the environmental objectives of energy policy. That said, we acknowledge the unique potential for energy efficiency improvements to serve both a social and environmental objective, enabling some low-income households to enjoy increased comfort at lower cost, both to themselves and the wider environment.

The Sustainable Energy Act requires local authorities to prioritise fuel poverty within their energy efficiency programmes. NEA hopes that the Committee will also give due weight to the contribution that energy efficiency can make to the achievement of the Government’s fuel poverty reduction targets. Whilst the comments which follow reflect our concern that energy efficiency programmes to tackle fuel poverty should take precedence, we recognise that many of the issues identified by the Committee are generic to the domestic sector as a whole.

The Behavioural Aspects of Energy Efficiency Schemes—the Quantity and Quality of Information Available, Public Knowledge and Motivation

It is widely accepted that public awareness of the benefits of energy efficiency is negligible and that motivation, even among relatively well informed consumers, is weak. Consequently, the quality and availability of information is a minor concern. In fact most of the literature produced, by fuel supply companies, the Energy Saving Trust and others, is clear, helpful and attractively presented (although it mostly requires a fairly high degree of literacy).

It seems evident that few consumers enquire about energy efficiency per se. For example monitoring by Ofgem of calls to fuel suppliers indicates that of around 24 million households in GB only 110,000 enquirers were given verbal advice about energy efficiency in 2003. 200,000, some of whom will be the same people, received printed information. In both cases these figures were lower (by 18–25 per cent) than in the previous year. Only 10,000 people in 2003 were referred for grants to help them install energy efficiency improvements, despite the fact that all these enquirers, and indeed all consumers, are theoretically eligible for assistance via the fuel companies’ Energy Efficiency Commitment schemes. Only one enquirer in five was told about these schemes.

However there is some potential to adopt a more proactive role in promoting energy efficiency as a solution to the problems which consumers themselves identify. At least for those on low incomes these are much more likely to be expressed in terms of difficulty in paying bills or in keeping homes warm enough. NEA welcomes the research undertaken by Ofgem to try to sensitize fuel suppliers to the capacity for call centre staff to recognise such situations as opportunities to provide energy efficiency advice. Whilst there is some evidence of improvement in this regard Ofgem has concluded there is room for considerably more.

More generally we concur with the view expressed in the Government’s energy efficiency implementation plan (Energy Efficiency: The Government’s Plan for Action, Defra, April 2004) that strong Government action is needed, embracing leadership, awareness raising and education, coupled with strong support programmes. We would emphasise that such a campaign needs to be sustained over a long period. This has not always been the case hitherto. On occasions information campaigns have been hastily withdrawn to cater for other priorities (as when the “Are you doing your bit” information campaign was withdrawn to release resources to deal with foot and mouth disease). Similarly, budgets for successive domestic energy efficiency schemes, from the Homes Insulation Scheme of the 1970s to Warm Front today, have been characterised by a stop go approach.
Whatever the effort dedicated to raising awareness NEA believes this will largely be wasted unless prior attention is paid to simplifying the arrangements which apply to support programmes. We see no value in endeavouring to persuade consumers to take action if it is not subsequently a simple and straightforward process to do so. We outline below our view of how this might be best accomplished.

THE SCOPE AND INCENTIVES FOR IMPROVING ENERGY EFFICIENCY

NEA commends the thorough investigation of the potential savings from domestic sector energy efficiency improvement outlined in the energy efficiency implementation plan. However, we believe the real challenge will be in realising this potential given widespread public indifference. We are aware that even in the experimental Warm Zones, where systematic marketing techniques are deployed, including street by street approaches, and offers of free or substantially discounted improvements are made, as many as 20 per cent of householders refuse these offers or cannot be helped.

We have no reason to doubt the efficacy of the research undertaken by Government itself into the barriers to improving energy efficiency in the domestic sector and spelt out in both the Defra energy efficiency implementation plan and HM Treasury’s consultation on fiscal incentives to improve energy efficiency. These identify lack of information, apathy, the cost of improvements and disruption and inconvenience as the primary factors inhibiting action on the part of householders. We also acknowledge that, until the recent reversal of the trend, a decade of progressively declining fuel prices has also acted as a disincentive.

However, in NEA’s view the current institutional arrangements affecting energy efficiency programmes represent a further obstacle to be negotiated before these barriers can be overcome. The plethora of different schemes, each with varying qualifying criteria, offering a different range of measures, and sponsored by different private and public bodies, is seen as a source of confusion even by those with a professional interest in advising consumers about energy efficiency. NEA favours simplifying these arrangements by creating a single national programme. We consider that this would help to overcome barriers to take up of assistance and help to communicate a clear and straightforward message about the importance of saving energy.

Such a programme could be constructed by combining the resources from existing programmes, although we accept that additional money will have to be allocated to meet more challenging targets for CO2 reduction. Ideally, this programme should be funded by taxation, releasing fuel suppliers, and therefore their customers, from their current financial obligations. NEA sees this as more equitable, being based on ability to pay, but also as providing a clear indication of an important national priority. As a means of raising at least some of the resources required we support recent suggestions that a windfall tax be applied to the excess profits made by North Sea oil and gas production companies and to the proceeds of the sale of distribution networks.

The programme should be comprehensive in form, both as regards the measures it provides and its availability to all. Following the precedent of the Homes Insulation Scheme (the original domestic energy efficiency programme) it should offer grants to all households that can benefit. Costs should be met in full for those on low incomes with a taper being applied to determine the level of household contribution expected from those who are more affluent. NEA believes that universal entitlement is likely to maximise take up and avoid some of the difficulties in marketing programmes exclusively for poorer households.

The objective of the programme should be to make homes as energy efficient as possible using technically feasible and cost-effective measures and setting a target energy rating of SAP 70—the approximate equivalent of current Building Regulations. It should apply to both owner occupiers and tenants.

We believe that it is desirable to focus on properties with the lowest SAP ratings in the initial marketing of the scheme since this will go some way to identifying those households at greatest risk of fuel poverty. We also believe that the programme should be able to explore the potential benefits of renewable sources of energy, domestic CHP and other measures to solve the particular problems of homes which are hard to heat economically because they are not connected to the mains gas network or because the construction type precludes the most common and cost effective insulation measures.

THE POTENTIAL FOR TECHNOLOGICAL IMPROVEMENTS TO THE ENERGY EFFICIENCY OF BUILDINGS

The energy efficiency implementation plan focuses on the most cost effective improvement measures using proven technologies. Clearly this is to be commended, particularly since the costs of these measures will be borne by consumers themselves, including those who currently have the greatest difficulty in paying for fuel. However NEA believes that it is neither sufficient nor equitable.
The measures proposed will provide substantial benefits to those households living in homes with cavity walls, accessible lofts and gas-fired central heating. Those living in older, less energy efficient properties, disproportionately the poorest individuals and families, and those without access to gas will be disadvantaged by this approach. Almost 45 per cent of those in fuel poverty in England live in homes without cavity walls. 36 per cent have no boiler to upgrade. Close to a quarter have no central heating at all. We acknowledge that the UK Fuel Poverty Strategy commits the Government to the eradication of fuel poverty in England, as far as reasonably practicable, by 2016. Some action will need to be taken to tackle such circumstances at some point. We see no justification for these fuel poor households being placed at the back of the queue, behind their more affluent counterparts in more modern properties. It is particularly disappointing that the implementation plan acknowledges these deficiencies but effectively postpones any decisions, declaring these to be issues to be tackled post 2010. Since these concerns have been evident for some considerable time, and were acknowledged in the 2001 UK Fuel Poverty Strategy, we believe that policy should be going further and faster to provide remedies than is evidently the case.

Accordingly NEA believes that the anticipated portfolio of energy efficiency measures in the implementation plan should be extended, embracing both existing, if expensive, measures such as solid wall insulation and new technologies such as heat pumps, micro CHP and roof mounted wind turbines and solar panels. We note that the implementation plan refers to current small-scale programmes to support some of these renewable options, but without indicating any intention to make any of these measures mainstream. Whilst the need to pilot those which are new and experimental in the domestic sector is not in doubt, we believe that tried and tested technology should be on the menu of energy efficiency improvements available via schemes such as Warm Front and EEC.

THE DEVELOPMENT AND PROMOTION OF ENERGY-EFFICIENT CONSUMER GOODS

NEA welcomes the progress made in improving the energy efficiency of household appliances by the combination of regulation and labelling. We support measures to build on the success of the Market Transformation Programme. However we believe that there are additional measures which could usefully be taken to enable people with lower incomes to benefit from the lower running costs of A rated appliances.

Low-income households commonly have the oldest and least efficient appliances and there are obviously financial constraints affecting replacement which do not apply to those who are more affluent. At worst this means buying second hand goods which do not meet modern efficiency requirements and may not comply with contemporary safety standards. The Fridgesavers scheme, providing A rated cold appliances at a modest cost to households in receipt of welfare benefits, is a good example of an innovative response, particularly in view of its links to the Warm Front programme. This was initially a national scheme, managed by the Energy Saving Trust on behalf of all fuel suppliers. NEA regrets that it has become a discretionary programme following the introduction of EEC. Our understanding is that some, but not all, suppliers continue to offer this scheme.

We believe a similar approach could be usefully applied in the case of the Social Fund, administered by the Department of Work and Pensions. Many thousands of claimants (sadly the Secretary of State’s Annual Report no longer reveals how many) apply for grants and loans to fund the purchase of essential household items such as cookers, washing machines and fridges. We think these claimants should at the very least receive information about appliance efficiency to assist their choice of product. Ideally the DWP could collaborate with fuel suppliers’ EEC programmes to offer low cost A rated appliances, or establish its own procurement scheme.

THE FUNDING AND CO-ORDINATION OF RESEARCH

NEA welcomes the recent establishment of a UK Energy Research Centre. We hope that this will lead to better coordination of a previously disparate and diffuse area of research activity. However the relationship between the UKERC and the Towards a Sustainable Energy Economy programme of which it is a part (itself sponsored by three different research councils) remains unclear. We would have expected an Energy Research Centre to co-ordinate all research activity in this field. As we understand current plans, more than half the research funds available will support research that is independent of the UKERC, albeit intended to be complementary. This seems to us an unduly complex set of arrangements.

We also have some concerns that the agenda for future research will be dominated by supply side concerns such as hydrogen fuel cells, renewable generation and the future of nuclear power, to the neglect of energy efficiency in general and fuel poverty in particular. NEA has proposed the establishment of a centre of excellence for fuel poverty research but we are not optimistic that this will attract support from existing
research councils. Since energy efficiency improvements are the cheapest, easiest and cleanest solution to both social and environmental problems, as the Energy White Paper acknowledges, we think it will be a missed opportunity if research fails to focus on the practical issues inhibiting their wider take-up.

October 2004

Memorandum by the National Energy Foundation

1. The National Energy Foundation is a leading educational charity working to promote the better use of energy, and welcomes the opportunity to submit evidence to the above inquiry.

2. Firstly, we welcome both the Government Energy White Paper dated February 2003, and the Plan for Action dated April 2004, which we believe provides a firm basis on which to plan for medium and long term reduction in carbon dioxide emissions.

3. The comments we wish to make relate entirely to energy efficiency in the non-domestic sector, ie business and the public authorities, and are based on the Foundation’s experience over the last seven years in managing, and financially supporting, the Energy Efficiency Accreditation Scheme. This Scheme is accepted as the national benchmark standard in energy efficiency. It enables achievement in the use and management of energy to be recognised through a highly regarded award from the Energy Institute. Over 200 organisations have gained the award since its introduction in 1993. They include leading organisations in finance, retail, commerce and industry, central and local government, NHS Trusts, Universities, and hotels, catering and leisure. As well as those accredited, we have a database containing some 2,500 organisations that have expressed interest in the Scheme. We are at present in the final stages of arranging for the Scheme to be taken over by the Carbon Trust, with the Foundation remaining as managers.

4. Our principal observation relates to the amount of dedicated effort being made in this sector to the management of energy. It has fallen drastically in the past 10 to 15 years. The main reasons for this have been the fall in the price of energy in real terms and the introduction of competitive energy markets. It has been easier to contain or reduce energy costs by shopping around to find the cheapest supplier than by improving energy efficiency. In consequence the effort given to the management of energy has been reduced and in many cases completely neglected. Reduced demand for energy management in the sector has inevitably led to a fall in the number of those practising it as a specialty. It would be surprising if the number of individuals with the job title of Energy Manager is more than a tenth of the number in the late 1980s, when it was claimed that there were over 5000 Energy Managers in the country. With increased interest in water and waste management and other environmental requirements, responsibility for these has often passed to the Energy Manager, with consequent dilution of the time given to managing energy.

5. As can be seen from (3) above, organisations from all the main categories of energy use have gained accreditation in the Scheme. Some use energy intensively, and its efficient management is essential for the business to survive and prosper; for others energy is a relatively small expense, and its efficient use is recognised as part of good management practice. If there is something in common to all who manage energy well, it is firm commitment from senior management.

Because of the importance of a lead from the top we like the principle of the Government’s “Making a Corporate Commitment” campaign launched in the early 1990s, to which some 2,000 Chief Executives signed up, although it was not followed up sufficiently rigorously to ensure that commitments given to improve energy management were honoured.

6. Whilst every category of use has examples of outstandingly good energy management, it must be said that these are usually a small minority and well outnumbered by those who fall far below these standards. There are still many sizeable users who do not even know what their energy bill is, and with no-one who has responsibility for its management.

7. In 1990 the Audit Commission produced an Occasional Paper, “Cutting Energy Consumption in Local Government”. It contained recommendations that authorities should have one full time member of staff managing energy for every £1 million of energy expenditure, and should invest about 10 per cent of their energy expenditure each year in energy efficiency measures. These criteria were found by the energy efficiency industry to be generally applicable to the use of energy in buildings, and came to be recognised as standard yardsticks. They are still valid, but in our experience are very rarely achieved.

8. What is to be done?

(a) We believe an essential requirement is to increase the amount of effort specifically dedicated to energy management in the sector. This will take time because as indicated many energy managers now have additional responsibilities and those working solely in this field as consultants currently have plenty of work. However the job of Energy Manager is generally considered to be satisfying, and if better career
opportunities are seen to be available it should not prove difficult to attract people into it. A reasonable target might be to restore the number of Energy Managers back to the 1990 figure of 5,000 within, say, 10 years.

(b) We believe that active encouragement should be given to allocating effort to energy management based on the Audit Commission yardsticks referred to above. This will stimulate demand for Energy Managers.

(c) The evidence is that whilst advertising campaigns and incentives have a part to play, many—and in some categories of use the majority—of organisations will do little or nothing about energy management if this remains an option. We suggest some form of direct government intervention will be needed if the targets for carbon reduction set for the sector are to be met. There is current debate about how the Energy in Buildings Directive should be implemented in the non-domestic sector, and we suggest the Directive provides an outstanding opportunity to make those responsible for buildings aware that they have a legal obligation to take an active interest in, and report on, the management of energy within the building.

Memorandum by Ofgem

INTRODUCTION

1. Ofgem welcomes the opportunity to provide evidence to the Lords’ Science and Technology Committee for its energy efficiency inquiry. The Government has ambitious targets for the improvement in energy efficiency across the economy and it is important that such changes are used to stimulate economic growth through the more efficient use of resources.

2. Ofgem considers that well functioning markets will be the most efficient way to deliver the Government’s objectives of curbing and then reducing carbon emissions. Ofgem therefore strongly supports the use of market-based instruments, such as emissions trading, to reduce carbon emissions. However, Ofgem recognises that there are energy efficiency measures at the domestic level with very short pay-back periods which have not been taken up and acknowledges that for this reason the Government has set up schemes to encourage consumers to be more energy efficient. It is important that both the Emissions Trading Scheme and the downstream energy efficiency programmes operate within a coherent regulatory framework so that investments that have already been made to comply with one set environmental legislation are not undermined or stranded by another.

3. Ofgem’s work in the energy efficiency field covers a number of aspects. Ofgem, through statute, is required to administer the Government’s Energy Efficiency Commitment (EEC) programme that requires gas and electricity suppliers to improve the energy efficiency of domestic consumers. Ofgem also, through a licence obligation, requires the suppliers to provide an energy efficiency helpline for all consumers, domestic and non-domestic. This allows consumers to call their supplier for advice on how to cut their energy consumption.

4. In other areas of Ofgem’s work we are mindful of the benefits reduced distribution losses on the networks can bring. To this end, distribution companies in their price controls have an incentive to improve the energy efficiency of their networks. This allows the companies to earn increased revenue for improving the efficiency of the distribution networks.

