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European Union Committee

27th Report of Session 2007–08

# The EU's Target for Renewable Energy: 20% by 2020

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## FOREWORD—What this report is about

In January 2008, the Commission published the 20 20 by 2020 package. This includes proposals for reducing the EU's greenhouse gas emissions by 20% and increasing its proportion of final energy consumption from renewable sources to 20%. Both of these targets are to be achieved by 2020. In order to meet the EU renewable energy target each Member State will be given a national target to meet based on their existing renewable generation, their GDP and a flat-rate increase for all. The UK's proposed target is 15%.

We conclude that the target level and date are underpinned both by analysis of what is feasible for the EU and by political considerations. We are concerned, however, that achieving 20% of energy from renewable sources by 2020 will be extremely challenging. We note that in a push to meet the target emerging renewable technologies may be neglected and investment may not be aimed at the most cost effective renewable generation technologies over the long term. We recommend, therefore, that the Government increase their support for research. We also recommend that the Commission consider regularly the impact on emerging technologies of Member States' efforts to meet the target.

The Commission's proposals include creating a standardised Guarantee of Origin (GoO) certification scheme for renewable energy. This would allow a market in GoO certificates to be created. Member States could then meet part of their targets by counting energy generated in another country for which they have bought the GoO certificate. The Commission believes this will create the flexibility needed for Member States to meet their targets. We recognise that some flexibility will be necessary, but are concerned that GoO trading has the potential to undermine efforts to increase renewable generation domestically. We recommend that the Government commit to achieving a significant proportion of the UK's target domestically.

We conclude that reducing the absolute level of final energy consumption through energy efficiency and saving measures should be the starting point of the Government's strategy for meeting the target. We believe that by spring 2009 the Government should commit to an energy consumption reduction target, such as 20% by 2020, and publish a comprehensive strategy specifying the steps needed to achieve this.

The majority of the evidence we received concentrated on meeting the renewables target through renewable electricity. However, Member States may work towards their targets using energy for heating and cooling purposes or for transport, as well as for electricity. We believe the Government should commit more fully to increasing the level of renewable heat in the UK. We also received evidence on the potential importance of microgeneration. We recommend that the Government increase grants available for microgeneration and introduce support aimed specifically at encouraging renewable heat.

We recognise concerns that the target date of 2020 may lead to the EU becoming reliant on existing renewable technologies, particularly wind power. We believe the Government must provide support to bring emerging technologies to commercial viability as quickly as possible. We also considered the contribution the proposed Severn Barrage project could make to meeting the target. Although the Severn Barrage may be able to provide large amounts of renewable electricity, the timescales involved mean that the Government cannot and should not rely on it to reach the 2020 target.

One of the principal barriers to the UK meeting its target is the problems experienced by renewable generators in gaining access to the electricity grid. We believe that renewable generators should be allowed to connect to the grid ahead of grid capacity upgrades. We also believe that new grid should be built ahead of firm commitments from renewable generators where it is likely that new grid will be needed. We recognise the risk of such new grid becoming a "stranded asset". We recommend Ofgem keep the issue under review and propose that any grid investments planned under this system should be reported annually to Parliament for scrutiny and the Government should report on their outcome. We recommend the Government introduce legislation to amend Ofgem's duties to prioritise sustainable energy generation as well as protecting the consumer.

The supply chain to the renewables industry constitutes a barrier to increasing renewable generation. The current condition of the supply chain means that there is simply not the industrial capacity to increase the UK's renewable generation fast enough, regardless of the wishes of energy suppliers. We urge the Government to come forward with proposals specific to overcoming the problems of the supply chain in the renewables industry.

Another significant barrier to achieving the UK's renewables target is the planning system. We welcome the introduction of an Infrastructure Planning Commission (IPC) proposed by the Planning Bill currently before Parliament but further measures are needed. We recommend that the Government should apply the provisions of the Electricity Act 1989 to all renewable generation projects with a capacity above 20MW to give planning consent power to the Government.

We are not convinced that the Renewables Obligation (RO) is the most appropriate support scheme for all types of renewable generation. Although we conclude that it would be too disruptive to replace the RO entirely, we recommend the Government create a feed-in tariff scheme to work in parallel with the RO. Generators could then choose the support scheme most appropriate to their operation. We urge the Government to act quickly in this area following their consultation so that investors are able to operate within a stable policy context.

We note that meeting the target will result in increased energy costs for consumers. Not only does this underline the need for energy efficiency policies but also means that action will need to be taken to shield the least well-off from the impact of increasing renewable generation.

We also recommend that in order to ensure continued investment in renewables and in emerging technologies in particular the Government and EU should consider adopting a target 2030 as well.

In conclusion, we believe that the scale of the challenge for the UK should not be underestimated. We believe that the target is unachievable unless the Government take quick and decisive action on all fronts, including encouraging large-scale generation, microgeneration and energy efficiency. We believe the renewables target should be agreed to because without the political momentum it will provide the UK will continue to under-perform on renewable generation and will be in an increasingly poor position to move away from fossil fuels in the future.

# The EU's Target for Renewable Energy: 20% by 2020

## CHAPTER 1: INTRODUCTION

1. In January 2008 the Commission published the 20 20 by 2020 package[1]. This package proposes committing the EU to a 20% reduction in its greenhouse gas emissions and to achieving a target of deriving 20% of the EU's final energy consumption from renewables sources, both by 2020.

2. The renewables target is outlined in the Commission's proposed Directive on the promotion of the use of energy from renewable sources[2]. Final energy includes energy used for heating and cooling, electricity generation, and transport. It is this proposal that is the focus of this report.

3. In order to achieve the overall EU renewable energy target of 20% the proposal includes individual targets for each Member State (see table 1). The UK's proposed target is 15%. These targets apply to the Member States' final energy consumption; earlier EU legislation[3] and the UK's domestic renewables targets[4] were concerned with electricity generation alone.

4. The draft Directive does not set this particular target in terms of low carbon or low emission energy. Instead, the target refers specifically to "renewable sources". This means that nuclear energy and carbon capture and storage are not included as viable technologies for meeting the target as their fuel sources are not renewable. Biomass is included because its fuel comes from renewable sources.

5. The 20 20 by 2020 package was preceded by a number of other Commission papers. Agreements at the European Council meeting in October 2005 at Hampton Court led to the publication in March 2006 of the Green Paper, A European Strategy for Sustainable, Competitive and Secure Energy[5]. The Green Paper led to the publication in January 2007 of the First Strategic Energy Review[6] and, in March 2007, to an Action Plan: Energy Policy for Europe 2007–2009[7]. These exploratory and strategy papers contributed to a number of pieces of proposed legislation, including the gas and electricity liberalisation package and the 20 20 by 2020 package.

6. The Government published a consultation on the UK's Renewable Energy Strategy in June 2008[8]. This document outlines a number of the problems associated with increasing renewables and puts forward some possible policy

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1 20 20 by 2020: Europe's climate change opportunity, COM(2008)30 final

2 On the promotion of the use of energy from renewable sources, COM(2008) 19 final

3 Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market, OJ L 283 (27 October 2001) p 33–40

4 Energy White Paper: our energy future—creating a low carbon economy, Cm 5761, February 2003.

5 COM(2006) 105 final

6 An Energy Policy For Europe, COM(2007) 1 final

7 European Council Action Plan (2007–2009), Annex 1, Presidency Conclusions, European Council 8–9th March 2007 (7224/1/07)

8 UK Renewable Energy Strategy consultation http://www.berr.gov.uk/files/file46799.pdf

options. The consultation will inform the Government strategy for meeting the target to be published in spring 2009. Evidence for our inquiry was taken before the Government's consultation document was published. During our evidence session with Malcolm Wicks, the Energy Minister, we discussed the proposed publication date for this report and its relation to the consultation. The Minister stated that this report would be helpful and timely (Q 289). We hope therefore that our report can contribute to the consultation process.

7. The report is split into three main parts: chapter two addresses the proposed renewables Directive itself; chapters three and four describe its implications for the UK, the barriers to be removed and the incentives to be provided to increase renewable deployment; and the final chapter discusses the achievability of the target and the implications for the UK if our national target is agreed to in Council.

8. Our inquiry was directed to the target proposed by the Commission and accepted by Member States, using the definition of renewable energy now envisaged in the Commission's draft Directive. It does not therefore deal with nuclear power, or with other technologies, e.g. use of hydrogen, which fall outside that definition. We do not address the matter of whether it is right to classify all first generation biofuels as renewable, or to classify all fossil fuels as non-renewable even if used with full Carbon Capture and Storage (CCS) facilities. These issues fall outside the scope of this report. Nor do we address the potential conflict that may therefore arise between meeting the targets set under the EU's definition of renewables and future priorities of a UK government that aims to meet energy supply, security and environmental objectives through greater emphasis on nuclear and other energy options.

9. The report does not consider in detail the continued exploitation of fossil fuels and nuclear power. However, we note the importance to energy security of exploiting conventional fuel sources within a viable long term carbon reduction policy, including what remains of the UK's oil and gas reserves[9], as well as pursuing policies related to energy efficiency and renewable energy. It is likely in the short to medium term, given present policy commitments and investment decisions, that it will be difficult to avoid an increasing contribution from fossil fuels.

10. The report does not cover other areas related to energy policy such as transport biofuels and the emissions trading scheme, or the overall economic arguments for and against renewable energy, some of which are the subject of inquiry by other committees[10].

11. We based our inquiry on an acceptance of the assumption that it is desirable that the UK and EU increase their use of renewable energy for environmental reasons and to improve energy security. Therefore, we did not investigate the science of climate change, nor did we focus on the EU's external relations with oil and gas producing countries[11].

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9 The Government estimates that there is 21–27 billion barrels of oil equivalent of oil and gas remaining to be produced from the UK Continental Shelf. The Energy Challenge: Energy Review Report, Cm 6887, July 2006

10 See report forthcoming EU Select Committee report on EU Emissions Trading Scheme and forthcoming Economic Affairs Select Committee report on the renewable energy target.

11 For further details see EU Select Committee, 14th Report (2007–08): *The European Union and Russia* (HL 98)

12. The inquiry was conducted by Sub-Committee B (Internal Market) (see appendix 1). We heard oral evidence from a wide range of witnesses, and received a large volume of written submissions. The Committee travelled to Brussels to meet further witnesses and also visited the offshore wind farm at Scroby Sands, the onshore turbines at Avonmouth docks and two micro-generation projects in Bristol. Witnesses are listed in appendix 2 and we are grateful for their contribution. We also thank our Special Adviser, Dr Robert Gross, Imperial College, London.

13. **We make this report to the House for debate.**

## CHAPTER 2: THE RENEWABLES DIRECTIVE

14. The proposed renewables Directive seeks to address "the dual objective of increased security of supply and reduced greenhouse gas emissions"[12]. The main aim of the proposed Directive is to set a target for the EU to achieve 20% of its final energy consumption (including heating, transport and electricity) from renewable sources.

15. The proposed Directive also contains provisions requiring Member States to ensure that planning and administrative procedures are proportionate and transparent, that information regarding renewables is promoted, that certification schemes are in place for renewable technology installers and that guidance on the use of renewables is provided for planners and architects. These measures are all aimed at enabling Member States to reach their target.

16. The EU has legislated previously to increase renewable energy generation, within the electricity sector. In 2001 the Community committed itself to achieving non-binding targets on renewable electricity. Directive 2001/77/EC set a target of 21% of electricity generation from renewable sources by 2010. The Commission expects that approximately 19% will be achieved by that date[13]. The UK set its own domestic targets in the 2003 Energy White Paper[14] to produce 10% of electricity from renewable sources by 2010. The UK appears unlikely to meet that target given that in 2007 only 4.96% of electricity was renewably generated[15]. Because of this lack of EU-wide progress, the European Council called on the Commission to propose more forceful legislation.

### Why 20% by 2020?

#### *Only a political slogan?*

17. There has been criticism that the 20% by 2020 target is more a slogan than an empirically based target (Helm p 212). The Commission and the Government agreed that the 20% was not arrived at solely by "deeply scientific" reasoning (Q 405 and Q 317). There was also a political aspect as the European Parliament had already proposed a more stretching target of 25% (Eluned Morgan MEP Q 367). The Commission argued, however, that its target is grounded in studies carried out to determine what level would be feasible given the EU's generating resources, what level would be affordable for the EU as a whole and what level would appear suitably ambitious (Q 405).

18. A further element of the Commission's thinking in proposing a 20% emissions reduction target, alongside the 20% renewable energy target, is that it expects other targets to be adopted at an international level. In the Communication 20 20 by 2020: Europe's Climate Change Opportunity, the Commission set the emissions reduction target at 20% "rising to 30% if there is an international agreement"[16].

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12 On the promotion of the use of energy from renewable sources, COM(2008) 19 final

13 Ibid.

14 Op. Cit.

15 UK Energy In Brief July 2008, BERR, http://www.berr.gov.uk/files/file46983.pdf

16 20 20 by 2020 Europe's climate change opportunity, COM(2008)30 final

### *Too much, too soon?*

19. The UK Renewable Energy Strategy consultation states that to meet the target around 3,000 extra UK offshore wind turbines will need to be built before 2020. During our visit to Scroby Sands, Norfolk, the state of development of offshore wind farms was described as still being a "cottage industry" and we were told that a move from medium-scale to large-scale wind farms is happening only now. This process can be seen in the increase in generating capacity from Scroby Sands (60MW) to the Robin Rigg site under construction in the Solway Firth (180MW) (see appendix 5).