5. Ofgem has detailed knowledge of administering and setting up domestic energy efficiency programmes having initiated the first Energy Efficiency Standards of Performance which required electricity suppliers to meet a domestic electricity saving target. The responsibility for setting the overall target now rests with the Government, but Ofgem continues to have the responsibility for administering the current Energy Efficiency Commitment. This programme requires gas and electricity suppliers, through a licence obligation, to promote energy efficient products to consumers. Ofgem’s ultimate sanction for failure to comply with such an obligation is to impose a financial penalty.

6. The current programme is expected to lead to a 1 per cent reduction in carbon emissions from households and cost nearly £500 million over the three years from 2002 to 2005. The second EEC will roughly double in size but is expected to cost roughly £1.200 million. These are considerable investments and have significant implications for gas and electricity consumers.

7. Provided below are our detailed comments on each of the questions provided in the call for evidence.
THE MOST APPROPRIATE MEASURE OF ENERGY EFFICIENCY, AND THE RELATIONSHIP BETWEEN IMPROVEMENTS IN ENERGY EFFICIENCY AND OVERALL ENERGY USE AND CARBON EMISSIONS

8. There are two main policy drivers behind the Government’s push to improve the energy efficiency of the domestic sector. The first is to reduce energy consumption, and consequently abate carbon emissions, while the second is to alleviate fuel poverty through making it cheaper to keep homes warm. Ofgem considers that for the Government programmes to operate effectively they need to send the correct signal to the market. It is therefore important for the programmes to be measured in the units of their objective: that is if the programme is being designed to reduce carbon emissions the activity being promoted should be measured in units of carbon abated and similarly if the programme is intended to reduce the numbers of those in fuel poverty then the success of the programme should be measured by the numbers taken out of fuel poverty. Neither the Warm Front programme or the EEC are measured in such a way and we consider, consequently, that their effectiveness for helping the Government meet its targets would be improved if this change were made.

9. With respect to the relationship between carbon savings and energy savings, it is particularly important to take consumer reaction into consideration. Defra have the lead in monitoring the outcomes from energy efficiency programmes. Evidence from the monitoring activity that has been carried out under the energy efficiency programmes suggests that more than half of the anticipated energy savings from insulation are not being realised. The reasons behind this are still being investigated, but it is expected that some will be a result of consumers using the insulation to keep their homes warmer rather than save energy. However, it is notable that for other products, like cold appliances, there is no scope for the consumer to undermine the energy savings that are realised. As a consequence measuring schemes on an actual carbon saved basis as opposed to an anticipated energy saved basis could lead to considerably different signal to markets about the suitability of the measures to promote.

10. It is also important to note that measuring energy efficiency programmes in terms of either carbon savings or energy saving will reduce the carbon/energy intensity of the economy. However, if the baseline is increasing, it might not necessarily lead to an absolute reduction in carbon emissions. This is an important distinction to make especially given the scale of the carbon reduction target that has been proposed by the Government.

THE BEHAVIOURAL ASPECTS OF ENERGY EFFICIENCY SCHEMES—THE QUANTITY AND QUALITY OF INFORMATION AVAILABLE ON ENERGY EFFICIENCY, AND WHETHER THE PUBLIC IS SUFFICIENTLY KNOWLEDGEABLE AND MOTIVATED TO ACHIEVE ENERGY SAVINGS

11. In the area of household energy use there is evidence that less investment is made in improving household energy efficiency than might be expected on the basis of reduced energy costs following investment in energy efficiency. This suggests that the consumer is neither sufficiently knowledgeable about the energy savings that it is possible to make through investing in energy efficiency measures nor motivated enough. However, it is likely that, in effect, there are several barriers; whether it is because the consumer has to make an investment at all, whether low income consumers have little access to capital, although a large number would be eligible for free measures, or whether there other reasons such as the financial saving available for some is too small to consider worthwhile. Breaking down these barriers will be important if the Government is to meet its energy efficiency targets.

THE SCOPE AND INCENTIVES FOR IMPROVING ENERGY EFFICIENCY, AND REDUCING WASTE, ACROSS THE ECONOMY, IN BOTH PRIVATE AND PUBLIC SECTORS

12. Suppliers have been effective in meeting their energy efficiency targets and demonstrated that they are in a good position to market energy efficiency measures to the domestic sector. Since 1994 the suppliers have met and exceeded their energy efficiency targets, and the experience from the current programme suggests that all the solvent suppliers will meet their targets. Suppliers meet their EEC targets by setting up schemes. These schemes tend to take the form of promoting energy efficient products and these are available for consumers in owner-occupier, private rented and social housing sectors. The table below provides our estimates of the measures likely to be installed by the suppliers in the current EEC programme.
### The Potential for Technological Improvements to the Energy Efficiency of New and Existing Buildings, and How these should be Implemented

13. The majority of the measures that the suppliers use to meet their current EEC targets are mature and have been available for some time, although some suppliers have brought forward innovative technologies. These have varied from improving the efficiency of appliances that draw low levels of power to new heating measures.

14. It was suggested in Defra’s EEC consultation document that DCHP should be supported through an incentive. Ofgem is against the use of incentives in the EEC as they distort the energy savings that suppliers are accredited with and prevent the market from finding the most efficient outcome. In addition, Ofgem does not consider it appropriate that consumers’ money, through the EEC, should be used to subsidise the R&D of innovative technologies, particularly those that have still to be proven to save energy, while some consumers remain in fuel poverty. If R&D is to be supported by the Government, Ofgem considers that this is better funded through general taxation.

### The Development and Promotion of Energy-Efficient Consumer Goods

15. Under the current EEC programme supplier activity has led to a considerable transformation of the cold and wet appliance markets: now most products sold are A-rated, the most efficient until a recent change in the classification. With respect to new consumer goods coming onto the market, such as brown goods and set-top boxes, there appears to be little attention to their energy consuming performance. The risk of this is that manufacturers, looking to minimise their costs, give little regard to the efficiency of each product. While each product in itself might only use a small amount of energy, the large volumes sold could undermine the progress that has been made by the energy efficiency schemes to date. It is therefore Ofgem’s opinion that where the design can be made more efficient for little or no cost the Government should be working with the manufacturers and trying to set up voluntary agreements to ensure that these products do not lead to large amounts of energy being wasted.

### Innovative Schemes to Use District Heating or Combined Heat and Power in Order to Reduce Overall Energy Demand

16. All measures that the suppliers can demonstrate save energy are eligible for accreditation under the EEC programme. Some suppliers have promoted district heating or combined heat and power to reduce overall energy demand. However, the cost of these schemes tends to be relatively high and consequently suppliers do not favour them over other forms of activity.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Total number of measures expected to be installed during the EEC (Priority Group)</th>
<th>Total number of measures expected to be installed during the EEC (non-Priority Group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loft insulation (empty loft)</td>
<td>34,200</td>
<td>18,300</td>
</tr>
<tr>
<td>Loft insulation (top up)</td>
<td>277,000</td>
<td>185,000</td>
</tr>
<tr>
<td>DIY loft insulation</td>
<td>53,400</td>
<td>402,000</td>
</tr>
<tr>
<td>Cavity wall insulation</td>
<td>411,000</td>
<td>333,000</td>
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<tr>
<td>Other insulation</td>
<td>318,000</td>
<td>447,000</td>
</tr>
<tr>
<td>Replacement boilers</td>
<td>79,200</td>
<td>126,000</td>
</tr>
<tr>
<td>Replacement boilers with heating controls</td>
<td>34,700</td>
<td>125,000</td>
</tr>
<tr>
<td>Heating controls upgrade only</td>
<td>18,200</td>
<td>122,000</td>
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<td>Fuel switching</td>
<td>12,600</td>
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<tr>
<td>Other heating</td>
<td>1,800</td>
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<td>CFLs (direct)</td>
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</tr>
<tr>
<td>Cold &amp; wet appliances</td>
<td>916,000</td>
<td>4,240,000</td>
</tr>
</tbody>
</table>
17. It should also be noted that district heating schemes (not those that produce electricity) are not always the most efficient system for households. The minimum efficiency for most boilers to be installed post April 2005 is expected to be higher than 86 per cent, an efficiency most district heating systems, from the evidence we have from supplier activity, would struggle to match. Where carbon savings could be made are in the systems which are run on biomass, although some concern has been expressed about these systems and the amount of non-renewable energy that is used in the collection and transportation of the fuel.

Energy Services

18. Energy Services are often described as the provision of the services households demand through the supply of gas and electricity and are often seen as one way to overcome consumers’ apathy to invest in energy efficient products. To a limited extent there is already a market for energy services in the non-domestic market. By contrast energy services have, so far, been little developed in the domestic market. Ofgem has established a trial to test whether, without the 28-day rule on customer switching, there will be greater demand for household energy services.

Memorandum by the Planning Officers’ Society and Local Government Association

1. Introduction

1.1 The Planning Officers Society (POS) represents the most senior professionals and managers of planning authorities in the English Local Authorities. The Society aims to ensure that planning makes a major contribution to achieving sustainable development from the national to the local level, in ways which are fair, equitable and achieve the social, economic and environmental aspirations of the community.

1.2 The POS, in conjunction with the LGA, makes the following comments on the issues being considered by this Inquiry as follows.

2. Appropriate Measure of Energy Efficiency

2.1 The POS and LGA welcome the review of the Building Regulations Part L which will further raise standards of both new build and refurbishment and drive up performance in relation to energy conservation and the early review of the Regulations is to be applauded.

2.2 However, building regulations need to make a step change to achieve the level of energy efficiency in buildings enjoyed by many European countries especially in terms of availability and installation of energy efficiency technology.

2.3 If building regulations are to help deliver energy conservation they must have an explicit and mandatory role in delivering Government White Paper targets to reduce CO₂ emissions and to achieve the targets to reduce pollution set by the Royal Commission on Environmental Pollution.

2.4 The Government needs to enforce higher building standards, particularly those of BREEAM and Eco-homes as developed by the Building Research Establishment. To this end, a quality mark scheme should be developed to require new buildings to be zero CO₂ rated and a list of Eco-homes and BREEAM standard contractors publicised. This process could be started by requiring all publicly funded developments—through public/private partnerships or direct grants to private industry—to build these standards as a minimum.

2.5 Many local authorities are currently seeking improved energy performance for developments through negotiation/use of supplementary policy, etc. However, in the absence of regulation or more direct incentives, this will only affect a small proportion of development where developer interests coincide with those of the local authority. The Government should therefore seek to implement a cost-effective solution to the enforcement of both Building Regulations and the Energy Performance of the Buildings Directive to ensure compliance.

3. Public Knowledge of Energy Efficiency

3.1 There is a real and urgent need to raise awareness across a wide spectrum of stakeholders as well as the general public about the usage of energy and the real benefits of energy efficiency. For many energy is relatively cheap and there are no obvious short-term benefits to be realised. The multiple benefits of energy efficiency need to be explained together with the longer term national and international benefits. This may mean that there is a need for a range of different “messages” to be marketed to targeted audiences (e.g. affordable warmth, global warming, security of supply, business competitiveness and property marketing).
3.2 The link between climate change and energy efficiency should be emphasised more effectively to both consumers and the construction industry. The carbon index, currently established through the SAP rating mechanism is therefore the most appropriate measure of energy efficiency.

4. IMPROVING ENERGY EFFICIENCY INCENTIVES

4.1 The POS/LGA concur that in order to achieve the step change in energy efficiency identified in the Energy White Paper, behavioural change needs to be addressed and we support the Government’s multi-dimensional approach. In order to deliver such change, all Government agencies charged with facilitating change need to draw more extensively on front-line experience through the initiation of a two-way dialogue with local authorities, installers, retailers and manufacturers. Policy makers, activists, corporate executives, educationalists, environmental professionals and others often make assumptions about behaviour and use these assumptions to explain why people act in a particular way. Funding for research into how to change environmentally significant behaviour is therefore critical in ensuring programmes achieve their anticipated outcomes.

4.2 A number of local planning authorities are already developing planning policies related to energy efficiency in design and construction. This energy policy making needs support and dissemination. Until this happens through the new planning system (LDFs), the local planning authorities will not have substantial policies on energy to compel developers. The changes to the planning system currently taking place will necessarily put a time lag into the process of policy formulation. Government Offices for the Region need to actively support such policy development, including target setting negotiated in consultation with local authorities.

4.3 The Government intends to increase the level of activity for Energy Efficiency Commitment (EEC). We agree that this is the most effective vehicle for improvement in energy efficiency and carbon reduction in the domestic sector. The LGA welcomes the proposal for the continuation of suppliers being required to achieve at least 50% per cent of their energy savings from the “Priority Group”. To this end, the LGA does not see the need or justification for the recent proposal from Defra for removing those in receipt only of disability benefits as opposed to income related benefits. Suppliers are currently finding difficulty in meeting the Priority Group targets and to remove those in receipt only of disability benefits would seem counter-productive for social, economic and environmental reasons. Regarding the practical options for improved interaction with EEC and Warm Front, to date, the scheme has been based on the optional involvement of energy companies with local authorities and there has therefore been a lack of co-ordination with other initiatives such as the Warm Front fuel poverty programme or initiatives of local authorities in the same area at the same time. This has led to competition and confusion on occasions. Better focus on resources will be achieved when consultation is made a principle of the scheme and when resources can be combined and targeted at all homes in each area. Without this, many gaps will remain in the delivery of energy efficiency in the domestic sector and these will become increasingly expensive to tackle retrospectively.

4.4 The failure to undertake energy rating of existing dwellings under the Government WarmFront Fuel Poverty Programme has created a situation where there is no real proof of benefits to the tenant or owner of the house that the energy efficient improvements will lead to affordable running costs. Examples can be provided. We also have to get energy rating into refurbishment and assessment models done as good practice.

4.5 There is a need for more research at the local level to assist local practitioners to address energy efficiency. Such research should address the effectiveness to date with the EEC.

4.6 The Government will need to consider carefully the problem of hard to heat housing, ie housing with solid walls and those with no access to the gas network. Improving energy efficiency in these homes has implications for a number of key policy areas of social and economic regeneration, including:

— Climate Change (mitigation against further climate change).
— Health.

4.7 It is unlikely that the Government will be able to achieve its targets in these key areas without addressing the issue of hard to heat housing. Consideration should be given to consultation with Ofgem on how these measures may best be incentivised through EEC.

4.8 Hard to treat homes is a major factor for social housing as well as the private sector. The key problem with many homes is that even when they are sealed, the ventilation issues are not dealt with and heat recovery systems are not installed. Without the correct ventilations many homes improved under energy efficiency
suffer from increased condensation and mould growth. This is also true of the warmfront programme which has no provision for adequate ventilation including heat recovery fans. Leicester City have been installing heat recovery systems since 1994 (City Challenge Programme case study available). This is not new technology.

5. Potential for Technology Improvements

5.1 Planning practitioners need help to develop their technical knowledge on what technologies there are, how they work, the suitability for application, procurement and delivery, the relative costs/benefits and after management options.

5.2 Cutting edge technology already exists throughout the EU in terms of energy efficiency goods and products, but in the UK we are suffering from a construction skills shortage and a lack of public knowledge about available options. Most of the retro-fitting of energy efficient goods is therefore installer-led and based on previous practise. As domestic householders are not aware of the latest technology available to them, there is also little demand to achieve change from the customer perspective. The current nation-wide skills shortage exacerbates the problem of a low quality of energy efficient housing stock. As building standards require a step-change to reach the highest standards for maximum reduction of CO₂ emissions the Government urgently needs to address the problem of skills shortages and inadequate training and focus on aspects that will deliver energy efficiency quickly and effectively.


6.1 There is a real opportunity to help the consumer choose energy efficiency when purchasing goods ranging from new homes to white goods. Whilst energy efficiency is not marketed, this means that energy efficiency in construction and design is not considered an essential element. This needs to change.

6.2 The promotion and take-up of these goods by consumers can be stimulated at a national level through various means of environmental fiscal reform. The LGA supports the increased introduction of financial incentives: there needs to be a much greater use of environmental taxes or levies raised on unsustainable energy activities in order to encourage and fund sustainable alternatives where practical. To this end the LGA has supported in the past, the introduction of measures to promote and motivate energy efficiency and energy saving, as outlined by the Association for Conservation of Energy (ACE) in its submission to the Government’s past consultation on Economic Instruments to Improve Household Energy Efficiency. With evidence gathered from 108 local authorities, the measures suggested by ACE included:

- Reduced VAT to 5 per cent for the supply and installation of energy efficient products or materials in non-grant schemes when householders employ contractors.
- Capital allowances and 100 per cent first year enhanced capital allowances for companies eg Energy Service providers, who invest in energy-saving equipment to lease to social landlords and households.
- A “domestic business tax allowance” allowing private landlords to claim investment in energy-saving materials against profits.
- A stamp duty rebate for house purchasers who make energy efficiency improvements to their home within six months to a year, for example.
- A tax allowance for companies training installers of energy-saving equipment.
- Greater use of energy labelling for homes would help to raise public awareness and to incentivise demand for improved energy performance in residential stock.

7. Combined Heat & Power Schemes

7.1 The context for the importance of establishing CHP as the balance of imports and exports in energy is set to change dramatically in the coming years. As the UK’s oil and gas supplies decrease, we will no longer be a net energy exporter, but become a net importer of energy. It is estimated that by 2020 the UK will be importing about three-quarters of its primary energy needs, (Energy White Paper, February 2003) unless we effectively and urgently invest in and achieve a diverse, decentralised mix of energy generation, including renewables and CHP. Local authorities can ensure that micro CHP and renewables are further promoted and developed in new build through development control, but will need targeted support, advice and information including improved incentives for developers to consider CHP.
7.2 Generally speaking, government programmes include action programmes and milestones which do not correspond with broader government targets as set out in the Energy White Paper. For example, Community Energy funding for promoting district heating and CHP only runs until 2006. This inconsistency sends the wrong message and in itself is not sustainable.

7.3 The time it takes to design a scheme or implement a scheme needs to be taken into account. Many government schemes in the past have been time related and this creates major pressures and burdens to meet what in many cases is unrealistic time scales. (Carbon Trust LAEF Project came out in December 2003 just before Christmas with a very short bidding period).

7.4 Many scheme pilots have already proven what works and how to do it, but there are no programmes that are just about replication of good practice. This is what is needed. Proven ideas and technologies with handholding and expertise to implement at local level.

7.5 All programmes need to correspond with government targets to encourage local authorities and the private sector to make investment in local actions.

7.6 Current national programmes simply amount to a “cherry picking” approach—resources for pilots need to be directed to mainstream programmes which enable action and progress towards national targets to become widespread and to gain economies of scale.

7.7 There should also be encouragement for other agencies to be involved like EEACS, and Energy Agencies, also utilise the energy networks in Europe like Energie Cite and FEDERENE.

7.8 With regard to local authority procurement and CHP, currently each individual local authority has to spend limited time and resources procuring a small Solar PV or Solar Thermal panel when collectively a national scheme could procure a long term contract which could be called down by local authorities as their refurbishment or building programme allow. The saving of local authorities’ resources would be significant, such as officer time spent responding to calls for tender and the legal issues of contracting with the supplier. This process can be used for boilers, CHPs, heat pumps, heat recovery, in fact there would be no limit. But the freedom for local authorities and community-based schemes would result in significant increase in local schemes. The industry could also gear up based on a long-term contracts and this would be reflected in lower prices: a national procurement facility for anything that features on the enhanced capital allowance list should be established.

8. Funding and Co-ordination of Research

8.1 Research into energy efficiency needs to emphasise the practical outcomes so that professionals and practitioners have access to a wide range of best practice and advice.

8.2 In its sustainable energy policy document, the LGA supports the need for independent research, measurement and monitoring of progress against national policies: there is a need for independent monitoring of the level of penetration of national programmes, and supporting evidence such as energy consumption data in the local authority’s area, to inform subsequent policy decisions.

8.3 Leicester City Council are carrying out research at the moment through the EST Innovation Programme to investigate how to finance large scale town wide or city wide implementation of energy efficiency measures. We call this “Just In Time Funding” as most of the schemes available to local authorities requires the identification of match funding in real terms. This research will be available in December 2004 but already it has highlighted the complications of local authorities using the Prudent Borrowing. What needs to happen is a clear strategy be set out for guidance on financing for local authorities with regard to energy efficiency improvements.

8.4 Good guidance exists on “Invest to Save” (GPG 312) this needs to be disseminated better in the form of training and awareness raising as it clearly demonstrates how the whole life costing works and the benefits to local authorities taking a long term view of the benefits of correct procurement and getting it right.

8.5 Procurement is one of the most powerful tools to energy efficiency. Public Authorities must utilise the opportunity to procure the right product at the right time for meeting the needs of energy efficiency and carbon savings. This submission has mentioned national procurement but awareness needs to be raised of how to procure correctly for energy and energy efficiency.
Memorandum by Research Councils UK (RCUK)

INTRODUCTION

1. Research Councils UK (RCUK) is a strategic partnership that champions the research supported by the seven UK Research Councils. Through RCUK the Research Councils together with the Arts and Humanities Research Board (AHRB) are creating a common framework for research, training and knowledge transfer.

2. This memorandum is submitted by Research Councils UK on behalf of four of the Research Councils, and represents our independent views. It does not include or necessarily reflect the views of the Office of Science and Technology (OST). RCUK welcomes the opportunity to respond to this inquiry from the House of Lords Science and Technology Committee.

3. This memorandum provides evidence from RCUK in response to each of the questions outlined in the inquiry, in addition to supplementary views from each Research Council:

   - Council for the Central Laboratory of the Research Councils (CCLRC) — Annex 1
   - Engineering and Physical Sciences Research Council (EPSRC) — Annex 2
   - Economic and Social Research Council (ESRC) — Annex 3
   - Natural Environment Research Council (NERC) — Annex 4

COMMENTS

4. The Research Councils recognise the important role of energy efficiency in contributing to the Government’s goal of achieving a 20 per cent reduction in carbon dioxide emissions by 2010. The Research Councils believe that investments in research in energy efficiency and energy use, alongside investments in renewable and sustainable power generation research, are indispensable to allow a transition to a low carbon economy. This investment is also important to achieve the other goals set out in the 2003 Energy White Paper: a reliable energy supply, competitive markets to raise the rate of sustainable economic growth, and to ensure that every home is adequately and affordably heated.

5. The Research Councils fund, or carry out, a diverse range of research into the development and introduction of potential energy efficiency measures in areas extending from the built environment to industrial processes and products, from materials to power generation, and from markets and regulation to organisational and individual behaviour.

6. EPSRC, ESRC and NERC fund research and post-graduate training in science and engineering. The majority of this funding is provided to UK universities. CCLRC, through the Laboratories, and NERC, through its Research Centres, also carry out research directly. The evidence presented in this submission relates mainly to the Research Councils’ role as research funders. Therefore, the Committee’s request for information on:

   “the funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications”

is addressed first. Evidence is provided for the other questions where relevant.

The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications

7. The Research Councils recognise the importance of conducting technology-based research in the context of a thorough understanding of markets, consumer demand and public acceptability and, within this context, cross-Council initiatives, in collaboration with stakeholders, play a crucial role. The cross-Council activities addressing energy efficiency are the “Towards a Sustainable Energy Economy” Programme (TSEC), the Tyndall Centre for Climate Change and the Carbon Vision Programme.

   “Towards a Sustainable Energy Economy” Programme (TSEC)

   — The £28 million TSEC programme was funded through the 2002 Spending Review (£20 million) and the Performance and Innovation Unit (£8 million). Funding was provided to EPSRC, ESRC and NERC. TSEC is a broad-based programme of research which aims to enable the UK to access a secure, safe, diverse and reliable energy supply at competitive prices, while meeting the challenge of global warming. TSEC is a multidisciplinary research programme that will adopt whole systems integrated approaches.
— Through TSEC, the Research Councils are supporting the UK Energy Research Centre (UKERC) to provide a focus for energy research in the UK and for international collaboration. UKERC will co-ordinate a National Energy Research Network bringing together researchers across engineering, the environmental, life, physical and social sciences and key stakeholders. UKERC will also act as a focus for knowledge transfer and public engagement. The Energy Research Centre meeting place at Oxford University will provide a physical locus for networking activities, both national and international, and will host short, collaborative, multidisciplinary projects aimed at making rapid progress on key scientific challenges. The UKERC, working with the research community and funding stakeholders, will develop a “National Research Atlas”. This Atlas will seek to record the consensus on the sequence of research problems to be overcome before new technologies (including more energy efficient technologies) can be commercially viable. Furthermore, it will identify active research and key gaps. The contribution to UKERC from the TSEC programme is £15 million over approximately five years from April 2004.

— UKERC research themes relevant to energy efficiency are:

  — “Demand Reduction” which addresses the challenge of reducing demand for energy through the introduction of new technologies and influencing consumer behaviour, while covering concerns about distribution and affordability.

  — “Energy Systems and Modelling” which will develop new scenarios and modelling approaches and tools bringing together demand and supply-side factors.

  — “Technology and Policy Assessment” which will provide a scientifically rigorous assessment of current research knowledge to address well-defined technology or policy questions identified in partnership with stakeholders from industry, government, regulators, NGOs and bodies such as the Carbon Trust. Assessments will cover issues such as: technical and economic potential of emerging technologies; energy system evolution; social, economic and environmental impacts; and policy and regulatory options and needs.

— Through UKERC, CCLRC is responsible for coordinating the web-based Research Portal19. The Research Portal will be linked to the Centre’s main website to provide specialist information on energy-related R&D projects and energy research data resources. The Portal will have two distinct parts:

  — An Energy R&D project database, to include all relevant Research Council grants, in addition to projects funded by Government Departments and bodies such as the Carbon Trust, the Energy Savings Trust and the Tyndall Centre. This will co-ordinate nationally all the energy research groups and help create a roadmap of energy research in the UK.

  — A feasibility study for the Energy Data Centre, the first point of contact for researchers wishing to access energy data and metadata (eg supply and demand data, information about policy scenarios, population forecasts, price forecasts, appropriate meteorological/hydrological and oceanographic data, etc). The Energy Data Centre will complement existing information sources and link to, other data sources where relevant20.

— The UKERC will engage in knowledge transfer activities to support wealth creation, both nationally and in the regions, to ensure that both the Centre’s research and research carried out within the National Energy Research Network is effectively linked to business. To underpin knowledge transfer, the Centre is developing a strategy on regional engagement with the Devolved Administrations, Regional Development Agencies, business and other regional stakeholders. UKERC has already begun to identify regional contact points to facilitate access to the Centres’ resources and provide a gateway to research capacity in each region. The strategy will focus initially on those regions where energy has been identified as a strategic priority and establish country/regional contact points in Scotland, Wales, the North East and the North West.

— Research complementary to that of the UKERC is being commissioned under TSEC’s “Carbon Management” and “Managing New Uncertainties” themes, which may include additional work of relevance to energy efficiency. Further work on energy efficiency is planned in a second phase of the TSEC programme, but this depends on funding from the 2004 Spending Review.

19 http://www.ukerc.ac.uk/Research%20portal.htm
20 It is NERC policy for researchers to register their data with the appropriate data centre (following the model of the NERC British Atmospheric Data Centre, for example).
TYNDALL CENTRE FOR CLIMATE CHANGE

— The Tyndall Centre for Climate Change Research is funded by NERC, EPSRC and ESRC. The Centre has research collaborations with numerous partners such as the CCLRC, the Environment Agency, Defra and the Potsdam Institute for Climate Impact Research. The Tyndall Centre supports transdisciplinary research, assessment and communication of the options to mitigate, and the necessities to adapt to climate change within the context of sustainable development. The Centre’s total budget for the first phase of funding is £10 million over five years. Research relevant to energy efficiency comes under the research theme “Decarbonising Modern Societies”, which aims to provide technical, regulatory, social and policy options to reduce atmospheric concentrations of greenhouse gases nationally and globally. The total expenditure in this theme amounted to £2 million over the life of the present first funding phase. To aid knowledge transfer, the DTI additionally provides £70k per year to allow the Centre to run a Business Liaisons Programme.

CARBON VISION PROGRAMME

— EPSRC, in partnership with the Carbon Trust supports “Carbon Vision”, a £14 million R&D programme on low carbon innovation. The Programme aims to build and consolidate UK research and development capability relevant to low carbon technology and to encourage cooperation between the research community and businesses. The “Buildings for Low Carbon Communities” consortium (£5.4 million) is funded through the Carbon Vision Programme and address energy efficiency research (see also paragraph 15). ESRC and NERC also contribute to Carbon Vision activities on a case-by-case basis.

8. In addition to the cross-Research Council activities, EPSRC and ESRC have a portfolio of research activities related to energy efficiency. The expenditure of each Research Council in the financial years 2000–04 is summarised in the following Table:

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<td>EPSRC</td>
<td>£1.4 million</td>
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<td>ESRC</td>
<td>£25k</td>
<td>£50k</td>
<td>£150k</td>
<td>£250k</td>
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Notes on data:
1. The data presented in the table are for expenditure on grants in the financial years shown.
2. The data is incomplete for 2004–05.
3. The EPSRC data was collected using a keyword search to capture research on improved energy usage, minimisation of energy usage through more efficient processes, products and energy management. This includes some Carbon Vision research. ESRC data includes the Sustainable Technologies Programme.
4. The data shown do not include the ESRC (£1.25 million) or EPSRC (£3.75 million) contributions to the £10 million Tyndall Centre Programme.
5. The data shown do not include TSEC or the UK Energy Research Centre.

9. All Research Councils have mechanisms to facilitate knowledge transfer, for example through collaborative research grants and collaborative training.

10. Sixty five per cent of EPSRC’s energy efficiency related research grants have one or more collaborators. The collaborators include, for example, local government and supermarkets, in addition to companies in the construction and power sector. Other knowledge transfer activities funded by EPSRC include the Integration of New and Renewable Energy into Buildings Faraday Partnership, research secondments into industry working on energy efficient and cost effective power semiconductor devices and a research network on comfort and energy use in buildings. More details are provided in Annex 2.

11. ESRC facilitates the involvement of potential research users at all stages of the research process from the initial identification of research issues, the conduct of the research, through to the communication of results and their transformation into policy and practice. Research and experience suggests that engagement throughout the research process is more effective in achieving impact and knowledge transfer than relying solely on end of research dissemination and knowledge transfer activities alone. For example, research projects under ESRC’s Sustainable Technologies Programme are being conducted in collaboration and partnership with a range of key stakeholders including a number of power supply and distribution companies, the Energy Saving Trust, Regional Development Agencies and local authorities. The Programme has close links with a range of key stakeholders such as the Sustainable Development Commission, Defra and DTI. A further example is provided by the Programme’s Network on Sustainable Consumption, co-sponsored by
Defra and convened by Green Alliance. This has provided a network bringing together researchers, policymakers (Cabinet Office, DTI, Defra, Treasury) and key figures from business in a dialogue about recent developments in research on consumption behaviour.

*The behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings*

12. The Research Councils believe that people’s choices and practices can lead to more sustainable patterns of consumption, crucial to the introduction of energy efficiency measures alongside new and more sustainable technologies. Research into the behavioural aspects of energy efficiency is underway through:

- The Tyndall Centre, within the theme “Decarbonising Modern Societies” (see paragraph 7).
- The Carbon Vision Programme in low carbon buildings. More details are provided below (paragraph 15).
- The UKERC “Demand Reduction” research theme (see paragraph 7).
- The ESRC’s £3 million Sustainable Technologies Programme which seeks to analyse what makes technologies sustainable, assess the roles technological and behavioural change can play in achieving more sustainable futures, and to reveal the social and economic processes that foster or inhibit innovation for sustainable development. More details are provided in Annex 3.

*The scope and incentives for improving energy efficiency and reducing waste, across the economy, in both private and public sectors*

13. Energy efficiency savings can be supported by a variety of measures, including incentives, regulations, advice and public information. The Research Councils believe that new technology could contribute significantly to increased energy efficiency, with research into, for example, advanced insulation materials, compressed air systems, combined heat and power technologies, light emitting diodes (LED), and control and combustion technologies. While such new and more sustainable technologies offer great potential, they cannot in themselves ensure sustainability. Key barriers to the uptake of sustainable energy initiatives within organisations need to be identified and overcome. The role of people’s choices and practices in achieving more sustainable patterns of consumption needs to be better understood. As part of this, more attention needs to be paid to the services and practices that energy consumption makes possible and how the transformation of resource intensive combinations of consumption, routines and habits might be achieved. Further details are provided in the Annexes.

14. The Programme on Environmental Decision-Making at the Centre for Social and Economic Research on the Global Environment (CSERGE), University of East Anglia, is undertaking research under a number of key themes including the attitudes of decision-makers and the enablers and barriers to the adoption of green energy initiatives (purchase of green energy and the on-site installation of CHP and renewable energy installations).