20. Some witnesses took the view that 20% by 2020 would be too much, too soon. Ofgem argued that the 2020 target would make the EU more reliant on a single renewable energy source, wind power (Q 199). It is estimated that in the timescale to 2020 the most mature renewable technology will be wind power and therefore meeting the 2020 target will rely heavily on an increase in wind generation (see paragraph 19). Lord Oxburgh, former Chairman of the House of Lords Science and Technology Committee whose report Renewable Energy: Practicalities was published in 2004[17], agreed that with a longer timeframe other technologies such as wave and tidal power may be available for greater exploitation, although he did not call for it (Q 124).

21. National Grid was concerned that the necessary reliance on wind to meet the 2020 target may "crowd out investment in other forms of renewables". They warned that the Directive may put too great an emphasis on meeting the target rather than "looking for the cheapest and quickest way to reduce carbon" significantly (Q 151).

22. We also received evidence warning against a longer timeframe. npower warned against "getting lost in the romance" that other technologies, such as marine power or solar electricity, were closer to commercial viability than they really were. If increases in renewable energy are to be achieved in the short to medium-term then wind power needs to be deployed (Q 264). Greenpeace argued that the 2020 target date was "not just an arbitrary number". Rather, it reflected a timeframe that industry regarded as practical but which was also close enough to create sufficient political momentum (Q 322). Both npower and E.ON argued that any moves to push back the deadline for the renewables target would create uncertainty in the market just at the time when investors are looking for credible renewables policies. Any such uncertainty would make increasing renewable generation significantly more difficult (Q 264).

23. Witnesses pointed to steps that are currently being taken to ensure that Europe does not become dependent on a limited number of technologies. Greenpeace argued that the Intelligent Energy Europe programme and the various EU-funded technology platforms were working to bring emerging technologies, like wave and biomass, closer to market (Q 350 and Q 380). The Commission echoed this view (QQ 423–424).

24. Although the Government do not explicitly address the problem of dependence on particular renewable technologies, they are consulting on ways to encourage innovation in the renewables sector. The UK Renewable Energy Strategy consultation outlines the support given by Government to energy technology research (p 207). This includes the Energy Technologies

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[17] See Science and Technology Committee, 4th Report (2003–04): *Renewable Energy: Practicalities* (HL 126)

Institute and the Technology Strategy Board. Each of these supports research aimed to accelerate the development of new energy technologies.

25. It was also argued that climate change science makes the discussion, of whether 2020 is too soon, otiose. Malcolm Wicks said that climate change dictated that action had to be taken soon to lower emissions (Q 317). Eluned Morgan MEP stated that EU emissions needed to begin falling by 2015 if the EU was to contribute to ensuring global average temperature increases did not exceed pre-industrial levels by more than 2°C[18] (Q 372).

26. Many witnesses saw a danger of the renewables target becoming a focus in its own right, rather than as a tool for achieving decarbonisation. The Climate Change Bill currently before Parliament will commit the UK to cutting $CO_2$ emissions by a minimum of 26% by 2020 and 60% by 2050[19]. Witnesses argued that policy-makers must look down "the other end of the telescope, the 2050 end" (Lord Dixon-Smith Q 202) and that the 2020 target is properly viewed as a "stepping stone to meeting 2050 carbon and energy goals" (Malcolm Wicks Q 288).

27. We do not agree with witnesses who state that the target was reached purely on political grounds. However, we recognise that feasibility studies and the imperatives of climate change were not the only factors considered. **Furthermore, as the target date has now been accepted in principle by the European Council we do not recommend that the 2020 deadline be extended.**

28. We recognise the too much, too soon argument and we share the concerns of some witnesses that the target of 2020 may favour wind power to the detriment of investment in emerging technologies. We welcome the Government's recognition of the importance of encouraging emerging renewable technologies. **We recommend that the Government increase their support for research into renewable technologies and ensure that the work of Government-funded research organisations is properly co-ordinated.**

29. **We recommend that as part of its regular assessment of Member States' progress towards the target the Commission should consider whether emerging technologies such as wave and tidal power are likely to be disadvantaged by the strategy and if so whether further intervention or research support is necessary.**

### Guarantees of Origin

30. Guarantees of Origin (GoOs) are a system whereby each MW of renewable energy generated is certified so as to guarantee its renewable credentials. A system of GoOs was introduced in previous renewables legislation (Directive 2001/77/EC). This Directive set out the minimum requirements for GoOs but their use was voluntary. Some Member States used them as a means for energy suppliers to prove their eligibility for financial support. Other Member States made little use of them. The Commission argued that this had led to different specifications for GoOs developing between Member States[20].

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18 This is one of the EU's climate change aims. See Limiting Global Climate Change to 2 degrees Celsius: The way ahead for 2020 and beyond (COM (2007) 2 final)

19 Climate Change Bill 2007–08

20 COM(2008)19

31. The proposed renewables Directive contains provisions for a new GoO scheme. The Directive would standardise the eligibility requirements for GoOs so that they can be used to measure Member States' renewable energy output more reliably. The Commission also sees GoOs being used as a tradable good so that an internal market in renewable energy can be created. This would allow Member States to meet their energy targets by generating renewables domestically as well as by buying GoOs accrued elsewhere in the Community.

32. The Commission told us that GoOs were necessary as the renewable targets for individual Member States were related to GDP, not generating potential. Therefore, GoOs were needed to allow some Member States to meet their targets in the most cost effective way. They gave the example of Luxembourg as "a small country with a relatively limited potential but a high target because they are lucky enough to be rich". It may need to meet its target by investing in renewables in poorer countries with higher generating potential. Bulgaria and Romania were cited as examples where the opposite could be true (Q 414).

33. Malcolm Wicks argued that although he expected most of the UK's target to be met through domestic generation, it was "important to develop the notion of trading" to achieve the target cost-effectively (Q 295). The Department for Business, Enterprise and Regulatory Reform's impact assessment of the Directive stated that intra-EU trading would reduce the UK's compliance costs by 30%. Other witnesses suggested that without GoOs it would be unlikely that the UK could meet its target (EDF p 196).

34. Some witnesses argued that the GoO proposals, as currently drafted, would not be flexible enough to allow the UK to make the necessary use of GoOs. Article 9 of the proposed renewables Directive states that Member States meeting or exceeding their indicative trajectories towards their targets can request their national competent body (the organisation assigned to deal with the issuing and recording of GoOs—in the UK this would be Ofgem) to trade surplus GoOs with other Member States. It also allows transfers between energy companies, subject to prior authorisation being given by the exporting Member State Government. npower argued that GoO trading needed to be more flexible and should be open directly to companies, without prior Government approval (pp 113–114). EDF agreed, arguing that the system currently proposed would "obstruct trading and force the UK to rely almost entirely on domestic measures to deliver its target obstruct trading and force the UK to rely almost entirely on domestic measures to deliver its target" (p 196).

35. Other witnesses were cautious about using a certificate trading scheme to meet the target. For example, Centrica warned that excessive reliance on GoOs would weaken investor confidence in the UK's renewables market, making it harder to increase domestic generation (p 117). Greenpeace argued that while Member States might work together to reach their targets, a trading scheme between energy companies would undermine national support schemes. They warned that energy companies would invest only in those countries with the most generous schemes. This would make achieving their target difficult for some Member States and overload the support schemes of others (QQ 336–339). Other witnesses also agreed that GoOs had the potential to disturb national support schemes (British Wind Energy Association p 96 and Scottish Power p 246).

36. Simon Roberts of the Centre for Sustainable Energy argued that, given its generating resources, if the UK needed to rely on GoO trading then that would be "a sign that the UK has not got its support mechanisms right rather than because the resources were that much better somewhere else" (Q 224).

37. Although it continues to support GoO trading, the UK Renewable Energy Strategy consultation recognises the potential dangers. It proposes limiting GoO trading to a specified portion of the UK's target.

38. None of the evidence received was very clear about how GoO trading would work in practice. Indeed, the details of an intra-EU scheme have yet to be decided, and various proposals are being debated by the Commission, European Parliament and Member States. Most submissions accordingly concentrated on whether the principal of GoO trading was appropriate. **GoO trading will very likely have to be relied on to fulfil some part of the UK's commitments. We believe, however, that a significant proportion of the 15% target should be met domestically to ensure that GoO trading does not undermine efforts to increase the UK's renewable generation capacity.**

39. **We recommend that the Government specify soon the maximum proportion of the UK's target to be met using GoO trading so that the extent of their reliance on them to meet the target is known.** This should help to create the stable and predictable investment environment the energy companies require.

### Legal base

40. The legal bases for the proposed renewables Directive are Article 95 (internal market) and Article 175(1) (environment) of the Treaty Establishing the European Community. Both of these provisions involve the co-decision procedure between the Council and European Parliament, and Qualified Majority Voting in Council.

41. The Government's explanatory memorandum on the proposal argued that Article 175(2) alone would be more appropriate, as that Article provides for the adoption of "measures significantly affecting a Member State's choice between different energy sources and the general structure of its energy supply". On the face of it, Article 175(2) appears relevant to the proposed measure. This legal base would subject the proposal to unanimity in Council and would involve only consultation of the European Parliament.

42. According to the explanatory memorandum, the Commission rejected the use of 175(2) because Member States already use renewables. It argued that increasing renewable generation would not alter the general structure of a Member State's energy supply given that the same grid infrastructure is used as for conventional power.

43. Eluned Morgan MEP stated that the European Parliament would not "concede territory" on the legal base as that would reduce their role from co-decision to consultation only (Q 400).

44. The Government are clearly alive to the issues of the proposed legal base and we expect the matter will be fully discussed during negotiations.

## CHAPTER 3: MEETING THE TARGET

### The UK's target

45. The draft renewables Directive would set the UK a target of 15% of its final energy consumption to come from renewable sources by 2020. In 2005, the UK produced only 1.3% of final energy from renewables. The only Member States to produce less were Malta and Luxembourg (see table 1). The Member States' targets were determined using a methodology that included a flat rate increase in renewables for each Member State of 5.5% and an additional increase based on each Member State's GDP per head[21]. A cap was applied to prevent any Member State being required to deliver over 50% of its energy mix from renewables.

46. Although 15% is not the highest target assigned to any Member State, the UK has the largest percentage point increase to achieve. Sweden, for example, will be committed to achieving 49% but in 2005 it was already producing 39.8% of its energy renewably. Other Member States have been assigned challenging targets. Luxembourg, for example, must increase its renewables level from 0.9% in 2005 to 11%. Denmark, Ireland, Germany and France all have been set percentage point increases close to the UK's.

**TABLE 1**

**National renewable targets[22]**

| | Share of energy from renewable sources in final consumption of energy, 2005 | Target for share of energy from renewable sources in final consumption of energy, 2020 |
|---|---|---|
| Belgium | 2.2% | 13% |
| Bulgaria | 9.4% | 16% |
| The Czech Republic | 6.1% | 13% |
| Denmark | 17.0% | 30% |
| Germany | 5.8% | 18% |
| Estonia | 18.0% | 25% |
| Ireland | 3.1% | 16% |
| Greece | 6.9% | 18% |
| Spain | 8.7% | 20% |
| France | 10.3% | 23% |

[21] Impact assessment accompanying the package of implementation measures for the EU's objectives on climate change and renewable energy for 2020, SEC(2008)85

[22] From Commission Document COM(2008) 19 final, Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

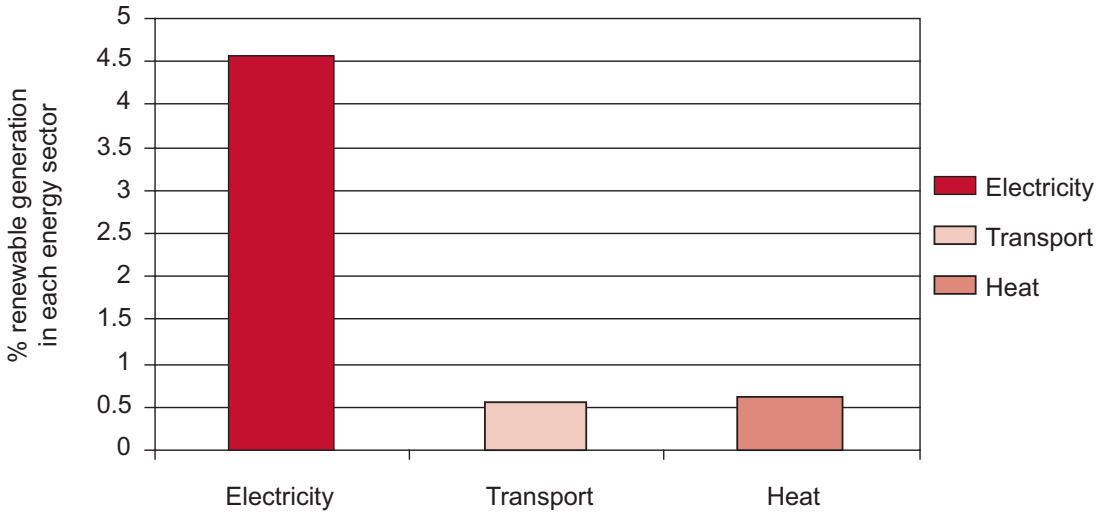
| | | |
|---|---|---|
| Italy | 5.2% | 17% |
| Cyprus | 2.9% | 13% |
| Latvia | 34.9% | 42% |
| Lithuania | 15.0% | 23% |
| Luxembourg | 0.9% | 11% |
| Hungary | 4.3% | 13% |
| Malta | 0.0% | 10% |
| The Netherlands | 2.4% | 14% |
| Austria | 23.3% | 34% |
| Poland | 7.2% | 15% |
| Portugal | 20.5% | 31% |
| Romania | 17.8% | 24% |
| Slovenia | 16.0% | 25% |
| The Slovak Republic | 6.7% | 14% |
| Finland | 28.5% | 38% |
| Sweden | 39.8% | 49% |
| United Kingdom | 1.3% | 15% |

47. Currently, the UK's final energy use is split into around 41% of energy used for heating and cooling, 37% for transport and 22% for electricity generation (see appendix 7). Whereas earlier legislation specified that renewables should be deployed through the electricity sector, the draft Directive would include a mandatory 10% target for renewable transport energy but in other respects leave Member States free to encourage renewables in any of these sectors.

48. It seems likely that the electricity sector will be used to provide the bulk of the UK's renewables. As outlined above, the Government have published a consultation into how best to achieve the 15% target and what contribution towards the target each energy sector might make. The UK's level of renewable heat is currently very low (around 0.6% of heating and cooling energy comes from renewable sources) and the mandatory 10% renewable transport energy aspect of the package is already contentious, largely because there is debate about the sustainability of biofuel crops.

**FIGURE 1**

**UK renewables use in 2006**




*Electricity and heat figures from UK Renewable Energy Strategy Consultation document. Figure for renewable transport energy from HMRC Hydrocarbon Oils Bulletin, July 2008.*

49. The Government have estimated that at least 32% of electricity will need to come from renewable sources in order to meet the overall 15% target. Other witnesses estimated 40% (British Energy p 183, Ofgem p 70, Business Council for Sustainable Energy UK p 254). In 2006, only 4.55% of electricity generation was renewable. In the UK Renewable Energy Strategy consultation, the Government have estimated that meeting the target will require an extra 30GW of renewable electricity generating capacity.

## Energy efficiency and energy saving

50. For some witnesses energy efficiency was "absolutely central" to meeting the renewables target (Eluned Morgan MEP Q 361). As the target is expressed as a percentage, reducing energy demand was a crucial first step to meeting the 15% target (Centre for Sustainable Energy Q 220 and UKERC p 264).

51. The UK Energy Research Centre (UKERC) have estimated that if "aggressive demand reduction policies" were put in place then around a fifth of the 15% target could be met without additional renewable energy generation (p 267).

52. The UK Renewable Energy Strategy consultation argues that energy efficiency measures can be a cheaper way of achieving emissions cuts than building new renewable generation. These efficiency measures must be, therefore, the starting point for the UK's energy policy. Although the consultation document includes some details about energy efficiency policies, the Government expect to consult further on energy efficiency in the autumn.

53. The Commission said that the feasibility studies for the EU 20% target took account of demand reduction. Hans van-Steen of Directorate-General Energy and Transport described the renewables target as a method of "stimulating efforts on energy efficiency" and said that without effective demand reduction it would be very hard to meet the 20% target (Q 426).

54. In its conclusions, the spring 2007 European Council committed the EU to reducing its energy use by 20% by 2020[23]. This was to be done using the provisions for National Energy Efficiency Action Plans contained in the Directive on energy end-use efficiency and energy services [24]. This Directive proposed an indicative, non-binding national energy savings target of 9% by 2016 for each Member State. In its Energy Efficiency Action Plan submitted to the Commission in 2007[25], the Government estimated that current and announced measures, if sustained, would achieve a reduction in energy use of 18% by 2016 (p 5). This seems to us optimistic on current policies.

55. To achieve the 15% target efficiently it is sensible to work to lower the absolute amount of energy consumed. **Therefore, we believe that energy efficiency measures must form the starting point for the Government's drive to meet the 2020 target. The scale of the challenge facing the UK means that action is necessary on all fronts.**

56. We welcome, as a first step, the Government package of measures announced on 11 September 2008 to help households become more energy efficient.

57. **However, we are disappointed that the Government are not consulting in depth on energy efficiency as part of their Renewable Energy Strategy work as this suggests that demand reduction will not be a central part of the strategy to meet the target. We believe the UK should commit to an energy reduction target, such as 20% by 2020, by the spring of 2009 with a fully worked-out strategy specifying the steps needed to achieve this.**

## Renewable heat and micro-generation

### *Renewable heat*

58. The proposed Directive allows for Member States to meet their overall energy targets through renewable heating and cooling as well as renewable electricity. Whereas electricity generation can be sited some distance apart from consumption, and the power moved from one to the other via the grid, the same is not true for heat. The Government's explanatory memorandum on the renewables Directive stated that there are significant barriers to increasing the use of renewable heat, such as a lack of transmission infrastructure. Currently 0.6% of the heating sector is from renewable sources.

59. Whilst city-wide heat networks and medium sized renewable Combined Heat and Power plants are in existence in several countries (Denmark, for example), renewable heat is often small-scale and generated close to demand. For this reason, discussion of renewable heat is often linked with micro-generation and we follow this convention here.

60. According to the Government, domestic renewable heat technologies are not currently competitive with conventional technologies like gas central heating. However, this assessment is dependent on the price of fossil fuels.

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23 Council document 7224/07 REV1

24 Directive 2006/32/EC on energy end-use efficiency and energy services, OJ L 114 (27 April 2006) pp 64–85

25 UK energy Efficiency Action Plan 2007

61. British Wind Energy Association (BWEA) argued that given the current low level of renewable heat it would not be possible for the heat sector to play a large part in attempting to meet the 15% target. In their view, renewable heat could only provide 3–4% of the UK's final energy consumption (p 93).

62. On the other hand, the Sussex Energy Group warned that interpreting the "renewable energy target into an equivalent renewable electricity target" risks making the 15% target harder to achieve (p 247). Centrica suggested that given the size of the heat sector (the UK Renewable Energy Strategy consultation estimates it accounts for 41% of final energy demand) there is significant scope for achieving increased renewables deployment through renewable heat (p 116). Furthermore, as the Directive does not concentrate exclusively on renewable electricity, making little use of renewable heat would overburden the electricity sector. Scottish and Southern argued that increasing the UK's use of renewable heat would reduce significantly the amount of renewable electricity required to meet the 15% target (p 241). EDF argued that to meet future, higher $CO_2$ reduction goals decarbonisation of the heat sector would be necessary. It would therefore be short-sighted to ignore renewable heat (p 197).

63. The UK Renewable Energy Strategy consultation estimates that around 14% of heat (5.74% of final energy consumption) should come from renewable sources by 2020 (p 7). In his evidence to us, Malcolm Wicks recognised the need to make use of the heat sector (Q 300). However, Juliet Davenport of Good Energy argued that although renewable heat could contribute significantly to meeting the target, policy in this area "has not been addressed very well yet, if at all" (Q 99).The UK Renewable Energy Strategy Consultation recognises this and states that to achieve an increase in renewable heat the Government will need to address both financial constraints and a number of other demand-side factors (p 114). The consultation identifies these demand-side constraints as limited awareness of renewable heat by local authorities and the general public; the air quality impact of biomass combustion; supply chain issues; and planning and building regulations.

64. To meet these challenges the consultation proposes providing a Renewable Heat Obligation similar to the Renewables Obligation for electricity generation (see box 1) or creating a Renewable Heat Incentive scheme similar to a feed-in tariff (see box 2) (pp 114–122).

### *Micro-generation*

65. Micro-generation is defined in the Energy Act 2004 as heat generation below 45KW and electricity generation below 50KW. It includes technologies like heat pumps and solar panels. The Government's assessment is that micro-generation will not have a large part to play in renewable electricity generation and will not contribute greatly to meeting the UK's target (Q 10).

66. It was also put to us that micro-generation should receive attention not only for its potential heat and electricity generating capacity, but also because it can help raise awareness of energy use and energy efficiency. Juliet Davenport of Good Energy was of the view that micro-generation "grasps people's imagination: my house is my castle, I generate my own power" (Q 100).

67. We received evidence that currently the cost of domestic micro-generation discouraged people from considering it. Both of the witnesses we met in Bristol who have micro-generation facilities in their homes agreed that they had installed them as a matter of principle rather than for economic reasons. Installing solar panels had been so expensive that had they been making a purely economic decision they would not have done so (see appendix 6). We note, however, that these costs are relative to conventional power which depends on the price of oil and gas. If these prices increase significantly, micro-generation may become more attractive.

68. Although the contribution of micro-generation and renewable heat to the 2020 target may be smaller than that coming from large-scale energy generation, we believe that micro-generation and renewable heat have the potential to contribute significantly to the UK's long-term emission reduction goals.

69. **We recommend the Government treat micro-generation and renewable heat technologies as being as important as large-scale electricity generation. To this end, we believe that the existing micro-generation grants should be increased and a system of grants specifically for renewable heat should be introduced.**

70. The evidence we received demonstrated a much clearer understanding of the issues affecting renewable electricity than renewable heat. However, we welcome the Government's recognition of the importance of renewable heat. The Government's estimate that 14% of heat should come from renewables accounts for around 38% of the UK's 15% final energy target. **To achieve this level of renewable heat we urge the Government to commit more fully to renewable heat than our evidence indicates is currently the case.**

### Potential technology mix

71. The Government have not specified how the electricity from renewable sources needed to meet the 15% target will be generated, but the common assumption is that the dominant source in the UK will be wind power. The UK Renewable Energy Strategy consultation estimates that the UK would need 14GW of new onshore wind and 14GW of offshore wind installed. The owner of the UK's seabed, the Crown Estate, in June 2008 invited energy companies to register an interest in developing offshore sites capable of supporting up to 25GW of generating capacity.

72. Other witnesses submitted technology mix illustrations for meeting 40% of electricity from renewables. The estimates varied due to differing assumptions of energy demand by 2020 and the amount of generating potential of each technology. For example, UKERC estimated that by 2020 over 18GW of extra onshore wind and almost 20GW of extra offshore capacity could be needed to provide 40% of electricity as opposed to 32% (p 265).

73. This reliance on wind is due to the fact that wind turbines are the most commercially mature technology available. Wave energy development is at least 15 years behind wind power and solar electricity remains an expensive technology (UKERC p 266). Whilst there is some scope for small scale hydropower, there is little further scope for exploitation of hydro resources (BERR Q 5).

74. UKERC's forecast also includes power generated by the proposed Severn Barrage as well as by other tidal power schemes. We were advised that the most productive site proposed for the Severn Barrage could generate around 4.4% of the UK's current electricity demand. However, there are many outstanding issues related to the barrage, including funding, planning and environmental consequences. The feasibility study commissioned by the Government is expected to run until at least 2010 before deciding on the preferred option. Dr Tom Shaw of Shawater stated that it was likely that detailed analysis of the preferred option would take a further four years and construction would take around nine years. He estimated that some electricity generation could come on-stream from year five of construction (Q 48 and Q 50). These estimates would result in the Barrage not being fully completed until 2023 but with partial generation from 2019.

75. Currently the draft renewables Directive includes provisions to allow large projects that are not operational by 2020, but are under construction by 2016 and are likely to be fully operational by 2022, to count towards the 2020 target. Should the Severn Barrage be built, it may still not be completed in time to contribute to the 2020 target.

76. We recognise that wind power will be the dominant technology in striving to meet the 2020 target. **In order to minimise the risk of the UK becoming reliant on wind power the Government must ensure that other technologies receive, where practical, the policy support needed to bring them to commercial viability as quickly as possible.**

77. **It is necessary to await the economic, technological and environmental assessments for the Severn Barrage project before decisions can be made about whether it can be included as a deliverable resource. The Government should not rely on inclusion of the estimated generating capacity of the Barrage to reach the 2020 renewables target.** If the UK is to meet its renewable target significant amounts of new generation capacity will need to be built. The length of the timetable for decision-making over the Severn Barrage project cannot be allowed to be repeated for other major generation developments.

## Security of supply

78. One of the issues that the renewables Directive seeks to address is the EU's energy security. In 2005, the EU's import dependency for energy was 52.4%[26]. BERR estimated that this would rise to 65% by 2020 if the EU did not adopt the proposed Directive (Q 11). By increasing the amount of energy generated domestically from renewable sources, the EU should be able to reduce its dependency on fuel imports and improve the security of its energy supply.

79. The Sussex Energy Group also argued that increasing renewable generation will add to the diversity of power generation technologies and increase energy security (p 249). This view is also stated in the UK Renewable Energy Strategy consultation.

### *Intermittency*

80. Professor Dieter Helm argued that security of supply is a more complex matter than simply the issue of reliance on energy imports (p 212).

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[26] Source: Eurostat December 2007

81. Due to their nature most renewable technologies are intermittent; they rely on the wind blowing, the sun shining, the tide ebbing and so forth. This intermittency has the potential to affect reliability of electricity supply. The electricity grid operator needs to balance energy generation to meet energy demand second by second. The UK transmission system operator (National Grid) already has to make provision for demand prediction errors and for unexpected faults with power stations and transmission lines. This requires sophisticated processes that allow rapid and cost effective responses to changes in demand or supply. However, since renewable generation depends, in part, on factors beyond human control, a new dimension of uncertainty is added to balancing the grid.