*The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented*

15. One of the major Carbon Vision investments is the ambitious £5.4 million Buildings for Low Carbon Communities consortium which started in October 2004. The aims of the consortium are to demonstrate how carbon emissions from the UK building stock can be reduced by 50 per cent by 2030, and to act as a catalyst for action to achieve these savings. Research will include buildings stock inventories; modelling of energy use; and householders’ use of energy-consuming appliances and services. This will also include the impact on energy consumption of social trends; changes in fuel prices; technological changes; as well as changes in buildings themselves. The Consortium aims to predict the impact on present and future carbon emissions of a range of policies and interventions.

16. The Tyndall Centre supports research at the University of Oxford on the “40 per cent House” which is seeking to identify the main policy implications of the Royal Commission for Environmental Pollution (RCEP) recommendation that a 60 per cent reduction in carbon dioxide emissions in the domestic sector should be achieved by 2050. The study is considering both reduced demand and household-level new and renewable energy supply technologies and assessing both total energy consumption and power demand levels. Initially the project aims to establish likely levels of consumption as a result of trends in household numbers, equipment ownership, effects of climate change (on heating and cooling) and known policies. The potential
for reductions will incorporate changed levels of building and demolition in the housing stock, decision trees on technology choices to avoid incompatibility, new Building Regulation standards, more efficient appliances and so forth. Consumer attitudes to and choices from lower carbon options will be investigated through focus groups, together with the impact of in-house energy supply (photovoltaic, micro-CHP, etc). Policy avenues will be identified partly through backcasting from the RCEP scenarios, as well as forecasting from the housing and domestic energy and carbon stock model.

17. EPSRC, ESRC and NERC (together with BBSRC and PPARC) have also considered the energy efficiency of their Polaris House building in Swindon. Energy usage is closely monitored and controlled, as part of the environmental management of the building. An independently commissioned review in November 2003 concluded that energy consumption at Polaris House was 19 per cent better than the National Indicator Standard. Examples of energy saving initiatives adopted include the installation of a building management system for the control of heating and ventilation, solar reflective windows and blinds and low energy lighting systems and sensors.

18. The Research Councils believe that research on energy-efficient goods should encompass the technological challenges, practices of use, and convention and consumption attitudes.

19. Research sponsored by the ESRC’s Sustainable Technologies Programme examines:
   — how domestic practices are organised and reorganised in ways that further embed resource intensive technologies as being important, if not essential, for the competent accomplishment of daily life;
   — the trade-offs faced by individuals when making purchasing decisions, including the criteria used by individuals in buying greener products;
   — the role of community energy initiatives in the take-up of available technologies.

20. The ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS), University of Cardiff, is conducting in-depth research on the electronics industry (specifically ICTs, large and small household appliances and consumer electronic) in North America, Europe and the Far East to explore changing business and stakeholder relationships within supply chains in response to issues of sustainability and accountability from the differing perspectives of regulators/policy-makers, producers, suppliers, retailers and consumers as well as the influence of other stakeholders (eg NGOs). Issues being explored include environmental specifications, stakeholders management and corporate reporting.

21. The Tyndall Centre project at CCLRC examines technical, environmental and socio-economic issues to accelerate the introduction of fuel cell CHP technology (see Annex 1, paragraph 6). Fuel cells are an ideal power source for CHP plants in the urban environment, converting a fuel’s chemical energy into electricity efficiently, quietly and with minimal pollution at the point of delivery.

22. ESRC’s Sustainable Technologies Programme at SPRU, University of Sussex, supports research to explore the technical, regulatory and institutional changes needed to enable large scale take-up of microgeneration of energy at the household level and the implications for the current energy system.

Annex 1

Memorandum by the Council for the Central Laboratory of the Research Councils (CCLRC)

BACKGROUND

1. The role of the Council for the Central Laboratory of the Research Councils (CCLRC) is to provide the primary portal for UK scientists to access major national and international experimental and computing facilities and associated centralised expertise of a scale well beyond those normally available at individual
universities. The CCLRC itself is not primarily a research grant-awarding body, and not in a position to actively steer the direction of UK Energy R&D; however several CCLRC staff serve on Research Council assessment panels, in addition to DTI and European advisory committees.

**Comments**

2. CCLRC also carries out an “in-house” energy research programme through the work of the Energy Research Unit (ERU). The ERU is part of the Applied Science Division in the Engineering and Instrumentation Department at the CCLRC and specialises in performing and enabling innovative research on new and renewable energy technologies. ERU has obtained funding for energy research from a range of bodies including the Research Councils, DTI, Defra, and the European Commission.

3. The ERU has an international reputation in wind energy research covering a broad range of topics including: aerodynamics, power electronics, flywheel and battery energy storage, control systems, materials testing, power output and demand forecasting, wind flow modelling and computer simulation and integration into electricity supply system.

4. More recently, the ERU has broadened its research activities to include photovoltaics, hybrid renewable energy systems, development of marine renewable energy systems, acoustic emission monitoring and other non-destructive testing techniques, hydrogen energy technologies, integration of wind turbines into buildings and the effects of climate change on energy usage, sustainability and efficiency.

5. CCLRC is also actively involved in research in innovative schemes to use district heating or combined heat and power in order to reduce overall energy demand, which is of relevance to this inquiry.

6. The CCLRC is involved in the work of the Tyndall Centre in two major projects:
   - Encouraging the use of fuel cells to provide heat and power. Combined heat and power (CHP) plants use the heat produced during electricity generation to provide local heating. The more efficient use of fuel compared to conventional energy generation leads to reduced carbon dioxide emissions. Fuel cells are an ideal power source for CHP plants in the urban environment, as they convert a fuel’s chemical energy into electricity efficiently, quietly and with minimal pollution. This project examines technical, environmental and socio-economic issues to accelerate the introduction of fuel cell CHP technology.
   - Hydrogen’s role in reducing greenhouse gases. In order to support the hydrogen economy, major changes are required in the energy supply infrastructure, implying the need for a well planned programme of investment and in addition, technological advances to achieve high process efficiencies and compact hydrogen storage vessels. Researchers from the ERU, at the CCLRC, are leading this project to map the stages required for a national energy infrastructure based on hydrogen produced from renewable sources. This will be a comprehensive review of how the hydrogen energy economy might be implemented in the UK and how much it can practically be expected to reduce greenhouse gas emissions. The review will include an assessment of major technological changes required and projections of the costs associated with each stage of implementation.

7. The CCLRC is responsible, through the newly established UKERC, for coordinating the Research Portal (paragraph 7 of the main submission).

8. The CCLRC has also led on the EPSRC funded network H2NET, the UK Hydrogen Energy Network. This was established in 2000 as a joint collaboration between industry and academia. Its principal aim was to promote research and discussion on issues connected with the development of the hydrogen energy economy within the UK. The formation of the Network was prompted by developments in the technologies underpinning a hydrogen energy economy.

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**The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications**

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21 [http://www.eru.rl.ac.uk/](http://www.eru.rl.ac.uk/)
22 [http://www.tyndall.ac.uk/publications/fact_sheets/it1_36.shtml](http://www.tyndall.ac.uk/publications/fact_sheets/it1_36.shtml)
23 [http://www.tyndall.ac.uk/publications/fact_sheets/it1_26.shtml](http://www.tyndall.ac.uk/publications/fact_sheets/it1_26.shtml)
24 [http://www.ukerc.ac.uk/Research/7portal.htm](http://www.ukerc.ac.uk/Research/7portal.htm)
25 [http://www.eru.rl.ac.uk/h2net.htm](http://www.eru.rl.ac.uk/h2net.htm)
Annex 2

Memorandum by the Engineering and Physical Sciences Research Council (EPSRC)

BACKGROUND

1. EPSRC support for energy efficiency-related research is part of a broad energy research portfolio. The annual spend on energy research was over £12 million in 2003–04. This research includes renewable and low carbon energy generation and related technologies that are also essential to help meet carbon emission reduction targets. In addition to this, EPSRC also funds the UK Fusion programme through a four year £48 million research grant awarded in April 2004.

COMMENTS

2. EPSRC supports a wide range of activities underpinning the spectrum of technical solutions to achieve carbon emission reduction targets, including energy efficiency. Research covers the development of technology to improve energy use through more efficient processes, products and energy management. The introduction of potential energy efficiency measures is relevant to many research areas such as the built environment, industrial processes and products, and power generation. Examples include research in energy efficient ventilation, refrigeration, batteries, turbines, lighting and photovoltaic cells.

The funding and coordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications

3. EPSRC recognises that energy efficiency issues encompass a breadth of scientific, technology and engineering disciplines. Research towards a low carbon economy requires multidisciplinary collaboration within and beyond the engineering and physical science boundaries, to include social and economic aspects. The understanding of markets, consumer demand and public acceptability issues cannot be dissociated from the technology challenges.

4. To be able to develop such a whole systems approach, EPSRC strongly believes in the value of cross-Council initiatives and in an early and effective engagement with stakeholders (see paragraph 7 of the main submission):

   - EPSRC is a partner in the cross-Research Councils’ “Towards a Sustainable Energy Economy” (TSEC) programme. TSEC supports the establishment of the UK Energy Research Centre (UKERC).
   - EPSRC contributes 35 per cent of the total budget of £10 million for the Tyndall Centre for Climate Change Research.
   - EPSRC is also working in partnership with the Carbon Trust on “Carbon Vision”.

5. EPSRC supports its own research portfolio of activities related to energy efficiency. Since 1999–2000, EPSRC’s expenditure on energy efficiency research totals more than £9 million. EPSRC’s annual support for the relevant activities is summarised in the Table in paragraph 8 of the main submission.

6. EPSRC support for research to develop energy efficiency measures is directed in particular towards buildings, industrial processes and products. Examples of research include:

   - work at the University of Sheffield on measures to improve the energy efficiency of existing housing in England and Wales;
   - improvements of energy efficiency of industrial processes such as research on a low energy route for nitrogen removal in biological wastewater treatment at Cranfield University;
   - planned work at Surrey University on developing a methodology and decision-support tools to help understand and evaluate environmental and economic consequences of the changes required for “decarbonisation” of the economy.

7. Sixty five per cent of EPSRC’s energy efficiency related research grants have one or more collaborators. The collaborators include, for example, local government and supermarkets, in addition to companies in the construction and power sector.

8. DTI and EPSRC sponsor The Integration of New and Renewable Energy in the Buildings Faraday Partnership. This provides a national focus for research, training and technology transfer in building-integrated new and renewable energy technologies, relevant to research into energy efficiency. It includes research on options beyond the basic energy efficiency packages of measures in the domestic and non-domestic.
building sector, with over 225 companies, Universities and other organisations involved. The core funding consists of a grant from the DTI of £1.2 million for three years, and a grant of £1 million from the EPSRC. In addition, ESPRC provided funding for fourteen postgraduate studentships in collaboration with industry sponsors. The Faraday Partnerships have been established to strengthen the way technology is developed and exploited within the UK by stimulating closer communication and cooperation between researchers and new product developers.

9. EPSRC sponsors five research secondments from De Montfort University to a UK semiconductor business. These secondments aim to build and sustain a skilled workforce and to facilitate the commercialisation of energy efficient and cost effective power semiconductor devices.

10. EPSRC supports the establishment of networks in new interdisciplinary research areas to develop and stimulate interactions between the appropriate science, technology research community and industrial groups. Of particular relevance to energy efficiency is the Network for Comfort and Energy Use in Buildings led by London Metropolitan University, which aims to identify and existing outputs and gaps in the ability of building scientists to predict the energy use of buildings and the risks of discomfort posed by low-energy buildings.

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The behavioural aspects of energy efficiency schemes—the quantity and quality of information available on energy efficiency, and whether the public is sufficiently knowledgeable and motivated to achieve energy savings

11. EPSRC believes that technology based research in energy efficiency has the potential to inform and to lead the development of policies in areas including market forces, consumer demand and public acceptability.

12. Research supported through the Carbon Vision programme is described in the main text paragraph 15.

13. EPSRC support also covered research at Bath University on the extent to which various kinds of feedback on energy use affect attitudes and behaviour of buildings occupants with respect to energy consumption.

The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented

14. Both domestic and non-domestic uses of energy in buildings are responsible for about half of the nation’s energy consumption and about half the release of carbon into the atmosphere. The building stock is therefore a prime target for cuts in emissions; from 1999 to today, EPSRC has invested over £1 million in the development of technological improvements to the energy efficiency of new and existing buildings. The technological challenges include thermal comfort, integration with renewable energy sources, land use, design solutions, development of new materials and associated manufacturing methods and public engagement activities.

15. The Carbon Vision investment in technological improvements to the energy efficiency of new and existing building is described in the main text of the submission paragraph 15.

16. EPSRC supported research at the University of Sheffield into quantifying the amount of daylight that will enter through windows taking into account the likelihood of dirt building up on the glass, obscuring some of the light. This is an important factor in designing more efficient buildings and the information obtained has been used to compile guidelines on the effect of urban air pollution on the availability of daylight in buildings. This output replaces old guidelines, dating from before the Clean Air Act, when there was much more industrial pollution in the atmosphere.

The development and promotion of energy-efficient consumer goods

17. Research related to improvements in energy efficient consumer goods supported by EPSRC includes development of novel materials, new design techniques, generic methodology and power management, applied for example to battery powered products. An example is the work at Brunel University to develop techniques for the design of new and highly efficient refrigerated display and storage cabinets to achieve energy savings in excess of 50 per cent compared to current state of the art technology. This research combines the benefits obtained by energy savings and reduction of carbon dioxide emissions to social benefits such as improvement of the environment in retail food premises, the improvement in product quality and shelf life.
Memorandum by the Economic and Social Research Council (ESRC)

BACKGROUND

1. The ESRC supports research on the economic, regulatory, social and behavioural aspects of energy efficiency. Much of this research is funded in collaboration with RCUK partners, for example through the Tyndall Centre for Climate Change Research, Towards a Sustainable Energy Economy Programme (including the demand management theme of the UK Energy Research Centre) and the Carbon Vision Initiative, and is detailed elsewhere in this submission.

COMMENTS

2. This Annex briefly provides details of some other research funded by the ESRC. Three other major ESRC research initiatives are particularly relevant:

- ESRC’s £3 million Sustainable Technologies Programme\(^26\), which is a part of the broader Sustainable Technologies Initiative, seeks to analyse what makes technologies sustainable, to assess the roles technological and behavioural change can play in achieving more sustainable futures, and to reveal the social and economic processes that foster or inhibit innovation for sustainable development (Brunel University);
- The Programme on Environmental Decision-Making at the Centre for Social and Economic Research on the Global Environment (CSERGE)\(^27\) at the University of East Anglia which is undertaking research under a number of key themes: multi-level governance and environmental policy integration; social capital, equity and justice; and innovation in decision-support tools and methods;
- The ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS)\(^28\) at the University of Cardiff which aims to help better understand, promote and “mainstream” the vital issues of sustainability, accountability and social responsiveness, through research into key business relationships (see paragraph 20 of the main submission).

Behavioural aspects of energy efficiency and the development and promotion of energy-efficient consumer goods

3. A number of projects under ESRC’s Sustainable Technologies Programme are exploring issues related to energy efficiency and energy consumption. Research at the University of Surrey has found that over 70 per cent of the total energy demand in the UK economy is attributable (directly or indirectly) to the household demand for final goods and services and a further 10–12 per cent is attributable to the provision of public services. This implies a need for a much broader characterisation of energy consumers (in terms of both direct and indirect demand) and that a much broader range of behaviours is relevant to energy use than is normally included within the studies of behaviour of (direct) energy consumers. Energy efficiency needs to be set against this broader framework. For demand side measures to make a significant contribution to the achievement of the Government’s targets for reductions in carbon emissions much more will be required than a simple shifting of people’s preferences for sustainable electricity tariffs or encouraging them to buy energy efficient products. Economy-wide targets for achieving sustainable energy consumption depend crucially on individual or collective behaviours and practices in a number of different arenas including: supply tariff choices; purchases of energy-using appliances; energy consuming practices in the home (personal hygiene, laundry, food preparation etc); demands for mobility and access; food consumption behaviours; engagement in recycling and re-use of products; material product choices; home-buying; patterns of use of domestic space; choice of leisure pursuits; demand for public services and so on. However, this broader spectrum of behaviours also suggests a potentially broader range of intervention points than has been the past focus for policy. Further research is needed to provide a more coherent understanding of the motivations of social actors, the values that underpin these, the ways in which behaviours are shaped and constrained, the ways in which lifestyle choices change and evolve and avenues through which they are influenced.