82. Witnesses were confident that intermittency could be managed, although doing so will increase energy costs (EDF p 197 and BERR Q 13). National Grid has calculated the additional system balancing services they would require to manage 40% of electricity from intermittent sources. They estimate that the cost per unit of electricity supplied would be in the range 0.14p to 0.28 p/kWh, or 1.6–3.2% of the average domestic bill. This would increase the average domestic consumer bill of £390 per year by £6–£12 (p 64).

83. The Government cited UKERC research that finds that intermittency is a manageable issue, but also noted that additional research is needed on very large penetrations of renewables (p 12). As part of the UK Renewable Energy Strategy consultation the Government commissioned research into renewables penetration from Sinclair Knight Merz (SKM)[27]. The SKM research explores the measures needed to integrate up to 50% of electricity from renewable sources, mostly wind power. SKM find that costs increase with increased renewable generation for a range of reasons associated with intermittency. These include additional system balancing services and the need for conventional reserve plant to ensure reliable operation (p 28, p 34, p 72 and pp 90–91). However, SKM do not report any insuperable problems in managing intermittency with up to 50% of electricity from renewables.

84. The SKM report notes that it is possible for supply to exceed demand on occasion when large amounts of renewables are installed (p 64). For example, at some times of the year a significant peak output from the Severn Barrage would occur at night, when demand is low and the output from a large capacity of wind could exceed demand on occasion. The Energy Policy Group, Exeter University, cited examples of energy storage technology being used to smooth variations in supply and demand (p 41). Scottish and Southern Energy and the UK Business Council for Sustainable Energy also saw a role for energy storage (p 240 and p 258).

85. The UK Renewable Energy Strategy consultation document highlights energy storage as useful technology to manage the issues of intermittency, along with demand response, for example through the use of smart meters. It states that the UK currently uses pumped hydro systems (where excess power is used to pump water up to a higher reservoir that can then be released to generate electricity when demand increases). However, the consultation notes that there is limited scope for new pumped hydro capacity

[27] Growth Scenarios for UK Renewables Generation and Implications for Future Developments and Operation of Electricity Networks, SKM, June 2008

in the UK (p 216). Other storage technologies are still emerging (BERR p 13).

86. One of the consequences of an increased use of intermittent generation is that conventional generation will need to be kept available to ensure demand is met even when renewable sources are unable to generate (EDF p 198, Scottish and Southern p 240). SKM estimate that around 15% of conventional capacity could be replaced by wind power supplying 50% of electricity (p 27). Nevertheless, renewable sources can save fuel and reduce imports. The Commission estimated that, with the need for reserve capacity taken into account, import dependency across the EU could be reduced by 4–5% (Q 426). The UK Renewable Energy Strategy consultation estimates that UK overall gas imports could be reduced by 12–16% by 2020. For the electricity sector, SKM modelling indicates a 38% to 50% reduction in reliance on gas by 2020 (p 7).

87. **We consider intermittency to be a manageable problem but one that will increase costs to consumers. However, the development of storage technologies and other options such as demand-side management could help reduce costs and, by reducing the need for reserve capacity, improve the economic and environmental performance of renewable energy.**

## CHAPTER 4: BARRIERS AND INCENTIVES

### Grid access

88. Article 14 of the proposed renewables Directive states that priority access to the transmission grid should be given to renewable energy. This is a proposal that the Government reject but they recognise that there are access problems for renewable generators (Malcolm Wicks Q 288).

#### *Grid connection requirements*

89. The technical aspects of grid connection are governed by the UK Security and Quality of Supply Standards (SQSS). They require the grid to have the capacity to handle the full potential generation of any plant connected to it. It is argued that these standards do not take into account the differences between conventional generation and renewables (Ofgem p 72).

90. Conventional generation and renewable generation operate with different load factors. The load factor is the fraction of the annual output that a power station produces relative to the output it would produce if it could be operated at maximum output 100% of the time. Conventional generators might operate for most of the time at or around their maximum output (load factors of perhaps 80%). However, many renewable stations operate over a wider range, and often considerably below peak output, since power generated is a product of wind speed or other environmental factors. For example, E.ON's Scroby Sands wind farm has a maximum generating capacity of 60MW but an average load factor of around 30%.

91. Furthermore, renewables are a replacement for power generated by conventional means. When a renewable generator is achieving a high load factor it should mean that a conventional power station can lower its output (Professor Catherine Mitchell, University of Exeter Q 135).

92. These two factors mean that there are few, if any, circumstances when any stretch of grid needs the capacity to handle the full output of all the conventional and renewable generation connected to it. Therefore, the SQSS theoretically requires far more grid capacity to be built than is needed (Q 144).

93. The criticisms of the SQSS are recognised in the UK Renewable Energy Strategy consultation. The Government suggest reviewing them to allow the connection of more generation.

94. The solution to this problem proposed by witnesses was a system of "connect and manage". This would mean a generator could be connected to the grid despite the SQSS ideal grid capacity not being present, on the understanding that at certain times its output may need to be reduced. Steve Smith of Ofgem compared it to selling airline seats. More seats may be sold than exist on an aeroplane because the operator is certain that not all passengers will use their tickets. Similarly, grid can be over-connected because the grid operator can be sure that not all of the potential power will ever be generated (Q 191).

95. However, BERR warned that "connect and manage" would mean higher energy prices for consumers because it would increase the difficulty and cost of balancing the grid. These higher balancing costs would eventually trickle

down to the consumer (Q 30). According to EDF, generators ordered to reduce their output would need compensation. This would also affect the consumer. In their view the cost of "connect and manage" was "unacceptable" (p 198).

96. The SQSS will lead to a surfeit of grid being built and the cost of this will be passed on to the consumer. **We believe that "connect and manage" offers a more efficient use of grid and should be adopted.** It is important to note, however, that either system will require additional investment because to meet the 15% target additional grid will need to be built. The cost of this will to be passed on to the consumer (see paragraph 158).

*Grid upgrades and new grid investment*

97. The SQSS affect both conventional and renewable generation but their impact on renewables is particularly acute. Conventional power generators can choose to build close to demand or where grid capacity is already good. Suitable renewable generation sites are dictated by generating capacity and weather conditions. These are frequently places where grid capacity is limited. This means that meeting the 15% target is not only a matter of increasing generation but also of significantly increasing grid capacity (Lord Oxburgh Q 106). The Government have commissioned studies to determine the grid network necessary to handle the increase in renewables (see paragraph 103).

98. BERR and Ofgem denied that funding was a barrier to greater grid investment. They both identified connection requirements as the principal problem (Q 30 and Q 190).

99. Other witnesses identified the connection regulations as a barrier. Currently the transmission operators (the owners of the electricity grid) are required by Ofgem to use a system termed "finance and connect" whereby renewable developers must be fully financed before grid connection work can begin. Professor Mitchell of Exeter University argued that this created a "chicken and egg situation" where issues of finance, planning and grid connection are all interlinked and rely on one another (Q 135).

100. E.ON stated that the current system means that grid development was always "behind the curve", waiting for renewables projects (Q 271). They suggested that other Member States allow transmission operators to "more proactively forecast grid needs" (npower p 112). Centrica, National Grid, E.ON and npower all supported allowing transmission operators to anticipate likely sites for renewables and invest accordingly rather than waiting for renewable developers to be fully financed and ready for connection before grid investment occurs.

101. This ability to invest ahead of need may become more important as the use of offshore wind farms increases. Ofgem raised the idea of laying a sub-sea grid to connect offshore wind farms, rather than each project needing to cable to shore and connect to the transmission grid there (Q 192).

102. However, allowing investment ahead of generation development could result in grid being built that is then not used. Ofgem referred to this as "asset stranding" (p 72). Centrica pointed out that National Grid could not currently carry out such investments as they are "not rewarded for taking riskier investments like that" (Q 266). As a result, National Grid said that the

transmission operators would be more exposed to asset stranding, and that risk would need to be offset through higher connection charges to energy suppliers. Eventually these costs would be met by the consumer (Q 160). As Ofgem's primary duty is to protect the consumer, this has not been its favoured solution.

103. In the UK Renewable Energy Strategy consultation the Government state that transmission operators have been asked to carry out studies into investment possibilities to help meet the 2020 target. The Transmission Access Review report[28], published by BERR and Ofgem alongside the consultation, states that once transmission operators have presented their investment proposals Ofgem will allow strategic grid investment ahead of developer signals.

104. **We believe that transmission operators will need to build in advance of firm commitments from developers if sufficient grid is to be built in time for 2020. We welcome the move away from "finance and connect" proposed in the Transmission Access Review. Ofgem will need to monitor this work closely to minimise the risk of asset stranding. Parliament should be informed annually of grid investments planned under this system and Government should report to Parliament on the use of such grid.**

*Grid queue*

105. As a result of the delays in the grid connection system a grid connection queue exists. According to National Grid there are now around 16GW of renewable generation waiting for connection (Q 156). This queue is handled on a first come, first served basis, regardless of how far along the planning or financing process developers are when they apply for connection. As connection work will not actually begin until financing problems have been solved, this means that would-be generators with no planning and finance problems may have their connection delayed by other developers who have yet to resolve problems in these areas but applied for connection earlier and whose applications can be considered to be slowing up the process (Ofgem p 72). Both BERR and National Grid recognised this as a problem (Q 25 and Q 156). In the UK Renewable Energy Strategy consultation the Government suggest allowing a limited period of "connect and manage" to help clear the grid queue.

106. We agree that the grid queue is a problem. The first come, first served method is creating an unnecessary and easily removable barrier to increased renewables deployment. If transmission operators were able to adopt a system of "connect and manage" permanently, grid connection could be made more predictable and timely. **We strongly support the Government's proposal to use "connect and manage" to reduce the grid queue and believe that this system should be adopted immediately and permanently.**

*"Use of system" charges*

107. Transmission operators charge energy generators for connection to their electricity grids. These are called "use of system" charges. In the UK,

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[28] This was a review into access to the transmission grid launched by BERR and Ofgem in July 2007.

transmission operators charge different amounts for "use of system" depending on generators' distance from energy demand. This is termed "locational pricing". Energy generators in the South East of England where demand is concentrated and existing infrastructure is strong pay less for "use of system" than generators further away from centres of demand.

108. Scottish Power contended that "use of system" charges were a barrier to renewables development. In Scottish Power's view such charges had a disproportionate impact on renewables because renewables plant will often need to be built further away from demand than conventional power stations (see paragraph 97). They estimated that a 100MW renewables installation in Scotland would pay £2.2 million per annum for grid connection while a similar installation near London would pay £0.6 million (p 244).

109. A number of other witnesses argued that locational pricing is not the most significant obstacle to renewable generation development. BERR (Q 28), Ofgem (Q 194) and the Renewable Energy Association (p 226) pointed to the connection queue in Scotland of 10–14GW as evidence that "use of system" charges are not a barrier.

110. Although we accept that locational pricing may affect some generators more than others, we believe that other grid access barriers are of greater significance. If the problems with grid access outlined above are eased the effects of locational pricing may become more important. **We call on Ofgem and the Government to keep this issue under review.**

### Planning

111. Many witnesses identified planning reform as "absolutely critical" (National Grid Q 150) as it will affect the building of both new generation facilities and electricity grid. Ecotricity told us that there was a system of "planning by appeal" as around 95% of applications were initially rejected by planning committees (Q 75). According to Phil Baker of Exeter University the upgrade to the transmission grid in North Yorkshire took 12 or 13 years to develop, 8–9 years of which was due to the planning system (Q 135). Similarly, Scottish and Southern estimated that a new onshore wind farm would take 10 years to develop and build, with half of that time spent in planning (pp 237–238).

112. The UK Renewable Energy Strategy consultation recognises the problems of planning. It stated that if projects currently held up in the planning system, as well as those under construction and those awaiting construction, were completed, 10GW of renewable electricity capacity would be added to the network. This would constitute a third of what the Government estimate would be needed to meet the 2020 target.

113. Ecotricity argued that one reason the planning system was too slow was that developments like onshore wind farms were subject to the same procedure as a home extension, and that the process involved the same people. The planning committees involved did not have the requisite skills to handle such planning applications. Ecotricity argued that as a matter of national strategic importance renewable energy deployment should be treated differently (Q 75).

114. National Grid also identified planning as a problem as electricity grid will often cross the boundaries of planning authorities. Nicola Pitts of National Grid explained that although BERR gave planning permission for overhead

lines, the necessary substations were approved by local planning authorities. This fragmentation means that "it is like being given permission to build a motorway but you do not have any on and off ramps" (Q 154) and that as a result grid construction was delayed.

115. The Planning Bill currently before Parliament is intended to improve the planning process. The Bill proposes the creation of an Infrastructure Planning Commission (IPC) which would be the planning authority for certain types of projects. In the energy sector it would be responsible for onshore proposals over 50MW and offshore proposals over 100MW. The Bill would also establish a national framework of strategic planning based on national policy statements on issues such as the need for increased renewable generation.

116. Some witnesses (Scottish and Southern p 238, Energy Networks Association p 210, E.ON p 109 and National Grid Q 154) welcomed the Bill and saw it as having the potential drastically to "increase the deployment rate of renewable technologies" (npower p 112). Michael Lewis of E.ON regarded the emphasis on national policy statements as useful as they meant that the need for new renewables should no longer be addressed at every planning inquiry; rather the question would already have been addressed in Parliament (Q 276).

117. Other witnesses, however, did not consider that the Planning Bill provided for sufficient reforms to the planning system. Maria McCaffery of the British Wind Energy Association (BWEA), which represents wind, wave and tidal energy companies, stated the Planning Bill "is not going to make the slightest bit of difference" to onshore wind generation (Q 252). This is because they estimated that most new onshore wind developments will be below the 50MW threshold.

118. Kevin McCullough of npower argued that even if the Planning Bill did sufficiently streamline the planning system, the new rules would take some time to become established and effective and therefore may not help to meet the target (Q 275).

119. Lord Dixon-Smith, former shadow Environment Minister, even saw the Planning Bill proposals as introducing new hurdles to renewables development. The Bill would not exempt any applications from planning regulations but would allow them to be assessed by a single body, the IPC. In Lord Dixon-Smith's view this meant that proposals would not be able to evolve as they passed through the planning system but would have to be presented perfectly formed from the outset. This would create new problems for developers (Q 205).

120. The UK Renewable Energy Strategy consultation recognises that the Planning Bill will not be sufficient to encourage the growth of renewable energy generation and meet the needs of the 2020 target. It suggests giving local authorities targets for renewable generation. This was similar to a suggestion offered by E.ON representatives at Scroby Sands who argued that local authorities should have targets for renewables in the same way they have targets for recycling (see appendix 5).

121. The consultation proposes easing the planning constraints on refitting existing wind farms with new turbines. Juliet Davenport of Good Energy referred to this as "repowering" and argued that if a wind farm already exists

it should not require new planning permission to upgrade its equipment (Q 94).

122. The consultation also proposes the creation of a renewables advisory service to planning authorities, to provide the necessary skills and information that Ecotricity believed were lacking and extending Permitted Development Rights so that householders would have automatic planning permission for some micro-generation installations.

123. Ecotricity proposed another possible reform. According to Ecotricity, "wind energy is the only major generating source which requires planning approval from District Councils" (p 193). Non-renewable generating stations over 50MW , such as coal- or gas-fired and nuclear power stations, are consented under section 36 of the Electricity Act 1989 by the Secretary of State. Ecotricity argued that the 50MW threshold was included at a time when wind power, and renewable energy generally, was less developed. They argued that the purpose of the law was "to take all but the very small conventional generators out of the hands of local councils and into the hands of the government". They concluded that these provisions should be amended, and the threshold lowered to 20MW, so that renewable energy is treated in the same way as other types of energy generation (p 193).

124. We received evidence that planning was not only an issue for renewable generation but for the UK's power generation generally. In 2006, 18% of the UK's electricity generation was from nuclear sources[29]. National Grid stated that due to the requirements of the Large Combustion Plant Directive[30] much of the current conventional plant in the UK will need to come offline by 2020. Similarly, much of the current nuclear plant will need to be replaced by 2020 (p 56). This means that reforms of the planning system will impact on new nuclear build as well as renewables.

125. Without an effective planning system we do not believe that the UK will be able to meet its 15% target. It is fundamental that appropriate procedures are put in place to ensure that new generation plant and grid infrastructure can be increased, subject to local considerations. This means that developers must be able to have confidence in the reliability and consistency of the planning system.

126. **We are concerned that consulting on how to improve planning measures still before Parliament does not create the stable and predictable planning environment needed to encourage investment in renewable energy. The policies resulting from the UK Renewable Energy Strategy consultation must be as comprehensive and definitive as possible.**

127. **We believe that strong measures are needed to improve the energy planning system. We support the proposals described in the UK Renewable Energy Strategy consultation document but believe that further measures will be needed. The Government should apply the provisions of the Electricity Act 1989 to all renewable generation capacity above 20MW.**

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29 Digest of United Kingdom Energy Statistics, 2007

30 On the limitation of emissions of certain pollutants into the air from large combustion plants, 2001/80/EC, OJ L 309 (27 November .2001) pp 1–21

### Supply chain bottlenecks

128. During our visit to Scroby Sands we were informed that a further barrier to meeting the target was the industrial supply chain (see appendix 5). We were told that suitable specialist vessels available for hire in Europe to build and maintain offshore wind farms are in short supply, that the market for turbine manufacture is limited and that the prices of copper and steel were making new offshore wind farms more expensive. This view was echoed by Ecotricity during the Committee's visit to Avonmouth docks (see appendix 6). E.ON estimated that these factors had contributed to a significant rise in the cost of building a wind farm. The Scroby Sands site cost around £1.2m per MW of capacity. Developments in the near future were likely to cost around £2.4m per MW.

129. BERR argued that by agreeing to the 2020 target a clear policy signal would be sent to investors and this would not only stimulate energy suppliers but also the necessary supply chain (Q 16 and Q 301). This was a view shared by BWEA, provided that a "strong message is sustained about the UK being open for business for renewable energy" (Q 235).

130. Greenpeace cited the examples of other Member States, such as Spain and Germany, where a clear, strong and stable policy environment had helped to create an appropriate industrial supply chain (Q 330). The UK Renewable Energy Strategy consultation states that the Government will "be working with the Regional Development Agencies, UK Trade and Investment and other relevant bodies to develop a co-ordinated strategy to address these supply chain barriers".

131. Simon Roberts of the Centre for Sustainable Energy was less optimistic that the target alone would "pull industrial development through" (Q 227). He argued that a more proactive approach was needed. He cited the Spanish example of making investment in local industries a requirement for renewable developers. This had helped to create the necessary industrial supply capacity (Q 227).

132. The supply chain issues are not limited to the renewables sector. Lord Oxburgh stated that there was also a waiting time of ten to 12 years for nuclear reactor vessels (Q 110). This may be a significant problem for UK energy supplies given that much of the UK's existing nuclear capacity will need to be taken offline by 2020 (see paragraph 124), and that Malcolm Wicks stated that new nuclear power stations may not be built by 2020 (Q 302).

133. As part of the UK Renewable Energy Strategy consultation exercise the Government commissioned a report on the supply chain[31]. This report identifies a number of supply chain problems. For offshore wind, for example, these include turbine supply, installation vessels and port capacity (p 19). The report also identifies problems common to all renewable technologies such as skills shortages and inflated material costs. The report proposes some actions such as increasing grants for port redevelopment and encouraging the transfer of skills.

134. The Government has also published a strategy paper, Manufacturing: New Challenges New Opportunities, outlining the Government's approach to

[31] Supply Chain Constraints on the Deployment of Renewable Electricity Technologies, Douglas Westwood, June 2008

manufacturing[32]. This includes a commitment to establish an Office for Renewable Energy Deployment aimed at addressing the barriers to renewable energy generation, including the supply chain.

135. **We agree that with a sufficiently strong commitment to renewables some investment will be stimulated. However, the current condition of the supply chain means that there is simply not the industrial capacity to increase the UK's renewable generation fast enough, regardless of the wishes of energy suppliers. Given the short timeframe involved, we urge the Government to use the analysis already carried out and build on their general manufacturing strategy and to come forward with proposals specific to overcoming the problems of the supply chain in the renewables industry. We look forward to reviewing such proposals.**

136. **We recommend that the Government share details of plans for renewable energy proposals widely so that market information is available to all parts of the supply chain.**

### Regulation

137. Some witnesses called for changes to Ofgem's statutory obligations to shift the focus of the regulatory objectives towards sustainability as well as the consumer interest. They argued that the political objective of increasing the proportion of energy generated by renewables (which will increase energy prices, see paragraph 158) was in conflict with Ofgem's primary duty to protect consumer interests (Professor Mitchell Q 132 and Centre for Sustainable Energy Q 220). Professor Helm argued that this conflict had exacerbated the barriers to increasing the use of renewables (p 213). Other evidence also stressed the importance of better co-ordinated policies between Government and the regulators (Ecotricity Q 69 and Good Energy Q 89).

138. Ofgem disagreed that its primary duty led it into conflict with the promotion of renewables. Steve Smith of Ofgem argued that it is "focussing on issues relating to removing the queue from transmission, changing the current arrangements to get more renewables on and that is driven by existing duties" (Q 176).

139. Malcolm Wicks argued that it was the Government's role to identify political objectives such as sustainability and that it was useful for the affordability of such objectives to be monitored by the regulator (Q 306). The UK Renewable Energy Strategy consultation proposes changing the guidance given by Government to Ofgem but leaving its duties as they are.

140. Witnesses considered that it was also important to take account of the regulatory regime in other Member States. BERR suggested that co-operation between European regulators may become increasingly important if the UK and the continent's electricity grids become more interconnected. We have previously heard evidence that this might be likely if European energy markets are liberalised[33]. Centrica warned that the UK's regulation must not become too complicated or create uncertainty for investors as this

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32 Manufacturing: New Challenges New Opportunities, BERR, September 2008 http://www.berr.gov.uk/files/file47660.pdf

33 European Union Committee, 5th Report (2007–08): *The Single Market: Wallflower or Dancing partner?* (HL 36)

would encourage investment in other Member States, undermining the UK's efforts to meet its target (p 119).

141. It is important that all the stakeholders involved receive clear and consistent policy signals. **Ofgem must encourage renewables development whilst also protecting consumers' interests.**

### Renewables Obligation and feed-in tariffs

142. As renewable energy is currently more expensive than conventional power not only do barriers to its development need removing but policies designed to encourage its growth are also necessary.

143. The Renewables Obligation (RO) is the UK's system to provide financial support to renewable generators so that their output can compete with power from conventional sources (see box 1 for details of the RO). Opinion about the RO was divided.

**BOX 1**

**Renewables Obligation**

The Renewables Obligation (RO) is Britain's[34] main mechanism for providing financial support to renewable electricity generators. The RO requires electricity retailers (called suppliers) to source a proportion of their electricity from renewable sources. This target is set by legislation. It started at 3% in 2002 and is increased each year. The target for 2008/9 is 9.1% rising to 15.4% in 2015. The Energy Bill before parliament will raise this to 20% by 2020 (see paragraph 145).

The RO is a 'certificate trading' scheme. Renewable energy generators are awarded Renewables Obligation Certificates (ROCs) for their output, which they can sell to suppliers. At present one ROC represents 1 MWh of renewable energy. Suppliers require ROCs to prove compliance with the target, which they do through presenting ROCs each one year period to the electricity regulator, Ofgem. The demand for ROCs from suppliers means that there is a value attached to ROCs in addition to the wholesale value of the electricity renewable generators produce. In the period since 2002 ROCs have typically traded at a price of between £45 and £50 per MWh on top of wholesale electricity prices which represents a significant premium for renewable energy[35] (in the same period wholesale power prices were typically around £40/MWh and are currently around £70/MWh[36]).

The market for ROCs is flexible. ROCs can be traded independently from the electricity renewable generators produce or sold together with it. Generators can enter into bilateral contracts with suppliers for ROC purchase or sell them through an open auction process, equivalent to a spot market. Auctions are run online by the Non Fossil Fuel Purchasing Agency several times a year and allow a transparent wholesale price to emerge for ROCs. As well as buying ROCs from independent renewable generators either directly or at auction, suppliers can become renewable generators themselves, build their own renewable energy schemes and generate their own ROCs.

34 The England and Wales RO were created in 2002, as was Scotland's. Northern Ireland's RO started in 2005. All three schemes are linked in that ROCs can be traded between them.

35 http://www.e-roc.co.uk/trackrecord.htm

36 UK Renewable Energy Strategy consultation, p 95

If suppliers end each year without sufficient ROCs to cover their obligation, they must make a payment into a buy-out fund. The buy-out price is fixed per MWh of shortfall and is adjusted with inflation each year. The proceeds of the buy-out fund are paid back to suppliers in proportion to how many ROCs they have presented. This is called the recycling mechanism. The combination of the buy-out fund and the recycling mechanism means that suppliers are encouraged to continue to buy ROCs even when they are more expensive than the buy-out price. However, it also places an upper limit on the price of ROCs because at some point it will become cheaper for suppliers to pay the buy-out price than to purchase ROCs. The cost of the RO is effectively paid by all electricity consumers, since electricity suppliers pass the cost of compliance on as a small increase in the tariff for the electricity they sell.

The main advantage claimed for the RO (compared to fixed price schemes, see box 2) is that the market for ROCs creates an incentive to find the most cost-effective way to generate renewable electricity. The main disadvantages are that it creates uncertainty for investors, since future ROC prices are uncertain. It is also unable to differentiate between renewable sources; ROCs are awarded per MWh regardless of the method of generation. Because of this the RO effectively favours mature and more cost effective generation technologies like landfill gas over less mature technologies like offshore wind and wave power that are currently more expensive. The Energy Bill contains proposals to 'band' the RO by technology. Mature options will get less than one ROC per MWh and early stage technologies more than one ROC per MWh.

At present the UK is behind its RO target; the RO for 2007 was 6.7% and renewable generation was 4.96%. In part, this shortfall is due to the barriers to renewable generation discussed in this report. Seven EU countries (Belgium, Italy, Latvia, Poland, Romania, Sweden, and the UK) operate schemes similar to the Renewables Obligation.