4. An example of research which is trying to explore such complexities is a project under the Programme at the Universities of Manchester and Lancaster, which is examining how domestic practices are organised and reorganised in ways that further embed resource intensive technologies as being important, if not essential,

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\(^26\) [http://www.sustainabletechnologies.ac.uk](http://www.sustainabletechnologies.ac.uk)

\(^27\) [http://www.uea.ac.uk/env/cserge](http://www.uea.ac.uk/env/cserge)

\(^28\) [http://www.brass.cf.ac.uk](http://www.brass.cf.ac.uk)
for the competent accomplishment of daily life. Looking at the use of domestic technologies in kitchens and bathrooms the research is exploring how such technologies have become necessary through their time and labour-saving functions. While technological innovation can reduce the resources consumed by individual appliances, it has also fuelled escalating standards and expectations of service. For example, the microwave has largely become a device for defrosting and reheating food, which has contributed to the demand for frozen and prepared foods; this in its turn is highly energy intensive in its production, distribution and storage. Initial results are showing that by focusing exclusively on energy use policy-makers have failed to pay anything like enough attention to the services and practices that energy consumption makes possible. In environmental terms, the challenge is to avert the normalisation of resource intensive combinations of technology and convention rather than to promote energy efficiency as an end in its own right. Efforts which focus on energy efficient devices alone are unlikely to succeed unless they can be accommodated within, or can reconfigure, practices of use, convention and consumption. Policy frameworks need to be reconfigured to engage with the transformation of routines and habits that trail environmental consequences in their wake.

5. The ESRC Sustainable Technologies Programme is also exploring the following research areas:

— the trade-offs faced by individuals when making purchasing decisions, including the criteria used by individuals in buying more sustainable products (eg price, quality, brand, energy use, durability and recyclability), what sources of information consumers use and how these criteria are reconciled (University of Leeds);

— the role of community energy initiatives in the take-up of available technologies (Staffordshire University).

6. The Programme has co-funded research with Defra, the Sustainable Consumption Network, with the aim of engaging decision-makers in a dialogue about recent developments in research on consumption behaviour and practice.

The scope and incentives for improving energy efficiency

7. Exploratory research conducted at CSERGE on the attitudes of decision-makers to the adoption of green energy initiatives (purchase of green energy and the on-site installation of CHP and renewable energy installations) found that the majority of the business, energy experts and local authority representatives interviewed believe there are commercial benefits in having a corporate green energy policy. It was generally agreed that organisations should take some responsibility for environmental impacts of the energy they use, however commercial viability is likely to be the main point for consideration when purchasing some form of green energy or energy saving equipment. There was a strong desire amongst the decision-makers interviewed for better communicated, specific and more accessible information and advice on green energy. Currently available information was felt to be too fragmented and general.

8. The main opportunities for the uptake of green energy included environmental benefits, corporate image benefits, reduced energy consumption, cost reductions and increased efficiency. Key barriers were found to include lack of availability, the current cost being too high, lack of clear, co-ordinated information, lack of knowledge and a tendency for business to look on environmental issues as being peripheral and not important to them. Within smaller businesses the lead for green energy approaches is normally best provided by a senior employee and ideally the owner/Managing Director. Realisation of green energy initiatives and efficiency benefits among participating businesses usually reflected the key facilitating role of such a senior management “enthusiast”.

Innovative schemes in CHP

9. A new research project under ESRC’s Sustainable Technologies Programme at SPRU, University of Sussex is exploring the technical, regulatory and institutional changes needed to enable large scale take-up of microgeneration (eg solar photovoltaics, CHP and fuel cells) at the household level and the implications for the current energy system. It will explore three possible business models for the development of microgeneration and construct dynamic financial models to assess the economics of different technologies under various conditions. If installed in sufficient numbers, micro-generation technologies could be highly disruptive for the current energy system. By blurring the boundary between energy supply and demand, these technologies could change consumer—provider relationships, and enable consumers to play a more active role in energy service provision. They present new challenges for all players within the energy system including regulators, equipment suppliers, and the housing and construction industries.
Annex 4

Memorandum by the Natural Environment Research Council (NERC) Background

BACKGROUND

1. NERC supports research in energy efficiency through the Tyndall Centre for Climate Change Research and the UK Energy Research Centre (UKERC).


3. NERC’s Director of Finance and Information Systems has strategic responsibility for the “Greening NERC” programme. As part of this programme, NERC is working with the UK sustainable development charity Forum for the Future to cost its environmental impacts. The environmental accounts for 2003 showed that the main costs are from energy consumption by NERC’s research ships, aircraft and buildings. NERC will be setting targets to reduce its emissions of greenhouse gases and other pollutants, and measuring progress with performance indicators. Further details are available in the “Vital Statistics” section of NERC’s 2003–04 Annual Report.

4. NERC’s comments include input from the Centre for Ecology and Hydrology (CEH) in addition to Swindon HQ.

COMMENTS

The most appropriate measure of energy efficiency, and the relationship between improvements in energy efficiency and overall energy use and carbon emissions

5. It may be difficult to judge the efficacy of particular efficiency measures if circumstances change, for example, if there is a switch from energy demand for heating to energy demand for cooling, especially if new technologies are introduced at the same time, eg local CHP schemes which might allow households to become net energy (electricity) producers rather than consumers.

The scope and incentives for improving energy efficiency, and reducing waste, across the economy, in both private and public sectors

6. There is considerable scope for improving energy efficiency and reducing waste in both private and public sectors.

7. A number of technologies could contribute to increased energy efficiency. Examples include advanced insulation materials, compressed air systems, light emitting diodes (LED), and control and combustion technologies. Demonstrating the performance of new technologies could give the market and the user confidence to adopt them, for example in the area of building technologies.

8. Increased efficiency could be encouraged by the following:

   — conducting audits of product-lifecycle carbon (or carbon equivalents of other greenhouse gases emitted in the lifecycle) and providing this information to consumers;

   — providing consumers with information allowing them to relate their energy consumption to the amount of carbon emitted and thus to the per-capita emissions considered appropriate under a “contraction-and-convergence” scenario;

   — providing consumers with information about their energy consumption over time so that they can manage it more efficiently.

9. There is a need to improve our understanding of the effect of policy intervention by properly evaluating the effect of different policy measures on energy demand, for example, the effect on energy demand of programmes introduced by energy suppliers to implement their energy efficiency commitments (EECs).

29 www.nerc.ac.uk/publications/annualreport2004/13_vitalstats.pdf
The potential for technological improvements to the energy efficiency of new and existing buildings, and how these should be implemented

10. Research should start now to identify technologies (eg integrated process control systems for low-carbon buildings) for application several years down the line.

11. More research is required into energy use in non-domestic buildings (offices etc), since the building stock is extremely heterogeneous. “Whole-systems” work would be particularly appropriate because the activities and preferences of occupants have to be considered.

12. The new Environment Centre for Wales, a partnership between the University of Wales, Bangor and the Centre for Ecology and Hydrology, is being housed in a new purpose-built environmentally-friendly building which demonstrates many aspects of environmental and sustainable construction including the use of locally-sourced materials such as Welsh oak and slate. The design of the building will allow up to 30 per cent of its energy to be generated from renewable sources such as photovoltaic panels30.

13. Similarly, the British Antarctic Survey (BAS) is trying to ensure that its new research station in Antarctica is built to a high environmental standard. Earlier this year it ran a design competition which emphasised environmental requirements31.

The funding and co-ordination of research into energy efficiency measures in the domestic and industrial sectors, and how well research is transferred into applications

14. Much of NERC’s spending on energy-efficiency research is channelled through the Tyndall Centre; NERC is contributing 50 per cent of the Tyndall’s first phase total budget of £10 million over five years. The relevant work at the Tyndall Centre comes under the research theme “Decarbonising Modern Societies”; expenditure in that theme amounted to £2 million over the life of the present first funding phase.

15. Through its coordinating involvement in the cross-Council Towards a Sustainable Energy Economy (TSEC) Programme, NERC has been instrumental in establishing the UK Energy Research Centre and is funding energy-efficiency research through the Centre. The total grant to UKERC from the TSEC programme is £15 million over approximately five years from April 2004.

Memorandum by The Royal Academy of Engineering

1. INTRODUCTION

1.1 Fellows of the Royal Academy of Engineering are professionally involved across the whole field of energy use technology. This evidence should be considered in the context of fossil fuel usage and is based on the work of a specialist group, but fully reflects views received on a wider consultation with Fellows. It argues that a whole systems approach is required to understand energy efficiency and that there are likely to be many more technological options to reduce energy use in the future than are often considered in energy planning. The UK has developed a relatively complex structure for advancing public policy in energy use, and this evidence questions whether addressing this complexity is now the right way forward, given the approaching deadline to meet the Government’s ambitious energy use targets.

2. ENERGY USE AND DEFINITIONS OF EFFICIENCY

2.1 Energy is never consumed for its own sake but always to achieve some other purpose. It is therefore natural to define energy efficiency as the ratio of outcome per unit of energy “consumed”. Such simple ratios are adequate for general purposes and are the form used in most international engineering standards. The major drawback is that the choice of the outcome measure may only be a surrogate of the real outcome. It may, for example, miss the implications of different patterns of use. A lighting system with a good lux/watt ratio may still have poorly designed lighting controls or provide more light than is necessary and so lead to waste. There is no substitute for real performance-in-use data when assessing energy efficiency. In more complex situations a whole system approach is necessary to understand correctly the total implication for national primary energy consumption.

30 http://bangor.ceh.ac.uk/English/wec.htm
3. Whole System Approach

3.1 The need for a whole systems approach to understand energy efficiency is necessary as energy is conserved according to the laws of thermodynamics and strictly, is not consumed. It is transformed from a high grade source, such as hot combustion gases, to lower grade forms, eventually being dispersed into the environment at ambient temperature. A high grade energy source is thus much more valuable than a low grade source with maximum efficiency being realised by the most efficient transformation processes and efficient use of the outputs. However thermodynamics places a lower limit on the waste energy lost in such transformations. So failing to take a whole system approach and not accounting for these losses can lead to serious errors in reasoning. This most commonly occurs in dealing with electricity.

3.2 Electricity is often used at the point of consumption with high efficiency, but it has incurred 60 per cent losses in its production at the power station including its distribution. Heating by direct combustion in a modern gas-fired condensing boiler is a considerably more efficient use of primary energy than electric resistive heating (the electricity itself also coming from gas). The waste heat from the power station can be used for heating but may require its thermodynamic grade to be higher, and this incurs a further drop in the efficiency of electricity generation. It is only when a whole system view is taken and the fuel saved from space heating is included, does the attraction of this combined heat and power configuration become apparent.

3.3 UK energy demand is sometimes given by the Office for National Statistics (ONS) in terms of “delivered energy”. This uses simple calorific value at the point of final use. Of all energy measures, this is the most misleading. It does not reflect primary energy use or total carbon emissions and ignores energy losses in the delivery system. Neither could it explain, for example, why “fuel switching” from coal to gas is the largest single energy efficiency option in the Government’s Energy efficiency Action Plan.

Academy Comment

3.4 The Academy would generally recommend price at the point of use as the best all round unit of energy used when defining energy efficiency as this puts an economic value on each of the transformation processes. Where a physical unit is required, or where there are market price distortions, primary energy is a very convenient measure that gives the total quantity of fossil fuel that enters the economy to deliver a unit of energy at the point of use. Although a cost for emitting carbon may be included in prices, in general carbon emissions need to be measured separately and any economic instruments should be applied to the prime energy source (fuel), in order to avoid distortions.

4. Patterns of Energy Use

4.1 A number of commentators have pointed out that energy is unlikely to be managed effectively unless its costs are comparable with other major running costs. This threshold is usually quoted at around 5–10 per cent of running costs; a figure consistent with the value used as a threshold for “fuel poverty”. In comparison, the average household spends around 3 per cent of income on fuel and power; less than the average spent on alcohol and tobacco.

4.2 This suggests that there are two quite distinct sectors to be considered when talking about energy use and they probably require complementary treatments. One sector is cost conscious where energy is managed effectively, and barriers to further investment may be predominantly financial. The other is where energy consumption is an entrained consequence of some other purchasing decision (eg the choice of a plasma TV). In this second sector it is critical that any actions to improve energy efficiency are simple and “hassle free”, and do not get entangled in lifestyle cultural signals associated with “conspicuous consumption”. Voluntary agreements on product efficiencies, and simple product performance banding, complemented with regulatory pressures, have a much stronger role in this sector than in the cost conscious sector.

Academy Comment

4.3 Currently, the UK has a complex structure of public bodies giving advice and promoting energy efficiency. In the managed energy sector there is an argument that local one-stop shops appropriate to a particular use (eg local energy advice centres for low income families) are an efficient targeted approach. The argument is weaker for the “non-managed energy consumption sector” where a multiplicity of advice or exhortation, sometimes expressed in different terms, may be a hindrance rather than an aid.
5. **Energy Efficiency Technologies in Consumer Products**

5.1 In most international studies of energy efficiency (eg by the US Oak Ridge National Laboratory) the technologies associated with improved energy efficiency in consumer products are conspicuously “low technology” in comparison with options offered for the “supply” side. There is a paradox to resolve here, since technical innovation in the demand side of the economy is at least as advanced as the “mature” energy supply sector. The answer may lie in the issue of incentives. For example very substantial advances in the energy efficiency of desk top computers has resulted not from energy efficiency programmes but from the application of laptop technology developed to extend battery life. The low energy LED light was originally developed to provide a very long life light source and not a high efficiency light.

*Academy Comment*

5.2 Low energy products characteristically have other positive properties than their low energy consumption. They tend to be lighter, run cooler, make less noise and pollution, and have longer lifetimes. This suggests that some energy predictions may be underestimating changes in the demand side by focussing only on a small range of products specifically designed as “energy efficient”.

6. **Energy Efficiency in Buildings**

6.1 In primary energy terms energy used inside buildings accounts for about half of the UK’s energy consumption. Building Regulations play an important role in advancing standards in the lower quartile of the construction industry, but their advancement depends heavily on the experience gained from best practice and pioneering designs developed elsewhere in the construction sector. It is regrettable that it is not common practice to report post-occupier experience in new construction publicly to improve this feedback. This may be because experience over the last 20 years of monitoring pioneering low energy designs has seldom produced all of the expected performance improvements.

6.2 The most important strategic issue in new buildings, at present, is the future of scale of the market for air-conditioning. Air-conditioning requires high grade energy to operate both circulation systems and refrigeration equipment. The UK has the good fortune of a maritime climate which enables comfortable buildings that are naturally lit and ventilated in summer. However a number of factors have introduced air-conditioning first in the commercial market and there is some prospect of in-roads into the domestic market unless designs of new highly insulated dwellings pay more attention to summertime conditions. This is raised for the first time in the new revision of Building Regulations currently out for comment.

*Academy Comment*

6.3 There is an urgent need to understand any causes of underperformance in innovative low energy buildings. This underperformance should not be treated as failings but as lessons learned. The implementation of the Energy Performance in Buildings Directive in the UK, which requires energy performance to be made publicly available, is an important step.

7. **Combined Heat and Power**

7.1 Although combined heat and power is often seen as using the waste heat of electricity generation, in normal practice it is the heat demand which takes precedence. CHP effectively exploits the opportunity for power generation offered by the thermodynamically high grade fuels used in district heating boilers when they are providing low thermodynamic grade heat for space and water heating. The result is a more efficient use of gas, but its economic success depends on the interface with the electricity system. This interface has to reflect that supplying heat to the district heating system is the systems first priority.
8. RESEARCH AND INNOVATION

8.1 Reviews by the International Energy Agency (IEA) and other bodies throw into sharp contrast the public funding for energy demand and supply side technologies. The US DOE has a funding for “energy science” of about $1billion, of which 40 per cent relates to better use of energy. In comparison with the US, the UK’s funding structure for research is more complicated and horizontally stratified. Symptomatic of this problem is that the total Energy R&D spend was not collected centrally in any of the recent UK Government energy reviews.

8.2 It would seem that an innovative idea would have to work its way up through the different funding source layers as it matured, re-competing for resources at each stage. This is in contrast to supply side research which tends to be more strongly vertically integrated and in large coherent programmes. While the UK should expect to win some intellectual property in supply side innovation arising from the technological challenge of low carbon emissions, it has significant manufacturing strength in demand side products.

Academy Comment

8.3 While the inclusion of an energy efficiency dimension in many public R&D funding programmes is to be welcomed, the consequence has been a mosaic of programmes that are horizontally rather than vertically integrated. A clearer roadmap for research in this area should be a high priority for the new UK Energy Research Centre.

November 2004

Letter from The Royal Society

Dear Mr Johnson

We are delighted to respond to the Committee’s call for evidence for the inquiry into “Energy Efficiency”. This response has been prepared in consultation with our Energy Policy Advisory Group (EPAG) and other experts in the field.