144. The Government confirmed their continuing belief that the RO is the right mechanism to encourage renewables growth. Since the introduction of the RO in 2002 renewable electricity generation has risen from around 2.87%[37] of generation to 4.96%[38] and BERR expected it to continue rising at a similar rate on current measures. They accepted that this would not be enough to meet the 2020 target (Q 22), but argued that with modification the RO would be the right mechanism to achieve the 30–40% of electricity generation necessary (Q 34).

145. However, the Energy Bill sets the RO level at 20% by 2020. Lord Oxburgh told us that the RO was effectively a cap setting the highest possible amount of renewable power the market would provide and, therefore, the Obligation level would need to be set higher than the 40% of electricity needed to meet the target (Q 106 and Q 120). The Government recognise this problem in their UK Renewable Energy Strategy consultation. They estimate that the RO target set out in the Energy Bill would only achieve 14% of electricity from renewable sources by 2020.

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37 HC WA22, 19 May 2008

38 UK Energy In Brief July 2008, BERR, http://www.berr.gov.uk/files/file46983.pdf

146. Some witnesses were much more critical of the RO and claimed that it has been ineffective at encouraging renewables and was "unfit for purpose" (Energy Policy Group, University of Exeter p 37). Simon Roberts of the Centre for Sustainable Energy characterised BERR's position as holding on to "the idea that it has the most pure and perfect support mechanisms in spite of the fact that it is not capturing industrial benefits, it is not achieving that scale" (Q 218).

147. One criticism of the RO is that it cannot provide enough support to emerging technologies. Matt Thomas of Ecotricity gave the example of marine technology (Q 87). The Energy Bill will band the RO scheme (see box 1). Supporters of the RO argued that this will improve its effectiveness (Centrica p 120).

148. Critics of the RO recommended replacing it with a feed-in tariff (see box 2). Professor Mitchell argued that whereas the RO was a risky mechanism for generators and therefore discouraged smaller suppliers from entering the market, feed-in tariffs provided certainty for investors. She argued that this was one of the principal reasons why countries with feed-in tariffs, such as Germany and Spain, have achieved higher levels of renewables deployment (Q 131 and Q 141).

149. Some witnesses argued that "mega-projects" like the Severn Barrage should not be included in the RO scheme (E.ON p 106 and Centrica p 120). Centrica's concern was that the generating capacity of the Severn Barrage could be so large that it would undermine the RO scheme by flooding the market with ROCs (p 120).

150. Ofgem claimed, however, that had it not been for grid and planning problems the RO would have been viewed as a "marvellous scheme" (Q 193). Dr Gordon Edge of BWEA argued that "to blame the Renewables Obligation for the failure of both the planning and the grid system is perverse" (Q 250).

151. A number of witnesses thought that it was now too late to change from the RO. Sarwjit Sambhi of npower told the Committee that if the Government were to change support schemes there would be a three-year hiatus in investment which would seriously delay the growth of renewables (Q 281). BERR also warned that changing the system could be "hugely disruptive" (Q 34 and Q 297).

152. This is not, however, a concern shared by the Centre for Sustainable Energy. They maintained that in recent years the Government had been sufficiently committed to renewables that a move from the RO to a feed-in tariff could be made without investors feeling that the Government was about to "pull the plug" on them (Q 221).

153. A compromise between the RO and feed-in tariffs was suggested by some witnesses. The Government should "experiment with a range of feed-in tariff scenarios" (Energywatch Q 187) alongside the RO. The Renewable Energy Association's submission supported the introduction of a feed-in tariff for micro-generation, renewable heat and biogas (p 227). The Government recognised the arguments against the RO and stated that there may be a role for feed-in tariffs for micro-generation (Q 297).

154. We are not convinced that the RO is the ideal incentive mechanism but we accept the argument that as it has now been in place for some time, it would

not be appropriate to replace it entirely. We agree that investors need stable policy signals. Replacing the RO completely with a feed-in tariff would undermine confidence and create a delay in renewable deployment.

**BOX 2**

**Feed-in tariffs**

Feed-in tariffs (FiTs) and Premium Payments Schemes are alternatives to the Renewables Obligation. Like the RO, they provide renewable electricity with a premium payment. Feed-in tariff schemes set a total fixed price per unit of electricity. Premium Payment schemes set a premium to be paid to the producer on top of the market price for electricity. Typically, the tariff or premium is set for 10 to 20 years although this varies by country and technology. After this period the price returns to market rates. Such schemes do not involve any form of certificate trading and do not set a target or quota for renewables.

Eighteen EU states have FiTs, premium payment schemes or hybrids of the two. Similar schemes exist elsewhere, for example in California and Australia. Details of the schemes differ but the German FiT model (Erneuerbare-Energien-Gesetz, or EEG) is a good example. It provides renewable generators with a technology specific fixed premium per unit for a fixed period of time. More expensive options such as photovoltaics receive a higher premium than cheaper options such as wind power. Each year the premium given to new developments is reduced to reflect technological improvements. Payments to existing developments are fixed and protected and are assured for 20 years.

The way most FiTs work is that regional or national electricity utilities are obliged to buy electricity from renewable generators (subject to technical and safety constraints) at premium rates set by the government. FiTs have been associated with a large growth in wind power in Spain, Germany and Denmark. Wind provides these countries with 9%, 5% and 20% of their electricity respectively. They have also been associated with rapid uptake of household scale solar photovoltaics in Germany and Spain.

One advantage of FiTs over certificate trading schemes is that the fixed price provides investors with greater security of income, which allows them to finance their developments at lower cost. The second benefit is that differentiation by technology allows countries to target support according to the technological maturity of each technology and adjust support as technologies improve. For example, Germany and Spain have generous support for solar PV, and Portugal has a dedicated tariff for wave power. Feed-in tariffs are also simpler in operation then RO type schemes. These factors may explain the substantial involvement of small investors in renewable energy in countries such as Denmark and Germany.

Recent analysis by the EU Commission[39] finds that FiTs often score highly in terms of effectiveness when compared to trading schemes like the RO. The Commission also finds that in the case of onshore wind the premium paid over and above estimates of cost of generation is lower under Feed-in tariffs than under RO type schemes. However, the German EEG has attracted domestic criticism for over-paying renewable generators.

[39] http://register.consilium.europa.eu/pdf/en/08/st05/st05421-ad01.en08.pdf

155. However, we believe that feed-in tariffs have the potential to stimulate generation in some sectors of the renewable market. Although the evidence we received in favour of feed-in tariffs anticipated that micro-generators would benefit most from such a system, we do not believe that the benefit of feed-in tariffs would be limited only to small-scale generation. Single site operators, community developments, affordable housing schemes and farmers will often want generation capacity above the micro-generation level. They are, however, unlikely to want to trade in the ROCs market with large energy companies. Such generators are likely to favour the certainty of a medium term feed-in tariff structure over the uncertainty of the RO. Therefore, we see potential for the RO and a feed-in tariff to work in parallel with generators choosing the most appropriate support scheme for their own needs. **We recommend that a system of feed-in tariffs be created to work alongside the RO.**

156. **We are concerned that the provisions of the Energy Bill before Parliament appear already to have been superseded by the UK Renewable Energy Strategy consultation. This does not constitute clear and stable policy signals. We recommend the Government amend the Energy Bill now and increase the RO target from 20% to 40% by 2020.**

157. **We urge the Government to act quickly following their consultation so that energy companies have a clear policy environment in which to make investment decisions.**

### Cost to the consumer

158. Meeting the 15% target will result in increased costs to the consumer. Overcoming the barriers to increased renewable generation, providing the correct incentives for its development and managing its integration into the energy mix through strategic grid investment, "connect and manage" and grid balancing polices all have cost implications. BERR has produced estimates of the cost to consumers of generating 37% of electricity from renewable sources to meet the 15% target (table 2). These cost estimates describe the potential range of relative cost increases compared to the *status quo* in four year periods. They range from 2010 to 2030 as the cost of increasing generation and infrastructure is likely to be spread across a number of years.

159. Whilst significant, it is important that these projected increases in costs to consumers are put into context. Increasing the share of energy from renewables is likely to increase consumers' bills but it will also help to shield consumers from fluctuations in global energy prices. These can be extremely significant and occur over short timescales.

160. For example, the average domestic consumer paid £45 more for the annual electricity bill in 2007 than in 2006, and £78 more for gas[40]. This followed increases in 2006 of £53 per year and £88 per year for domestic electricity and gas bills respectively[41].

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[40] Based on data from the June 2008 edition of the government's Quarterly Energy Prices report http://www.berr.gov.uk/files/file46669.pdf

[41] Quarterly price report, June 2007 http://www.berr.gov.uk/files/file40157.pdf

161. Rapid increases like this can be accompanied by longer run trends in prices. Electricity and gas prices decreased steadily during the 1990s but this trend sharply reversed at the start of this decade and consumer bills have increased most years since 2001. In real terms, in the period from 2001 domestic gas prices have increased by over 60%, and electricity prices by nearly 30%[42].

**TABLE 2**

**Cost to the domestic consumer of generating 37% of electricity from renewable sources**

| 37% renewable electricity | Price increases with oil prices at $70 per barrel | Price increases with oil prices at $150 per barrel |
|---|---|---|
| 2010–2014 | 1 to 4 % (£4 to £15) | 1 to 2 % (£6 to £11) |
| 2015–2019 | 3 to 6% (£12 to £22) | 0 to 1% (£1 to £6) |
| 2020–2024 | 9 to 12% (£34 to £44) | 5 to 6% (£24 to £29) |
| 2025–2029 | 17 to 20% (£57 to £67) | 2 to 3% (£7 to £12) |

*Figures from appendix 7*[43]

162. Allan Asher, Chief Executive of the consumer organisation Energywatch, said that consumers "might become actively hostile to the sorts of measures that push up costs" (Q 179). He argued that the Government would need to include the consumer in the country's effort to meet the target. He suggested that use of technology such as smart meters—which provide the householder with up-to-date information on their energy use—could help increase energy efficiency and so help to meet the target (Q 183).

163. **We believe that although an increased use of renewables will cushion consumers from fluctuations in gas and oil prices, meeting the UK's 15% target will result in consumers paying more for their energy. This underlines the need for a commitment to an effective energy efficiency strategy** (see paragraphs 50–57).

42 Quarterly prices report June 2008

43 BERR's analysis of the costs to consumers was carried out using assumptions of 32% of electricity coming from renewable sources and of 37%. The estimates for oil price increases at both $70 per barrel and $150 per barrel were only carried out for 37%. For further discussion of the cost to consumer see the forthcoming Economic Affairs Select Committee report on the renewable energy target.

## CHAPTER 5: SHOULD THE UK AGREE TO THE TARGET?

164. As stated above (see paragraph 10), we accepted as the basis for our inquiry the assumption that the EU and the UK should increase their use of renewables. Given that assumption, the central question the proposed Directive raises for the UK is whether as a result the UK would be committing itself to a target it cannot achieve.

### Is the target achievable?

165. In order to meet the target the EU and the UK will need to increase their renewable energy generation rapidly. The EU will need to raise its overall renewable energy generation from around 8.5% to 20% (Q 2) whilst the UK will have to achieve around a ten-fold increase in renewables, from around 1.5% in 2006 to 15% by 2020 (Q 2).

166. The majority of witnesses argued that the UK target is technically achievable but very challenging. Lord Oxburgh describes the target as "something exceedingly important, exceedingly bold and also exceedingly challenging" (Q 106). No witnesses, however, argued that the target is achievable within the existing policy environment. Cambridge Econometrics has estimated that on current policies the UK would achieve less than 5% of final energy from renewable sources by 2020[44]. This is a view accepted by BERR (Q 3).

167. The UK Renewable Energy Strategy consultation recognises the problems we describe in chapters 3 and 4 and the Minister stated that "a number of radical steps" need to be taken to address them (Q 310). However, the UK Renewable Energy Strategy consultation states that the effectiveness of any Government policy will "depend on how energy companies, developers and investors in the market, and the supply chains which serve them, respond to the signals we provide".

168. Other witnesses are less confident either that the target is achievable or that the necessary reforms will be put in place to make the target achievable. Allan Asher of Energywatch stated that the UK's 15% target is "absolutely unachievable" without a "virtual storm of innovation" which he does not expect will happen (QQ 184–185). Similarly, Jeremy Nicholson of the Energy Intensive Users Group described the target as "ridiculous" (Q 451).

169. The BWEA stated that the most important factor in enabling the UK to meet its target is political will (Q 234). Similarly, Lord Dixon-Smith argued that to achieve the target the UK must "get over that wretched thing, which we all suffer from, institutional inertia" (Q 203).

170. **We believe that the EU's 20% by 2020 target, and the UK's 15% national target, should be regarded as a stepping-stone, not as a goal in itself. Without political momentum, the UK will continue to under-perform on renewable generation and will be in an increasingly poor position to move away from a reliance on fossil fuels. We are content, therefore, for the Government to agree to the proposed Directive but in our judgement the target can only be met if at least the conclusions and recommendations of this report are followed.**

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44 UK Energy and the Environment, February 2008 (Cambridge Econometrics)

171. **However, in order to provide an incentive for technologies and investments not fully deployed by 2020, but which will require commitment and resources before then, the Government and the EU should consider also adopting a target for 2030 so as to both sustain the overall momentum for renewables and provide an incentive for still emerging technologies, such as wave and tidal power.**

## CHAPTER 6: SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

### Why 20% by 2020?

172. We do not agree with witnesses who state that the target was reached purely on political grounds. We believe that as the target date has now been accepted in principle by the European Council the 2020 deadline should not be extended. (paragraph 27)

173. We recommend that the Government increase their support for research into renewable technologies and ensure that the work of Government-funded research organisations is properly co-ordinated. (paragraph 28)

174. We recommend that as part of its regular assessment of Member States' progress towards the target the Commission should consider whether emerging technologies such as wave and tidal power are likely to be disadvantaged by the strategy and if so whether further intervention or research support is necessary. (paragraph 29)

### Guarantees of Origin

175. Guarantees of Origin trading will very likely have to be relied on to fulfil some part of the UK's commitments. We believe, however, that a significant proportion of the 15% target should be met domestically to ensure that Guarantees of Origin trading does not undermine efforts to increase the UK's renewable generation capacity. (paragraph 38)

176. We recommend that the Government specify soon the maximum proportion of the UK's target to be met using Guarantees of Origin trading so that the extent of their reliance on them to meet the target is known. (paragraph 39)

### Energy efficiency and energy saving

177. We believe that energy efficiency measures must form the starting point for the Government's drive to meet the 2020 target. The scale of the challenge facing the UK means that action is necessary on all fronts. (paragraph 55)

178. We are disappointed that the Government are not consulting in depth on energy efficiency as part of their Renewable Energy Strategy work as this suggests that demand reduction will not be a central part of the strategy to meet the target. We believe the UK should commit to an energy reduction target, such as 20% by 2020, by the spring of 2009 with a fully worked-out strategy specifying the steps needed to achieve this. (paragraph 57)

### Renewable heat and micro-generation

179. We recommend the Government treat micro-generation and renewable heat technologies as being as important as large-scale electricity generation. To this end, we believe that the existing micro-generation grants should be increased and a system of grants specifically for renewable heat should be introduced. (paragraph 69)

180. To reach the level of renewable heat the Government estimate could be achieved by 2020 we urge the Government to commit more fully to

renewable heat than our evidence indicates is currently the case. (paragraph 70)

### Potential technology mix

181. In order to minimise the risk of the UK becoming reliant on wind power the Government must ensure that other technologies receive, where practical, the policy support needed to bring them to commercial viability as quickly as possible. (paragraph 76)

182. It is necessary to await the economic, technological and environmental assessments for the Severn Barrage project before decisions can be made about whether it can be included as a deliverable resource. The Government should not rely on inclusion of the estimated generating capacity of the Barrage to reach the 2020 renewables target. (paragraph 78)

### Security of supply

183. We consider intermittency to be a manageable problem but one that will increase costs to consumers. However, the development of storage technologies and other options such as demand-side management could help reduce costs and, by reducing the need for reserve capacity, improve the economic and environmental performance of renewable energy. (paragraph 87)

### Grid access

184. We believe that "connect and manage" offers a more efficient use of grid and should be adopted. (paragraph 96)

185. We believe that transmission operators will need to build in advance of firm commitments from developers if sufficient grid is to be built in time for 2020. We welcome the move away from "finance and connect" proposed in the Transmission Access Review. Ofgem will need to monitor this work closely to minimise the risk of asset stranding. Parliament should be informed annually of grid investments planned under this system and Government should report to Parliament on the use of such grid. (paragraph 104)

186. We strongly support the Government's proposal to use "connect and manage" to reduce the grid queue and believe that this system should be adopted immediately and permanently. (paragraph 106)

187. We call on Ofgem and the Government to keep the issue of locational pricing under review. (paragraph 110)

### Planning

188. We are concerned that consulting on how to improve planning measures still before Parliament does not create the stable and predictable planning environment needed to encourage investment in renewable energy. The policies resulting from the UK Renewable Energy Strategy consultation must be as comprehensive and definitive as possible. (paragraph 126)

189. We believe that strong measures are needed to improve the energy planning system. We support the proposals described in the UK Renewable Energy Strategy consultation document but believe that further measures will be needed. The Government should apply the provisions of the Electricity Act 1989 to all renewable generation capacity above 20MW. (paragraph 127)

### Supply chain bottlenecks

190. We agree that with a sufficiently strong commitment to renewables some investment will be stimulated. However, the current condition of the supply chain means that there is simply not the industrial capacity to increase the UK's renewable generation fast enough, regardless of the wishes of energy suppliers. Given the short timeframe involved, we urge the Government to use the analysis already carried out and build on their general manufacturing strategy and to come forward with proposals specific to overcoming the problems of the supply chain in the renewables industry. We look forward to reviewing such proposals. (paragraph 135)

191. We recommend that the Government share details of plans for renewable energy proposals widely so that market information is available to all parts of the supply chain. (paragraph 136)

### Regulation

192. Ofgem must encourage renewables development whilst also protecting consumers' interests. (paragraph 141)

### Renewables Obligation and feed-in tariffs

193. We recommend that a system of feed-in tariffs be created to work alongside the RO. (paragraph 155)

194. We are concerned that the provisions of the Energy Bill before Parliament appear already to have been superseded by the UK Renewable Energy Strategy consultation. This does not constitute clear and stable policy signals. We recommend the Government amend the Energy Bill now and increase the RO target from 20% to 40% by 2020. (paragraph 156)

195. We urge the Government to act quickly following their consultation so that energy companies have a clear policy environment in which to make investment decisions. (paragraph 157)

### Cost to the consumer

196. We believe that although an increased use of renewables will cushion consumers from fluctuations in gas and oil prices, meeting the UK's 15% target will result in consumers paying more for their energy. This underlines the need for a commitment to an effective energy efficiency strategy. (paragraph 163)

### Is the target achievable?

197. We believe that the EU's 20% by 2020 target, and the UK's 15% national target, should be regarded as a stepping-stone, not as a goal in itself. Without political momentum, the UK will continue to under-perform on renewable generation and will be in an increasingly poor position to move away from a reliance on fossil fuels. We are content, therefore, for the Government to agree to the proposed Directive but in our judgement the target can only be met if at least the conclusions and recommendations of this report are followed. (paragraph 170)

198. In order to provide an incentive for technologies and investments not fully deployed by 2020, but which will require commitment and resources before then, the Government and the EU should consider also adopting a target for 2030 so as to both sustain the overall momentum for renewables and provide an incentive for still emerging technologies, such as wave and tidal power. (paragraph 171)

## APPENDIX 1: SUB-COMMITTEE B (INTERNAL MARKET)

The Members of the Sub-Committee which conducted this inquiry were:

Lord Bradshaw
Lord Dykes
Lord Freeman (Chairman)
Lord James of Blackheath
Lord Mitchell
Lord Paul
Lord Powell of Bayswater
Lord Rowe-Beddoe
Lord Ryder of Wensum
Lord Walpole
Lord Whitty

### Declaration of Interests

Lord Freeman
*Chairman, PricewaterhouseCoopers UK Advisory Panel*

Lord James of Blackheath
*Former Chairman and Chief Executive of North Sea Assets PLC and British Underwater Engineering Limited*

Lord Rowe-Beddoe
*Chairman, Welsh Development Agency (1993–2001)*

Lord Powell of Bayswater
*Director, Caterpillar Inc*
*Chairman, Rolls-Royce International Advisory Board*

A full list of Members' interests can be found in the Register of Lords Interests:

http://www.publications.parliament.uk/pa/ld/ldreg.htm

## APPENDIX 2: LIST OF WITNESSES

The following witnesses gave evidence. Those marked * gave oral evidence.

* Mr Phil Baker
  Mr and Mrs Bannerman
  British Energy
* British Wind Energy Association
* Centre for Sustainable Energy
* Centrica
  Mr Giles Chichester MEP
  Confederation of British Industry
* Council of European Energy Regulators and European Regulators' Group for Electricity and Gas
* Department for Business, Enterprise and Regulatory Reform
* Lord Dixon-Smith
  Drax Power Limited
  EDF Energy
* Ecotricity
  Ms Kathryn Emmett
* Energy Intensive Users Group
  Energy Networks Association
  Energy Research Centre, University of Exeter
* Energywatch
* E.ON Climate and Renewables
* The European Commission
* Friends of the Earth Europe
* Good Energy
* Greenpeace
  Professor Dieter Helm
  Ms Anna Hope and Mr Jackson Moulding
* Professor Catherine Mitchell
* Ms Eluned Morgan MEP
* National Grid
  Dr Karsten Neuhoff
* npower Renewables
* Ofgem
* Lord Oxburgh

PB Power

Re-generation Partnership

Renewable Energy Association

Renewables Advisory Board

Scottish and Southern Energy

Scottish Power Limited and Scottish Power Renewable Energy Limited

* Shawater

* Professor Goran Strbac

Sussex Energy Group

UK Business Council for Sustainable Energy

UK Energy Research Centre

Welsh Assembly Government

## APPENDIX 3: CALL FOR EVIDENCE

The Internal Market Sub-Committee (Sub-Committee B) of the House of Lords Select Committee on the European Union is undertaking an inquiry into some of the issues raised by the European Commission's "20 20 by 2020: Europe's climate change opportunity" Communication[45].

On 23 January 2008 the Commission published a package of proposed Directives together with the 20 20 by 2020 Communication. The Communication commits the EU to achieving a 20% reduction in greenhouse gas emissions and a 20% share of renewable energies in EU energy consumption by 2020. The latter target is covered in more depth in the proposed Directive on the promotion of the use of energy from renewable sources[46].

Sub-Committee B's inquiry will seek evidence on the renewable energies target and its place within EU energy policies in general, issues related to grid access and the role of state support schemes in encouraging renewable energy generation. This inquiry will not investigate the emissions reduction target, carbon capture and storage or the 10% transport bio fuels target.

### General Questions:

How achievable are both the EU's general 20% and the UK's national 15% renewable energies target?

How coherent are these proposals in the context of the EU's energy policies in general and the Third Energy Package in particular?

To what extent are these targets capable of improving the EU's security of energy supplies?

### Grid Access:

How effective has the existing legislation (2001/77/EC) been in encouraging grid access for renewable energy generators?

To what extent does grid access remain a significant barrier to increased consumption of renewable energies? Is it consistently a problem across all Member States?

How does Use of System charging affect grid access for renewable energy generators? How far can the different levels of renewable energies take-up in different Member States be attributed to Use of System charging and cost sharing rules?

What impact do the various systems of reinforcement planning and work have on encouraging renewable generation? How important is the issue of constraint in increasing Member States' renewable generation?

To what extent is further co-ordination of National Regulatory Authorities needed?

How far do current regulations inhibit access to the grid?

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45 COM(2008)30 final.

46 COM(2008)19 final.

## Support Schemes:

At what level should the EU be involved in harmonising or regulating support schemes offered by Member States to encourage renewable energy generation?

What impact have the various schemes in operation across the Member States had on encouraging renewable energy? How have these schemes affected take-up both by producers and commercial and domestic consumers?

Will cross-border renewables markets be genuinely affected by the existence of a variety of support schemes? Is necessary investment hampered by lack of market harmonisation?

To what extent would the enhanced use of Guarantees of Origin certificates require the harmonisation of support schemes?

## APPENDIX 4: GLOSSARY OF TERMS AND ABBREVIATIONS

**Biofuel**: This term covers those fuels derived from organic material (see biomass), whether solid, liquid or gaseous (see biogas). The term is used to differentiate these fuels from fossil fuels which are ultimately derived from organic matter but are the result of geological processes. Example biofuels include: wood chip pellets (solid), ethanol derived from sugar cane (liquid) and anaerobic digester (gas).

**Biogas**: This term would typically be used to describe the gas produced by the anaerobic (meaning in the absence of oxygen) breakdown of organic material (see biomass). It includes gas from landfill sites and from purpose-built anaerobic digesters that may take agricultural waste as their feedstock. Whilst the composition of the gas will depend on the source organic material, it is usually a combination of methane and carbon dioxide which can then be combusted for electricity generation, to provide heating, or both.

**Biomass**: Biomass is a term used to describe organic material which can either be used directly as a fuel source (for example wood), or can be processed into a usable fuel (see biofuel and biogas). The material may be waste from other processes such as agriculture or forestry, or may be grown specifically for use as a fuel or feedstock to convert into biofuel. Biomass combustion technologies for electricity generation and CHP are widely used in some parts of Europe and are commercial technologies that can be cost competitive with fossil fuels if a low cost biomass feedstock (such as waste wood) is available.

**CHP**: Combined Heat and Power (CHP) technologies aim to increase the overall efficiency of combustion-based electricity generation by using the waste heat from the process to supply a heat demand. The heat demand may be for industrial processes or for space heating. Industrial-scale CHP plants combined with district heating systems to distribute the heat output to public and private buildings are a well established technology, common in some parts of Europe.

**EC**: European Commission.

**EU**: European Union.

**FiT**: Feed-in tariff.

**GoO**: Guarantee of Origin.

**Ground/air heat pumps**: The basic principle of these devices is that they convert the low-grade diffuse heat energy in the ground or air to a high-grade concentrated heat source suitable for space and water heating. The process is similar to a refrigerator operating in reverse, and requires an electrical energy input to drive the pump. The heat output from the process is typically two to four times more than the energy required to drive the pump, with air-source devices typically being toward the lower end of this range and ground-source typically being towards the upper end of the range.