Our comments are primarily based on previous Royal Society studies. We would be pleased to provide copies of these and/or expand on any of the points outlined below:

— The main obstacle at present to the achievement of energy savings is that energy is too cheap to provide the motivation for maximising efficiency. Our economic instruments report (2002) shows that placing primary emphasis on well-designed economic instruments can provide considerable motivation and incentive across the industrial and domestic sectors for energy efficiency savings.

— The current UK Climate Change Levy goes some way towards promoting energy efficiency measures across the economy; however as we outlined in our 2001 report on the European Renewables Directive, it excludes major energy users such as households and transport. We recommend that the Government acknowledge and act on this issue in the forthcoming review of the UK Climate Change Programme.

— Although market mechanisms should have a principal role in driving energy efficiency measures, implementing the correct regulation is also important. Part L of the Building Regulations has been an effective measure for reducing building energy consumption in the last two decades, but it has only a limited impact on the existing building stock. In the domestic sector, the introduction of Home Condition Reports in 2007 (requiring the seller of a house to provide potential buyers a report on energy efficiency and other conditions on the house) will highlight and stimulate energy efficiency measures and generate information on home energy ratings. However further financial incentives are required to drive people in this sector to make efficiency investments to the fabric of their property, the benefits of which may only be realised after long periods of time.

25 October 2004

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Memorandum by The Royal Society for the Protection of Birds

Executive Summary
This inquiry is timely because the UK’s carbon dioxide emission projections have just been revised upwards, with the result that the cuts previously expected from the current suite of emission reduction measures will fall significantly. There is thus an urgent need for the UK either to put in place additional reduction measures or strengthen existing ones, or both.

In this memorandum, the RSPB outlines current energy efficiency policy in the UK and the measures that the Government has or will put in place in order to achieve the carbon reduction targets set out in the Energy White Paper 2003. We discuss the barriers to improving energy efficiency along with additional measures that the RSPB advocates.

We believe that much of the emphasis on making energy efficiency improvements has been placed on industry and that successive governments have failed adequately to tackle energy efficiency in the commercial sector or in households. With regard to households, there continue to be unnecessary trade-offs between improving energy efficiency and tackling fuel poverty.

In principle, we welcome the proposals to extend the Energy Efficiency Commitment (EEC). But in light of the revised carbon dioxide projections for the UK, we consider that the EEC for the period 2005 to 2008 should be strengthened by the obligation being set at 200 Terrawatt hours, rather than the 130 Terrawatt hours proposed. This would yield a carbon saving of about 1 MtC per year and should be achievable at net financial benefit.

We are broadly in favour of the proposed amendments to Part L of Building Regulations to improve building energy efficiency by 25 per cent. However, the Government should ensure that the Regulations are implemented, monitored and enforced. In addition, further amendments need to be undertaken as soon as possible in light of the Sustainable and Secure Buildings Act 2004.

We believe that targeted economic instruments will provide the correct signals to encourage householders to make energy efficient choices. A combination of price reductions for the most efficient products and price increases for the least efficient will give consumers a clear indication of the UK Government’s commitment to energy efficiency.

Introduction
1. The Royal Society for the Protection of Birds (RSPB) is Europe’s largest wildlife charity with over one million members. We manage one of the largest conservation estates in the UK with 182 nature reserves, covering more than 126,846 hectares. The RSPB is part of the BirdLife International partnership, a global alliance of independent national conservation organisations working in more than 100 countries worldwide.

2. We consider that human-induced climate change poses the biggest long-term threat to global biodiversity. We therefore support policies and measures that reduce the anthropogenic greenhouse gas emissions that cause climate change. We generally support the conclusions of the Energy White Paper, in particular its long-term target of reducing emission by 60 per cent by 2050.

3. To help meet that threat, we believe the heaviest emphasis must be on the largest, cheapest and least damaging source of carbon reduction—energy efficiency and lowered demand, in both the energy and transport sectors. Estimates of the cost effective savings from energy efficiency vary but are uniformly high. Currently, neither reductions in energy consumption, nor the adoption of energy efficiency measures and devices approach cost effective levels, and much more should be done through policy and public outreach to close the gap.

4. In addition to its long-term target of reducing carbon dioxide emissions by 60 per cent by 2050, the UK Government aims to reduce carbon dioxide emissions by 20 per cent by 2010, and comply with its formal Kyoto Protocol target to reduce emissions of the six main greenhouse gases by 12.5 per cent by 2010. This inquiry is timely because the UK’s actual carbon dioxide emission projections have just been revised upwards, with the result that the cuts previously expected from the current suite of emission reduction measures will fall from 15.4 per cent from 1990 levels by 2010 to 14.3 per cent. Even if new measures, such as the EU emissions trading scheme, are taken into account CO2 emissions are projected to fall by only 15.2 per cent by 2010, compared with the previously expected 16.3 per cent, well short of the UK target of 20 per cent. There is thus an urgent need for the UK either to put in place additional emission reduction measures or strengthen existing ones, or both.
BACKGROUND TO UK ENERGY EFFICIENCY POLICY

5. The UK plans to achieve the bulk of its emission reductions by reducing energy demand, mainly by increased energy efficiency. However, especially in the case of the 60 per cent target, it would be impossible to expect to achieve all reductions in this way. Assuming an increasing improvement in living standards, there are limits below which reducing energy demand (including energy efficiency) becomes increasingly expensive whilst improved energy intensity (more low or zero carbon energy supply) is comparatively cheap, especially if economies of scale are realised. Emissions reductions of 60 per cent or more require both energy efficiency (and demand reduction) and renewable supply.

6. The exact balance among energy efficiency (and demand reduction) and renewable technologies, and among the various efficiency and renewable technologies, could vary considerably. The main factors in deciding how policy should seek to affect that balance are cost, technical potential, and the potential impacts on health, safety and the environment, including wildlife. Political will, public education and people’s eventual willingness to modify lifestyles can also play an important role.

7. With respect to the balance between efficiency and renewable energy, in terms of both cost and impacts on wildlife, energy efficiency and demand reduction measures are generally to be strongly preferred in reducing greenhouse gas emissions. Demand reduction is almost inevitably cost beneficial and many forms of energy efficiency can be delivered at zero cost or, often, net benefit.

8. As energy efficiency and demand reduction offer the prospect of saving money at the same time as combating climate change, most of the climate change-related policies and measures adopted by the UK are primarily about efficiency and demand reduction. The table below shows those measures which are targeted at improving energy efficiency.

UK POLICIES FOR GREENHOUSE GAS EMISSION REDUCTIONS

<table>
<thead>
<tr>
<th>Policy</th>
<th>Estimated carbon saving (MtC equivalent) pa 2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Change Levy (CCL)</td>
<td>1.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>CCL exemptions</td>
<td>0.3</td>
<td>0.5</td>
<td>&gt;0.5</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>Climate Change Agreements and IPPC</td>
<td>1.3</td>
<td>2.5</td>
<td>3.3</td>
<td>&gt;4.2</td>
</tr>
<tr>
<td>UK Emissions Trading Scheme</td>
<td>2.0</td>
<td>2.0</td>
<td>&gt;2.0</td>
<td>&gt;2.0</td>
</tr>
<tr>
<td>Building regulations</td>
<td>0.8</td>
<td>1.4</td>
<td>&gt;1.0</td>
<td>&gt;1.0</td>
</tr>
<tr>
<td>Energy use in buildings</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Energy Efficiency Commitment</td>
<td>2.0</td>
<td>2.6–3.7</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Home energy efficiency scheme</td>
<td>—</td>
<td>0.2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Standards and labelling</td>
<td>—</td>
<td>0.2–0.4</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Central heating for fuel poor</td>
<td>—</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Public sector targets</td>
<td>—</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Fuel duty escalator to 1999</td>
<td>—</td>
<td>1–2.5</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>EU voluntary agreements</td>
<td>—</td>
<td>4.0</td>
<td>5.75</td>
<td>7.5</td>
</tr>
<tr>
<td>Ten Year Plan</td>
<td>—</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Sustainable distribution</td>
<td>—</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Total carbon saving in 2010, compared to 1990 levels (all gases).</td>
<td>25.95</td>
<td>23 per cent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. The Energy White Paper suggests that, of the additional cuts of 25 MtC needed by the UK by 2020, 8–12 Mt are likely to come from energy efficiency (plus a further 2–4 Mt from the EU emissions trading scheme, which will itself tend to drive energy efficiency), and only 3–5 Mt from an increase in renewables.

34 From the The UK’s Third National Communication under the United Nations Framework Convention on Climate Change, Defra 2001.
35 Soon to be supplemented and, in 2008 superseded by the EU Emissions Trading Scheme (EU ETS).
36 Including the effects of other related measures.
37 After 2010, estimates are included under energy efficiency commitment.
38 After 2010, estimates are included under energy efficiency commitment.
39 Includes differentiated Vehicle Excise Duty and changes in company car taxation concerning carbon dioxide.
40 The EU emissions trading scheme should give a further saving of 1.5 MtC by 2008.
10. To a large extent, current carbon reduction policy already tends to favour energy efficiency over renewable supply because of the strong preference for market-based fiscal (and voluntary) policy instruments, such as emission trading, the climate change levy and associated agreements. This approach inherently favours energy efficiency and demand reduction over renewable supply options, since market solutions rationally lead to the least cost solution, and efficiency is generally cheaper than renewable supply.

**Barriers to Uptake of Energy Efficiency Measures**

11. Energy efficiency normally has clear advantages in terms of emission abatement, cost, technical feasibility and impacts on wildlife, but it is often practically and politically difficult to devise and implement policies that encourage its widespread take-up. The first reason is that energy costs in both business and in homes typically represent quite a small proportion of total outgoings. There is thus little financial incentive to cut energy use, although recent rises in energy prices will increase this incentive in all sectors. Linked to this is the fact that energy saving devices sometimes require significant capital outlay, typically being more expensive than less efficient products that fulfil the same function. Thus, although they save money in the longer term, the higher initial cost is often a significant barrier to their exploitation. Also, there is often a reluctance to switch from a tried and tested technology to another, newer one.

12. As a consequence, energy efficiency measures and technologies, even when they yield significant costs savings and are subsidised by government, usually have slow and limited take-up. Examples of this include energy saving white goods (such as fridges, washing machines and condensing boilers) and compact fluorescent light bulbs. With the establishment of the EU appliance efficiency labels, this situation is beginning to change.

13. The slow acceptance of energy saving appliances is compounded by an ongoing trend to consume more energy. In the domestic sector, for example, the average home not only has far more energy consuming devices than it did a few decades ago but the perception of what constitutes a comfortable living temperature has also risen. In fact, domestic energy efficiency in homes has risen significantly over the decades but it has been offset by the increase in energy use.

14. A major hindrance to the widespread uptake of energy efficiency and reduced demand has been political—a reluctance by successive governments to introduce policy that would force more action from ordinary people by, for example, taxing domestic heating fuel, or applying the climate change levy “downstream” directly on ordinary homeowners. A justifiable fear that such policies would exacerbate fuel poverty has also been a powerful political constraint on action in that sector. Even when it has attempted to influence individuals in the domestic sector, the Government has preferred to act indirectly, through the energy supply industry. For example, the Energy Efficiency Commitment places an obligation on electricity and gas suppliers to meet efficiency targets on behalf of their customers by persuading them to purchase more energy saving goods. While the Energy Saving Trust is focused principally on improving efficiency in the domestic sector, it has been given few resources or policy tools to go far beyond the provision of advice.

15. Partly because of political factors constraining action in the domestic sector, the Government has increasingly turned to putting the onus for achieving efficiency gains upon big business and industry. Most of the contribution to carbon reduction in the next few years will come from energy efficiency in this sector brought about by a combination of the emissions trading scheme and the climate change levy and its associated agreements. Even in the industrial sector, however, perceived impacts on the competitiveness of UK industry have acted to constrain Government’s ambitions, with the result that industrial targets for carbon reduction have generally been weak, and have been confined to some sectors and not others. For example, under pressure from strenuous lobbying from industry, the UK National Allocation Plan (NAP) under the EU Emissions Trading Scheme (ETS) ended up with a very small target reduction, focused exclusively on the power generation sector, since power is not internationally traded. In fact, subsequent analysis by the Carbon Trust has revealed that adverse impacts on UK industry will be negligible, except in the case of aluminium.41 Even for firms that are captured under one or more of the general fiscal instruments, economically rational efficiency decisions are often missed, especially by smaller firms for whom energy represents a relatively small proportion of expenditure. For this reason the Government has employed a number of flanking policy instruments, including direct support for business efficiency through the Carbon Trust, and indirect support through enhanced capital allowances for eligible efficiency technologies, to increase and accelerate uptake of business energy efficiency.

16. The fundamental problem with this approach is that potentially large, inexpensive, and environmentally benign carbon savings from energy efficiency and demand reduction are being missed, especially in the domestic sector. It is also arguable that, in spite of the emphasis of current policy on business energy efficiency, insufficient policy instruments are available to increase the uptake of energy efficient measures in commercial sectors, especially among small and medium sized enterprises.

RSPB Policy on Energy Efficiency and Demand Reduction

17. In general, the RSPB advocates much greater Government action to improve energy efficiency and reduce energy demand. Whilst recognising the various practical and political constraints on policy to encourage greater energy efficiency, we believe that very much more should be done, especially in the domestic and commercial sectors, where we would propose a target for a 40 per cent improvement in energy efficiency by 2020. Rather than continuing to use the scourge of fuel poverty as a reason to postpone or weaken domestic action on energy efficiency, the existing fuel poverty strategy should be significantly strengthened and resourced, to accelerate the rate at which the problem is reduced and eventually eliminated. Much more effort should be made to educate and inform the public about the consequences of their energy choices, and financial and other instruments put in place to channel those choices in rational directions.

18. In principal, we welcome the proposed extension to the Energy Efficiency Commitment (EEC). However, in the context of upwardly revised emissions projections, the RSPB considers that the EEC for the period 2005 to 2008 should be strengthened by the obligation being set at 200 Terrawatt hours, rather than the 130 Terrawatt hours proposed. This would yield a carbon saving of about 1 MtC per year and should be achievable at net financial benefit (we note that it was originally Defra’s intention to treble, rather than double, the obligation and our proposal is consistent with this). Consideration should also be given to extending the EEC to the commercial sector.

19. The RSPB is also generally supportive of the proposals to amend Part L of the Building Regulations to improve building energy efficiency by 25 per cent. However, the Government needs to ensure that local authorities are adequately financed so that building control departments can ensure the regulations are implemented, monitored and enforced. In addition, now that the Sustainable and Secure Buildings Act has been passed by Parliament, the Government needs to ensure that the new powers that this Act provides are used effectively by amending Building Regulations as soon as possible. For all new homes we recommend requiring that by 2006 the Ecohomes “Excellent” standard is met.

20. The use of targeted economic instruments will also provide the correct signal to encourage householders to make energy efficient choices. A combination of price reductions for the most efficient products and price increases for the least efficient will give consumers clear direction of the UK Government’s position in relation to action to improve energy efficiency as part of its drive to reduce UK carbon emissions.

21. The RSPB believes that lowering VAT on products with an improved environmental performance will encourage consumers to switch away from products that cause more damage to the environment. In terms of energy efficiency, we support the introduction of 5 per cent VAT on:

   - A-rated household appliances (especially cold appliances).
   - Compact Fluorescent Lamps (CFLs).
   - DIY energy efficient products such as loft insulation and draught stripping.

22. As an important complementary measure, the RSPB believes that HM Treasury should impose a charge on the least energy efficient products. These would include:

   - A 10–20 per cent charge on household appliances with an EU Energy label rating of C to G.
   - A 50 pence charge on tungsten light bulbs.

23. In addition to these measures, we believe that homeowners should be encouraged to improve the fabric of their property to make it more energy efficient. Measures which should be adopted to achieve this include:

   - Stamp duty rebates for installing energy efficiency measures.
   - One-off Council tax rebates where energy efficiency measures have been installed.
   - Incentives for house builders to adopt standards beyond Building Regulations. This could be offered as a rebate on Corporation Tax or as a cash-back payment, linked to the extra cost of construction.

43 ODPM Consultation on the Proposals for Amending Part L of the Building Regulations (October 2004).
24. It is uncertain that, even with the introduction of all the measures outlined above, the Government will achieve the carbon reduction targets that are needed from improved energy efficiency. It is likely that other measures will also be needed. This will include the provision of additional advice and information to householders on energy efficiency and how this will contribute to the reduction of the impacts of climate change.

*October 2004*

**Memorandum by Sciotech**

**Energy Prices**

When energy is cheap and does not carry its social-environmental cost, there is little incentive to save energy. Conversely when energy is expensive as from 1978 to 1984, oil was $40/barrel and there was intense activity in energy efficiency. By the time that industry had responded the oil price had dropped to $10/barrel and pollution and greenhouse gas emissions were not yet the concerns that they are today.

However this time, the oil price has risen rapidly from $20 to in excess of $50/barrel because demand has exceeded the industry’s ability to supply. This has been predicted for some years and there is significant evidence that the world’s supply is close to peaking and thereafter it is likely that oil production will decline at the rate of ca 3 per cent per annum.\(^{44}\) The increase in oil price has led to a corresponding increase in gas price which in turn has increased the demand for coal so that one can conclude that the era of cheap energy is over.

*So unlike any previous energy “crisis”, there is now a sustained need to increase end use efficiency into the foreseeable future.*

If consumers (and utilities) knew what the energy prices would be during the life time of their investment, then a rational decision could be made whether to invest in demand or supply. This decision would also be helped by energy carrying its full price through transferring the external costs from society to the user.

*Consideration to be given to using taxation to provide a consistent price for energy which should increase in real terms as resources are depleted and concerns about pollution grow.*

**Demand and Supply**

The Government’s response to date has been to encourage supply side to expand its capability rather than emphasize the opportunities to reduce demand. Society can however choose whether it wishes to invest in increasing the supply or managing the demand. Supply requires an investment decision ultimately by one enterprise which can employ energy analysts and economists to make a rational business decision. Demand requires decisions by thousands of consumers based on their diverse viewpoints of energy economics, the conflicting signals about energy prices and a lack of balanced information about the long term benefits of investing in energy efficiency.

*Balanced information to be available locally and at point of sale about options for investing in energy efficient products.*

**Rate of Borrowing and Payback Time**

The Government’s response to getting utilities to invest in energy efficiency is its energy efficiency commitment which is financed by the consumer directly through being debited £3.60 per year. This equates to a Government target of 62 TWh at an average cost of no more than 1.0 p/kWh or approx 30 per cent of the cost of investing in supply. Utilities seem to have little difficulty in meeting this target so suggesting the huge potential still available for achieving greater penetration of energy efficiency.

A large enterprise such as a utility can typically borrow money at bank rate plus say 0.5 per cent, a small enterprise at say bank rate plus 5 per cent and an individual at an even higher rate of interest.

If individuals could borrow at a rate similar to that of large enterprises then investment in energy efficiency would become more attractive. In the extreme case one could argue that monies should be lent at zero interest rate, which has been tried by utilities such as Scottish and Southern Energy and found to have some success.

*Low interest loans to be made available by utilities, banks or building societies so that consumers can invest in improving end use efficiency.*

\(^{44}\) C Campbell and J Laherrere, “The end of cheap oil” *Scientific American* March 1998; also R Mayer and R Bentley, House of Lords Select Committee on Energy Security HL paper 82 d 12.02.02.
VAT on Supply and Demand

A further barrier for introducing energy efficiency is the rate of VAT which for consumers is 5 per cent on supply but 17.5 per cent on demand side measures. Since the Government was able to convince the European Commission that VAT should be reduced from 17.5 per cent to 5 per cent for supply, the same argument could presumably be used for reducing the VAT rate for products which are energy efficient. This will require an amendment to current VAT legislation which currently only allows one VAT rate to be applied for any product group.

When this was discussed by the EU finance ministers, the Commission argued against this proposal on the grounds of difficulty of implementation. However differential VAT is already in widespread use throughout the EU (0, 5 and 17.5 per cent for the UK) so this is an invalid argument.

Reconsider UK policy on differential VAT for energy efficient products and convince other member states like France to reopen discussions with the Commission.

Consumer Time Horizon and Information Flow

Large scale investment by consumers is only likely if the payback time for the extra investment in energy efficient products falls within the consumers’ time horizon.\(^{45}\) This applies equally whether it is a low energy light bulb with a payback time of say six months or an energy efficient condensing gas boiler whose payback time may be greater than the life of the appliance.

Reducing the cost of investment should be accompanied by an increased flow of information about the benefits of investing in energy efficient appliances in order to extend the consumers’ time horizon.\(^{46}\)

Simply putting a label on the most energy efficient products does not allow consumers to make a rational decision or a comparison between different models in terms of energy or environmental impact. For example modern washing machines use about half the amount of water, energy and detergent of older appliances and wash cleaner and dry better than older models. This information is contained within the EU energy label which gives comparative rankings for energy efficiency as well as specific performance criteria. However only about 1/3 of consumers have any knowledge about the EU energy label.

Increase information flow to consumers about energy efficient products and EU energy labeling in a rational way to encourage investment in energy efficient products.

Education for Sustainable Development (ESD)

One could argue that our current lifestyle is not sustainable for even one more generation because of increasing constraints on supply and the need to reduce environmental pollution associated with energy use.

The 2003 UNECE conference in Kiev attended by European environmental ministers agreed to develop a strategy and policies to promote such an educational initiative. The UN will initiate a decade of promoting ESD starting in 2005 whilst this will also be a theme of the forthcoming Austrian presidency of the EU.

Some limited trials in UK schools, most recently this year, have shown that themes such as global warming and what each can do to mitigate climate change can be understood by pupils as young as year five.\(^{47}\) The challenge is for pupils not only to involve their own parents in how to reduce their energy consumption (and utility bills), but also what they can do when they grow up and start their own family.

Education for sustainable development to become a core topic within the national curriculum with resources put in place to support this initiative.

Education for Energy Efficiency

Purchasing energy efficient appliances requires both the seller and the buyer to have a rational discussion of what meets the consumer’s needs best in terms of performance, economics and the environment. For this dialogue to be successful the consumer needs to ask the appropriate questions and for the retail staff (or installer) to have sufficient training to be able to give the appropriate answers.

\(^{46}\) Rayner Mayer and Randall Bowie, “Public awareness initiatives for an energy sustainable Europe”, EEDAL ’03, Turino October 2003.
\(^{47}\) R Mayer, S Turan and J Krivosik, “Saving energy in the home; environmental educational modules for use in primary and high schools by Sciotech Projects”, October 2004; see also European appliance information system http://www.eais.info
A national educational strategy is required which can be implemented locally. This requires not only provision of suitable courses but also taking the training to those who need it.

Specific queries posed by select committee:

MEASURES

The most appropriate measure of energy efficiency is the ratio of energy used to energy delivered. Environmental impact to be measured by UK average CO₂ emissions to produce one unit of energy.

Discussions under way about revisions to the EU framework directive on energy labeling should include how to incorporate the environmental impact of energy use. Information on utility bills should include information about environmental impact in the form of CO₂ emissions.

UK to promote addition of environmental information to EU energy label.

Utilities to add to existing bills the associated CO₂ emissions; also how the previous 12 months usage compares with the national average per family (in terms of energy and emissions) and where consumers can find advice about reducing their bill locally or via a phone line.

BEHAVIOURAL ASPECTS OF ENERGY EFFICIENCY SCHEMES

Current information is insufficient and unbalanced so the consumer is in general not able to make a rational decision about how to reduce his utility bills (and save the environment). Advice to consumers needs to be available at local level and the Citizens Advice Bureaus would be best able to deliver such information. However this expansion of their tasks would need to be financed either locally (or regionally) and training courses and resources provided possibly as part of Agenda 21.

Expand advice to consumers at local level.

SCOPE FOR IMPROVEMENT END USE EFFICIENCY

The scope for improving end use efficiency is very large as studies over the past 30 years have shown. Transforming the market for investment in energy efficient appliances, products and houses requires identifying and overcoming all the barriers in a systematic manner as has been undertaken for heat pump heating systems.48

The involvement and commitment of all the key participants is essential in developing the market as it is in their and the country’s long term interest. For example once a house is well insulated not only will the fabric be better sustained but also it will benefit the dwelling and the occupants during the life of the dwelling which could be as long as 100 years.

An energy efficiency target to be set which will match that proposed by the Commission of 2 per cent improvement in energy efficiency per annum.

ENERGY EFFICIENCY OF BUILDINGS

The potential for energy efficiency of buildings is enormous because the UK housing stock is aging rapidly as the replacement rate is now less than 1 per cent of the housing stock per year. So the average house will now have a lifetime of at least 100 years. Improvements in building fabric and energy performance should therefore be very attractive provided that these are undertaken together.49 Putting an energy efficient boiler into a poorly insulated home is not as cost effective as increasing the insulation and reducing the boiler and radiator sizes at the same time.

Installers of heating systems to be trained to assess energy performance of the building as well as the heating system and to be able to recommend the most appropriate level of insulation and heating system with the lowest environmental impact.

Energy labeling of buildings is a further concept which is being promoted within the new EU directive on energy performance in buildings. This is important when buildings are sold or rented.

48 “Electrical heating and cooling of residential buildings, a study on transforming the European market for energy efficient heating/cooling appliances”, SAVE study D127/022, final report dated October 1998.
Whilst the provisions for assessment of the heating system only apply above 1000 square meters there is no reason why this should not also be undertaken for smaller dwellings like single family homes.

*Heating systems of all buildings whatever their size to be inspected after a period of 15 years and recommendations made as to how to improve the efficiency of the existing or consider alternative heating systems like renewable energy systems.*

**Energy Efficient Consumer Goods**

In many sectors energy efficient products already exist which could implement enormous savings; the EU estimated in 2000 that half the EU’s savings in CO₂ emissions required to meet compliance with the EU’s Kyoto target could come from energy efficiency alone. So the prime target should be gaining acceptance of the potential of existing technology and that global warming can be mitigated by everyone doing something to improve energy efficiency and reduce utility bills.

Barriers to market entry such as lack of knowledge at point of sale, inability to select most appropriate and efficient products and optimum methods of sizing and installation need to be addressed in a systematic manner.

*Implement strategies to overcome barriers to market entry of energy efficient products and services.*

**Funding and Coordinating Energy Efficient Research**

This has always been inadequately addressed because it is multi-disciplinary in nature. Moreover it is not fashionable like other areas of science or technology and energy efficiency and can, in many cases be easily implemented by the consumer without any scientific or technical knowledge.

However energy efficiency measures alongside renewable energy sources are the most sustainable way of developing a UK energy policy. Space and water heating in buildings is best done by combining renewable energy sources with high building performance and energy efficient boilers such as heat pumps.

*A viable and sustainable energy efficiency strategy, policy and research budget is required to be set alongside those for renewables and clean coal technologies.*

**Memorandum by Solar Thermal**

**The Situation with Regards to Heat**

The Energy White Paper’s targets for reductions in the amount of carbon dioxide emitted by the UK are ambitious. The DTI estimated that heat generation of one sort or another accounted for 32 per cent of the UK’s final energy consumption. Despite the significance of heat as a proportion of our overall energy usage, most of our Government’s efforts to promote renewables and reduce carbon emissions have been aimed at the electricity generation sector. Most efforts related to heat have been aimed at improving efficiency, through for example insulation. Whilst the Government has recognised the contribution of renewable heating systems there has been a lack of specific policies to promote them. 8 per cent of the energy the UK uses is devoted to heating water as buildings, particularly houses become more energy efficient in heat terms, hot water will represent an even more significant part of overall energy use. In this context, active solar heating technology can provide even more effective and significant reductions in our carbon emissions.

**Solar Thermal Technology**

*How it works*

The sun generates an enormous amount of energy. Very large quantities of this energy reach the Earth’s surface. Solar Thermal heating systems exploit the part of this energy that arrives in the form of heat and use it to heat up water.

A typical system would consist of a collector, cylinder, boiler, controller and pump. Light from the sun is used to heat up a surface within the collector. This surface is likely to be selectively coated to maximise heat absorption and is known as the black body or absorber. If the temperature of the hot water cylinder is lower than that of the collectors, then the controller will start the pump. The pump circulates a fluid, usually water with glycol or just water depending on the design of the system, through pipes that are in contact with the absorber. Heat is then transferred from the absorber to the liquid in the pipes. These pipes also pass through
the cylinder. As they pass through the cylinder, heat is transferred from the pipes to the water inside the cylinder. Depending on the amount of thermal energy being collected (it varies with conditions and time of year), heat from the collectors can remove the necessity for the boiler to be active in heating water or can effectively preheat the water reducing the quantity of energy that needs to be used to heat the water to the desired temperature for use.

Though it is not mandatory with every system, many of the solar thermal water heating systems on the market are sold in conjunction with new higher efficiency boilers often of the condensing variety.

Condensing boilers have an extra heat exchanger that utilises heat from the boiler’s exhaust gases to pre heat water in the boiler system. This has the result of improving their efficiency, the National Energy Foundation suggest that condensing boilers can achieve 95 per cent efficiency during normal operation, this is an improvement on conventional boilers. The Energy Saving Trust estimate that condensing boilers in combination with the correct heating controls can reduce a household’s fuel bills by up to 40 per cent, reflecting a marked improvement in energy efficiency.

Scale

This technology can be employed on a range of scales. It can be fitted to residential properties to provide a significant share of their hot water needs.

The technology can also be used for larger scale applications in the UK there have been larger scale projects to provide for the hot water needs on the scale of schools, homes for the elderly, public swimming pools, town halls and office buildings.

At the largest scale, solar thermal technology can be employed as part of district heating projects. Often it is used in conjunction with biomass for low carbon domestic heat generation. This has taken place in a number of Northern European nations such as Sweden, Denmark and Germany as well as some Southern European nations.

The Savings

In terms of the residential scale, estimates vary between the various systems. Depending on specific households’ usage patterns, the range across the various systems is from 40–70 per cent of the household’s hot water usage. The amount of useful energy contributed by the solar thermal system is estimated, by the solar trade association, to be in the region of 1,500 to 2,000 kWh annually. This assumes energy usage of about 3,000 kWh per year for water heating being used by a family of four. In terms of overall energy saving, this will depend on the type of system and items installed with it.

The manufacturers’ estimates of carbon saved range from half a ton to a ton and a half of CO2 saved a year per dwelling. The yearly savings achieved in terms of reduction in the annual energy bill range between £50–£120 depending on usage and system. Side by side testing of 8 different home hot water heating units found that the active solar thermal systems produced, between 1,000 and 1,300 kWh. Moreover, the energy usage of pumping systems ranged from zero to approximately 108 kWh.

At the medium scale there is a much greater variety of projects and thus bigger range of potential savings. For example, a feasibility study for a school swimming pool project predicted 10 tonnes of carbon savings annually. Burton on Trent town hall has up to 70 per cent of its hot water needs supplied by solar thermal technology.

At the very largest scale there is also significant variation depending on the project. An example is Kungälv in Sweden. It is one of the largest solar thermal heating plants in Europe and generates 4,000,000 kWh of solar heat annually avoiding the production of more than 1,000 tons of CO2. The plant generates in combination with bio mass wood chip boilers.

Barriers to Implementation

Public Awareness—This was highlighted by the findings of the ATLAS project. The report highlighted “lack of awareness amongst the general population”, which it is not clear has been rectified as it is again mentioned in the Solar Trade Association’s recent report into the UK solar market.

Lack of Installers—The solar trade association points to a lack of trained installers in the UK, this they claim is leading to complaints of poor quality work that tarnish the representation of solar thermal. Carbon Trust aims to resolve this by providing funding for a solar thermal training course syllabus called “SunTrain” which
energy efficiency: evidence

will allow plumbing colleges to more easily teach solar. However, there is a general lack of workers with plumbing and heating skills in general that should be addressed.

Planning—The need to obtain planning permission for some solar thermal installations is a further complication to the process of obtaining a solar thermal installation. All residential Solar Thermal installations should be classed as permitted developments in planning legislation as a bare minimum.

Finance—The cost of an installed retro fitted domestic solar thermal system ranges between about £2,500 and £4,000. Costs can be reduced in the case of new build installations or DIY as a significant cost results from retro-fit installation. The life cycle of solar thermal installations ranges from 20 to in excess of 30 years in many cases.

The ATLAS project mentioned the small size of the UK solar market and general lack of awareness as contributing to high marketing costs and thus increasing overall costs of solar thermal installations. Addressing both of these issues is vital to solving the finance related problem for residential systems. This does not seem to have been achieved yet, the solar trade association estimates there to be around 42,000 units in operation in the UK. Out of the potential number of properties (around 20 million), this is a poor level of proliferation. Especially considering that the UK could be saving more than 20 million tonnes of CO2 with this technology.

Currently the main assistance that an individual wishing to install one of these systems would receive is in the form of a Clear Skies grant. This used to be £500, but since July 2004 this figure has been reduced to £400. A key issue is the lengthy pay back period of these products. In most residential cases this is not less than 10 years.

The cost of the larger projects is clearly going to be dependent on their size. Currently Clear Skies offers not for profit organisations the lesser of 50 per cent of the cost or £100,000 grants for all forms of renewable projects on the basis of case by case applications. The Carbon Trust offers businesses enhanced capital allowances, which allow them to write off the whole cost of the investment in solar thermal against taxable profits during the period during which they make the investment. Anecdotally, there seem to have been problems with both these schemes in terms of conflict of interest occurring at the level of the grant awarding board for Clear Skies and whether the scheme to encourage businesses is effective at all. Once again the issue of the pay back period looms large at this scale too.

Solving this should be a key objective for a government wishing to promote this mature carbon emission reducing technology.

**Solving the Finance Problem**

Given the lower cost of installing solar thermal in new build situations, one least cost option is to alter building regulations to require it to be installed in all new build properties. ODPM statistics suggest that on average over the past five years over 145,000 new dwellings were completed each year in England and Wales, if even half of these had solar thermal installed as a matter of course in conjunction with high efficiency condensing boilers, in excess of 75,000 tons of CO2 could be saved annually at a relatively low cost when spread over the life span of the system. It would be possible to specify that all new developments have solar thermal, the larger developments would represent an even larger carbon saving.

A heat obligation could be established. If it is set up along the same lines as the current renewable obligation functions along, a system of heat obligation certificates trading could be set up. Solar thermal installations could qualify for this and thus the resident would receive an annual payment in the same way that owners of micro generation equipment do now for their ROC. This scheme would reduce carbon emissions through encouraging greater efficiency and the installation of solar thermal, bio mass and other forms of renewable heat generation. Renewable district scale schemes could also qualify and therefore be encouraged.

The Government could offer interest free loans for the installation of solar thermal units. The current problem is related to the large initial outlay and long period over which the returns accrue. If it was possible that individuals paid for their solar thermal system over a period nearer to the lifetime of the system, house holds may find it easier to see the benefit of installing the system. One of the current problems is that house holds pay for their current heat energy as they use it on a monthly basis. However, those who use solar thermal have to pay for all of the energy that they will get from the sun over a thirty year period in one payment in advance. If part of the reason for the long pay back periods and apparently high start up costs is the small size of the market. Central and local government could expand the size of the market directly in a number of ways. There is the aforementioned requirement to install solar thermal. The Government could encourage/require local councils and ALMOs to install solar thermal progressively in their housing stock through percentage of suitable housing stock targets. Due to the large number of properties under their control this could greatly increase the number of units being sold and also the tonnes of carbon emissions being avoided. Moreover,
training a work force to install these systems would create jobs and skills in the local area. In addition, the systems could go some way to tackling fuel poverty given the sizeable reductions they can bring about in heating bills. Public buildings should be encouraged to install solar thermal, this would set a positive example of functioning solar thermal to the outside community and due to their generally larger size a larger carbon saving.

**Memorandum by Paul Spare MSc CEng FIMechE FEI—Energy Consultant**

**Introduction**

1. The basic hypothesis that increasing the efficiency of energy processes on the micro scale can reduce consumption on the macro scale is fallacious. It is a lamentable failure in political education that this gross misunderstanding is repeated regularly and remains a fundamental policy of some government agencies. Substantial and varied evidence is available to demonstrate that increased efficiency increases consumption. As this deduction is sometimes counter-intuitive, it may be difficult for non-engineers to accept, but this error needs to be publicised more widely if the delusion is to be disposed of once and for all. The following evidence is relevant.

**The Industrial Revolution**

2. When the first steam-powered pumping plants were built over 200 years ago, their efficiency was no more than about 1 per cent—measured as useful work output divided by thermal energy input. Gradually, improvements in design (starting with the separate condenser), better materials and the thermodynamic cycle saw this increase to about 30 per cent. The result was not a reduction in the quantity of fuel used, but an increase by a factor of thousands over a period of 100 years, as the new machines cut the cost of pumping mine water and encouraged new enterprises to take advantage of cheaper coal.

**Electricity**

3. The end of the 19th century saw the start of large scale electricity generation. The generators were very small—only tens of MW. Most power was still generated from coal-burning steam engines, with heating by coal and lighting by gas. Electricity was very desirable and demand increased—replacing steam and gas in many applications. Coal consumption did not reduce however, since electricity stimulated industrial activity. As productivity increased, more coal was needed for fresh outlets.

**Motor Vehicles**

4. Similar evidence can be found with the private car with its internal combustion engine. Forty years ago, engines were very often less than 1 litre capacity. After the seventies oil crisis, EC directives and similar legislation have forced increased engine efficiency and reduced fuel consumption. According to the incorrect government premise, total fuel consumption should have reduced, but the opposite has occurred. Reduced fuel consumption has enabled customers to buy cars with larger engines and achieve greater convenience for the same fuel consumption. Average engine sizes have increased, with basic vehicles having 1.5 to 2 litre engines and a high proportion of large cars having engines of 3 litres and above. Transport is now the sector where greenhouse gas emissions are most out of control and where there is the clearest evidence that higher efficiency increases energy demand.

**Winter Fuel Allowance**

5. The Government has provided a £200 allowance to underprivileged households for several years. The purpose of the allowance is to provide enough money for people to keep warm in the winter—ie to remove the restraint that would normally stop them from buying more fuel because of its high cost. The same result would be achieved if their appliances were to be made more efficient; the relative cost of their fuel would go down and they would be inclined to buy more—as with any commodity where demand is elastic.
**Interim Summary**

6. Increased efficiency will always reduce the net cost of the utility and attract marginal consumers. Any consumers that do reduce their fuel use will have extra money available to buy new goods and services that will in their turn consume more fuel and energy. This process can be seen in all economies. As states industrialise and develop more advanced technologies, their per capita energy consumption increases; it does not decline.

**Areas for Reduction**

7. According to the latest DTI energy statistics, transport is the largest final energy consumption sector, at 56 Mtoe (p 9 of UK Energy In Brief—July 2004). The other three sectors are: Domestic 47.9 Mtoe; Industry 34.6 Mtoe; Services 19.5 Mtoe. This total of 158 Mtoe is an increase of about 15 per cent since 1980. If an attempt is being made to reduce consumption, it is most beneficial to start with the largest contributor. Unfortunately, that is transport—the sector that is specifically excluded from the work of the Committee.

8. Looking at electricity, a greater change can be seen. Consumption has increased by 44 per cent since 1980 and by 65 per cent since 1970. The Industrial, Services and Domestic sectors have similar shares.

9. There are financial pressures on the industrial and services companies to reduce any costs (energy is no exception) to improve profitability. Companies in these sectors are approached as corporate units and although more encouragement may be needed, regimes exist to provide advice and assistance. Let us therefore consider the domestic sector, where energy use has grown steadily, so that it is the largest consumer of electricity, but where the position is far more fragmented.

**The Domestic Sector**

10. The use of electricity in the domestic sector is spread over a multitude of machines, lighting, heating, entertainment and gadgets. The consumption of individual appliances will be very small in many cases, although the aggregate is large. Can new technology improve the efficiency of the equipment? It would take an enormous R&D effort to reduce the consumption of this vast range of equipment, much of which is changed every few years. Even if improvements could be made, consumers cannot be forced to buy the most efficient. Other factors affect the choices people make when selecting equipment. A huge number of appliances are imported from the Far East, North and South America as well as the EC. We may have little or no control to force foreign manufacturers to improve their products.

11. The cost of electricity has been reduced in recent years, so there is less incentive to select economical equipment. The average bill is of the order of £300–£400 per year. Depreciation on a new family car, by comparison may be £4,000 per year. Reducing electricity bills by 10 or 20 per cent may require massive changes in behaviour, but will bring little financial benefit to a household. I know from my own experience and that of other engineers in the energy field that bombarding households with appeals to turn off lights and unattended equipment meets with very little success.

**Power Generation Fuels**

12. By far the greatest improvement to CO$_2$ production would be brought about by the replacement of coal or gas-fired power stations by thermal nuclear plants. The burning of a premium fuel such as natural gas is a particularly myopic and destructive choice. I advised against the use of natural gas for electricity generation over 20 years ago, but short-term thinking overcame this logic and North Sea supplies are already in decline. Coal is a dirty fuel, but at the present time there is little other demand for it and as an indigenous resource, is very valuable in the face of political interruptions to oil supplies. Reversing the “Dash for Gas” does however make much sense.

13. In 2003, gas provided the fuel for 38 per cent of electricity generation. The thermal efficiency when used in this process may be about 45 per cent. Electricity took about 30 per cent of the gas consumed—325 TWh about 1 trillion ft$^3$—producing about 40 million tons of CO$_2$. This use of gas for electricity was almost as much as the domestic sector—386 TWh. So the life of North Sea gas for domestic use could be almost doubled if gas-fired electricity generation were to cease. More particularly, when used in domestic fires and boilers, the thermal efficiency can reach 85 per cent, so that the release of the same quantity of CO$_2$ would take place over twice the time period. This needs to be a complementary policy to the building of new nuclear power stations.
Efficiency Criteria

14. With regard to the interaction between energy efficiency and gross output of the economy, a certain amount of caution is needed or the wrong conclusions may be drawn. If the mix of economic activities remains generally the same over a period of years, then if GDP increases at a faster rate than energy use, it can be safely concluded that efficiency is improving. The situation in the UK over the last 25 years has departed from this norm. Industries such as engineering and manufacturing have been in steady decline as consultancy/service industries have expanded. The former sectors use heavy machinery and are energy intensive; the latter sector is not. An increase in domestic product involving mainly office activities would be accompanied by a reduction in energy use and hence an apparent improvement in energy intensity, but this could exaggerate the real gains in energy efficiency.

October 2004

Memorandum by United Utilities

Introduction

United Utilities has significant energy interests. We are a major user of electricity, a generator, distributor and provider of metering and connections services. Our core business is in utility management. We own and operate water, wastewater, electricity and gas infrastructure in the North of England. Taken together, our UK operations account for one third of one percent of UK electricity consumption, mainly in the energy-intensive treatment and transportation of water and wastewater.

Although we do not supply energy, we do provide energy services to hundreds of businesses. For example, our partnership with the Welsh Development Agency will achieve 15 per cent of the Welsh Assembly’s emission reduction targets for the SME sector. We also have expertise in CHP through our own operations, and work with partners.

Government (including Ofgem) has instigated and supported a large number of grant schemes, partnerships and advice services over the last couple of decades. Although there have been pockets of good practice, our general view is that this work has been underfunded and fragmented. Persuading large numbers of consumers to use less of a resource which is (i) historically cheap; and (ii) in seemingly plentiful supply remains a challenge without strong incentives for changing consumer behaviour.

The Most Appropriate Measure of Energy Efficiency

Going back to first principles, the energy efficiency of a process is the ratio of the energy input against a theoretical minimum level of consumption needed for the process. “Inefficiency” is due to losses, generally heat.

To stimulate innovation to increase energy efficiency, efficiency figures could be quoted against gross, rather than nett, energy content. Stoichiometric combustion is the theoretical maximum amount of energy that can be released from burning a fuel, giving a fuel’s gross energy content. In the same way, it is possible to calculate the theoretical minimum amount of energy required to achieve a goal—from making steel to a complex manufactured product.

However, manufacturers often refer to efficiency against “nett energy content” where certain losses have been removed from the gross, which leads operators to think they are “95 per cent efficient” when they may only be 80 per cent. Although adopting this measure of “efficiency” will show lower percentage values, its broad use will encourage people to question where the “lost” energy is, leading to innovation that will drive efficiencies up.

The Relationship Between Improvements in Energy Efficiency and Overall Energy Use and Carbon Emissions

Tonnes of carbon dioxide equivalent is a useful way of looking at emissions and it will be the international language of emissions trading, enabling relationships to be drawn between relationship of money and emissions into common language. There is also good historic data available (for example, from the Office of National Statistics).
The Behavioural Aspects of Energy Efficiency Schemes—the Quantity and Quality of Public Information Available on Energy Efficiency, and Whether the Public is Sufficiently Knowledgeable and Motivated to Achieve Energy Savings

There is a lot of information and advice available but too often fragmented and hard to find at the right time. The price signal of rising fuel bills will feed increased interest in energy efficiency. But the key is to make energy efficiency cheap and accessible.

We favour market mechanisms where possible, but with energy efficiency there is a clear case of market failure. Rational behaviour would see individuals looking at whole life costs of their investments, when replacing a boiler, installing double glazing or cavity insulation. The reality is of course that few individuals behave in this way; there is little incentive to invest to save when payback periods are longer than the average time individuals own their properties.

Public policy should therefore concentrate on supporting consumers to make the right choice. That may be through improved information, but it is also likely to require financial incentives to reduce payback periods. Energy Services Companies (ESCOs) can play a big role here, provided they, too, are given appropriate incentives.

Public agencies also have a major role, accounting for over 40 per cent of the economy. Procurement decisions need to capture energy savings. New buildings funded in part or wholly by the public sector, and public sector offices and other estate, should be exemplars for the behaviour government wants to see adopted in the rest of the economy. And public agencies’ regulatory and policy functions could be used to direct higher standards of building design.

We have mixed experience of this. For new build, in a major public-private regeneration scheme for which we provided utility services in North Manchester, energy management elements of the scheme were the first casualties of cost cutting. On the other hand, we are seeing growing interest from local authorities and RSLs in managing energy efficiency in their housing stock.

The Scope and Incentives for Improving Energy Efficiency, and Reducing Waste, Across the Economy, in Both Private and Public Sectors

United Utilities believe that there is significant scope for improving energy efficiency in these sectors, by focusing on three areas:

— Establishment of incentives on the way organisations procure plant, goods and services. There is scope to ensure that public sector purchasing policies have a requirement to include energy efficiency and associated technology as contract award criteria. The Government could also review the current VAT arrangements to provide benefits to organisations who purchase goods and services that have energy efficient credentials, as well as reviewing the ECA framework to ensure that the full range of energy efficient technologies can qualify.

— Establishment of grants to stimulate investment. The Community Energy Programme (CEP) has been instrumental in stimulating the growth of District Heating in the Public Sector. The CEP is currently under review and we would recommend a substantial extension of the scheme. We would also urge the Government to consider other grants to stimulate other energy efficient technology. We would advise caution in the construction of grant schemes; in our experience, many schemes have had little effect and have either become vehicles for consultants to make money or have been focussed on “demonstration projects”; future grants should be targeted at significant projects across all sectors.

— Extension of market mechanisms to provide clear pricing signals to sustain that investment. The recent publication of the Energy Efficiency Action Plan failed to address the contribution that business could make to the delivery of benefits in energy efficiency. The risk, for example, is that schemes like EEC2 will simply incentivise cavity wall insulation, whilst failing to capitalise on the significant contribution from technological innovation. We would urge the Government to consider the introduction of market mechanisms, such as the ability to trade EEC-type credits between organisations engaged in the supply of energy, and also the ability for organisations within the supply chain to qualify for credits under future energy efficiency schemes.
Innovative Schemes to Use District Heating or CHP in Order to Reduce Overall Energy Demand

There are clearly economic factors that influence the viability of district heating and CHP schemes, such as the difference between the price paid for purchase of input fuel, versus the price at which the output can be sold (including heat purchasing in the case of district heating). When viewed as a stand-alone project, it is often difficult for investors to make it past this hurdle.

In order to maximise the benefit of such technology, we need to link the investment in technology to a wider range of benefits, not simply the exported value of heat and power, through the establishment of more comprehensive schemes. One way is to encourage the extension of the ESCO model into the Public Sector. United Utilities are currently working with a Local Authority to explore ways in which an ESCO can be established to share the investment risk in a district heating scheme that has already been planned, but also to consider other investments over a 20 year period (including the adoption of existing CHP and the construction of new CHP plants) that will help deliver the objective of “carbon neutrality”. The advantage is that the ESCO can access a wider range of benefits and income streams, and the ESCO will be well placed to consider new technologies (such as DCHP, wind etc.) as they emerge. District heating installation costs are often significant for pipework infrastructure.

Government could also look to the opportunities for incentivising more effective use of “waste” heat from thermal power stations. Large power stations (over 20 MW thermal input) producing low-grade heat could be incentivised to use the heat generated. Government assistance would be needed to enable this significantly.

The Funding and Co-ordination of Research into Energy Efficiency Measures in the Domestic and Industrial Sectors, and how well Research is Transferred into Applications

It is currently difficult to secure funding for research. The budgets available are transient and limited. Reasonable budgets should be fixed and held for at least three years to increase industrial and domestic sector familiarity with application processes, and confidence of securing grant support.

For those prepared to share findings, a higher level of grant should be payable, as this allows the free sharing of knowledge, essential to significant innovation, which is often only truly effective after a few iterations.

25 October 2004