**GW**: GigaWatt (a measure of instantaneous power, one billion (thousand million) Watts). The unit of power installed capacities of countries and large power stations are often denominated in.

**GWh**: GigaWatt hour (a measure of energy, one GigaWatt of power delivered for one hour).

**Hydro power**: Hydro (or hydro-electric) power harnesses the kinetic energy of water as it runs down from a high level catchment area to a lower level, typically in mountain regions. The energy of the flowing water is captured either by exploiting

the natural force of streams and rivers, or by constructing a hydro-electric dam. The water flow is directed towards a turbine generator to produce electricity. Since river flow is rain-fall dependent, this resource is subject to seasonal and longer term climatic fluctuations. Hydro power can also provide a relatively high capacity means of storing energy and is often used for peak electricity load demand since it is easily brought on and off-line. Hydro-power is exploited commercially world wide, contributing around 17% of global electricity supply. There is limited potential for expansion in the UK.

**KW**: kiloWatt (a measure of instantaneous power, one thousand Watts).

**KWh**: kiloWatt hour (a measure of energy, one kiloWatt of power delivered for one hour). The unit domestic electricity bills are denominated in.

**MEP**: Member of the European Parliament.

**Mtoe**: Million tonne of oil equivalent is a unit of energy: the amount of energy released by burning one tonne of crude oil.

**MW**: MegaWatt (a measure of instantaneous power, one million Watts).

**MWh**: MegaWatt hour (a measure of energy, one mega Watt of power delivered for one hour). The unit sales of wholesale electricity are often denominated in.

**RO**: Renewables Obligation.

**ROC**: Renewables Obligation Certificate.

**Smart meters**: Advanced electricity meters. 'Smart' is a generic term used to cover a range of devices, from enhanced meters that provide real-time and readily-understood electricity consumption information to consumers, through to devices which monitor the demand/supply balance on the electricity grid and are able to shut down appropriate appliances when supply is insufficient to meet demand. The aim of the former is to encourage consumers to reduce electricity consumption, the aim of the latter is to smooth out demand/supply fluctuations.

**Solar Photovoltaics**: Solar photovoltaics (PV) convert sunlight directly into electricity. Photons of light liberate electrons in an appropriate semi-conducting material. Unlike almost all other technologies for generating electricity they have no moving parts and do not depend upon kinetic or thermal energy. Current commercial devices are manufactured from silicon-based semi-conducting material. PV can be utilised in a range of scales from tiny cells for electronic goods to large arrays. The most common application for power generation is building integrated PV where panels made of PV are mounted on domestic or commercial buildings. Other semiconductors can also be used and novel materials and designs are being actively researched throughout the world. The technology is commercially available but is relatively expensive compared to other commercial renewable technologies such as wind and hydro power. Research efforts are focused on cost reduction.

**Tidal stream and barrage**: Tidal stream power exploits the kinetic energy of tidal currents. Most designs use underwater turbine generators similar to wind turbines. Energy capture is optimised in areas of powerful currents where natural flows are concentrated between obstructions, for example at the entrances to bays and rivers, around headlands, or between land masses separated by water. Tidal barrages exploit the potential energy in the height difference between high tides and low tides by impounding the receding tide. The barrage is a form of dam across a river or estuary that blocks tidal water during its ebb phase and then releases the water through a turbine generator to create electricity. Tidal barrages

typically have a greater visual and environmental impact than tidal stream devices and there are a limited number of suitable sites for barrages around the world. Unlike some renewable energy sources, both tidal stream and barrages benefit from being predictable.

**TW**: TeraWatt (a measure of instantaneous power, one trillion (thousand billion) Watts).

**TWh**: TeraWatt hour (a measure of energy, one TeraWatt of power delivered for one hour). The unit national annual consumption of electricity is often denominated in.

**Watt**: Measure of instantaneous power, one Joule per second.

Wave power: Electricity generated from ocean waves. The fledgling wave power industry is characterised by a plethora of device types but they all seek to harness the energy in rising and falling wave fronts to generate electricity. No technology has established a dominant position although the oscillating water column (OWC) based devices for shoreline generation have been demonstrated effectively. For offshore power generation, the 'Pelamis' articulated floating tube device is possibly the nearest to commercial-scale deployment. At present only a small number of demonstration devices are in operation world-wide. Reflecting the early stage of wave power, costs are generally high compared to more developed options such as wind power.

**Wind power**: Electricity generated from the wind. The basic principle involves harnessing the energy of a moving air stream to rotate a shaft to which an electrical generator is attached. This is a well-established technology and the dominant design for large-scale power generation is the tower-mounted horizontal axis turbine where the turbine blades face into the wind direction. Turbines for commercial electricity generation are usually clustered together to create 'wind farms'. Wind power is the most commercially advanced renewable energy technology (apart from hydro), with around 90 GW installed worldwide.

## APPENDIX 5: VISIT TO SCROBY SANDS OFFSHORE WIND FARM—9 MAY 2008

The Members of the Committee that visited Scroby Sands were Lord Freeman (Chairman), Lord James of Blackheath, Lord Powell of Bayswater, Lord Walpole.

Scroby Sands is a wind farm owned and managed by E.ON. It was opened in 2005 and is sited 2.5km off the coast of Caister, near Great Yarmouth. It has a generating capacity of 60MW, supplying energy for 41,000 homes.

The Committee were met by Dave Rogers, UK Regional Director of E.ON Climate and Renewables, Adrian Chatterton, Head of Construction and John Beresford, Asset Leader for the wind farm.

Dave Rogers gave the Committee an overview of E.ON Climate and Renewables, a business within E.ON set up in 2007 to manage and develop E.ON's renewable energy portfolio. E.ON has 1353MW of renewable generation installed in Europe and the USA. 245MW of this is sited in the UK spread across 20 generation sites. These sites include 2 offshore wind farms, 1 biomass plant and 17 onshore wind farms. The Scroby Sands installation is the largest of these. Currently under construction is a third offshore wind farm in the Solway Firth. This wind farm, Robin Rigg, will have a generating capacity of 180MW.

Adrian Chatterton then gave a presentation describing the construction of the Scroby Sands site. The choice of the site on the relatively shallow waters of Scroby Sands had benefits and problems. The shallow waters mean that the 7.4km$^2$ site is located away from shipping lanes. This was a problem during construction because it required the use of suitably shallow draught construction vessels and construction could not be carried out a low tide. The Scroby Sands site does, however, benefit from good port facilities at Great Yarmouth and Lowestoft.

The power generated from the wind farm is cabled back to shore and connected at an existing substation to the distribution network. This meant that the project bypassed any potential problems with connection to the transmission grid.

During his presentation Mr. Chatterton identified some of the constraints on developing this kind of wind farm. There are the practical difficulties of matching the construction plan to suitable weather and tidal conditions. More importantly there are supply chain constraints. All energy generators will be affected by rises in copper and steel prices but there are particular supply chain problems for renewable energy. For example, during the construction of Scroby Sands E.ON used turbine piles made by two different manufacturers. These firms no longer exist and Robin Rigg will use parts made by only one company. Similarly, specialist vessels needed for offshore construction are in short supply. The uncertainty created by these conditions can be seen in the price for construction. Whilst Scroby Sands cost around £1.2m per MW, future projects will cost at least £2.4m per MW.

In order to stimulate the necessary industrial infrastructure clear and stable policy signals are required from Government. All three of the representatives welcomed the proposed re-banding of the Renewables Obligation (RO) scheme to provide 1.5 RO Certificates per MW for offshore wind and stated that without this change the construction of offshore wind farms would not be possible.

John Beresford then gave a presentation discussing some of the practicalities of keeping the wind farm operational. The turbines can generate power with wind speeds as low as 4 m/s and will generate at their full potential at speeds of 14–25

m/s. Above this point the blades are turned from the wind to avoid damage. For around 90% of the time the turbines will be generating at an overall load factor of around 30%.

As with the construction of the wind farm, maintenance is affected by weather conditions and lack of specialised vessels. Maintenance is not possible for around 120 days a year due to weather conditions and the two existing vessels suitable for large scale maintenance work are frequently in demand for other projects. This increases the cost of the running of the wind farm in comparison to an onshore installation.

The Committee then took a boat out to the wind farm. During discussions on the boat the current state of offshore farm development was characterised as needing to evolve from a "cottage industry" to a full industrial size. This move is apparent in the difference in generating capacity of Scroby Sands (60MW) and Robin Rigg (180MW). It was noted, however, that the gas-fired power station in Great Yarmouth can generate around 400MW with a higher load factor than wind farms. Another issue related to this increase in scale was that the operation of Scroby Sands has provided lessons in matters relating to offshore wind farms. For example, some of the original gears in the Scroby Sands turbines were found to be too fragile despite being tried and tested over some years on onshore wind farms. The Robin Rigg site is now being built with more hard wearing gear boxes.

The issue of planning was also discussed. Whilst no specific planning problems were discussed in relation to the Scroby Sands site, it was suggested that to facilitate the planning system a target for renewable generation should be set for local authorities (as exists for waste recycling) rather than simply encouraging them to work towards a national target.

## APPENDIX 6: VISIT TO BRISTOL—23 MAY 2008

The Members of the Committee that visited Bristol were Lord Freeman (Chairman), Lord Mitchell and Lord Whitty.

The visit consisted of three parts; a visit to the wind turbines at Avonmouth docks with Ecotricity and the Bristol Port Company, a meeting with Parsons Brinckerhoff and BERR, and a visit to renewable projects managed by Good Energy.

### Avonmouth Docks

The Committee were met by Vince Dale, Managing Director and Madeline Carroll, PR Officer of Ecotricity and Patrick Kearon, Director of Public Affairs, Bristol Port Company.

Avonmouth docks are equipped with three 2MW wind turbines operating at a 32% load factor. These provide around 75% of the site's power needs. The site is connected to the grid network. The installation is owned and managed by Ecotricity who sell on the Renewables Obligation Certificates earned.

The issue of planning permission was discussed. For the Avonmouth docks installation planning permission was not a great problem as the turbines are on a brown field site. Mr Dale estimated that of Ecotricity's projects around one in ten on brown field sites will be sent to appeal. On green field sites appeal is more likely, around two out of three projects. Around 90% of Ecotricity's projects are successful in the planning system. On average Ecotricity take around three years to develop a project. This includes filtering out areas unsuitable due to various barriers (low wind speeds, housing, protected land etc …) Once a suitable site has been located Ecotricity must then negotiate with the owners of that land. Ecotricity have been working to develop projects close to existing grid infrastructure in order to reduce any grid connection problems.

Despite Ecotricity's success rate, Mr Vince was concerned that many planning applications get turned down at a local level regardless of evidence submitted. Ecotricity suggest moving planning of these kinds of projects up to County Council level in order to retain some democratic oversight whilst making a strategic and considered decision more likely. Both Mr Vince and Mr Kearon stated that the Planning Bill would not streamline the system for their projects as they do not meet the 50MW threshold. A further planning problem identified was objections from the Ministry of Defence (MoD). According to Mr Vince on a number of occasions the MoD have objected to projects but not continued that objection at planning appeal. He views this as an unnecessary delay to projects.

The building and maintenance of onshore turbines in comparison with offshore projects was discussed. In the case of the Avonmouth docks turbines, only two days of the year are lost to maintenance and the turbines are operational for over 95% (95.53% over 11 months of operation) of the time. Ecotricity are also aware of potential supply chain problems. Currently they have developed relationships with manufacturers in Germany for three years but beyond that they are unsure what arrangements they will have to come to.

The Committee discussed the proposed Severn Barrage with Mr Kearon. It has been suggested that a system of locks within the barrage would allow shipping to pass through it and to the docks. The Bristol Port Company believe that this would have an adverse effect on their business. Not only would a system of locks

increase waiting times to get into the docks but the barrage would permanently reduce the depth of the Severn. Currently the River Severn runs deeper further into land than any other UK dock; this benefit would be lost if the barrage were built.

### Parson Brinckerhoff (PB Power)

The Committee met Peter Kydd, Project Director of Severn Barrage Feasibility Study and Gary Shanahan, Deputy Director of Severn Tidal Power Unit, BERR.

PB Power have been appointed to carry out a feasibility study into the Severn Barrage project. The handout from this session can be found in the written evidence section of this report.

### Good Energy

The Committee met Hugo House of Good Energy. He arranged for the Committee to visit two micro-generation projects Good Energy are involved with. The first was the house of Mr and Mrs Bannerman. The second was the house of Jackson Moulding and Anna Hope. Both of these homes have been fitted with solar photo voltaic panels for electricity generation and hot water. Many of the same themes were brought up at both projects.

In both cases the solar panels had been installed not on the expectation of making significant savings in energy bills but on a point of principle. Good Energy suggested that on average a payback period of 20 years is expected for the installation of solar panels.

Both parties stated that being able to easily see how much electricity was being generated and how much was being bought from their supplier (Good Energy) mean that their power use habits had changed. Although this may be evident only in small ways such as leaving lights off, recharging mobile phones during the day rather than overnight or only using the dishwasher on sunny days, the increased awareness of energy use is important.

Both witnesses stated that finding qualified companies to install or repair the panels is also a challenge. Although Jackson Moulding and Anna Hope carried out the installation work themselves any repairs to equipment required them to send parts away to companies in Germany or Denmark. Mr and Mrs Bannerman also noted that choosing a reliable installation company was relatively difficult as there is no universal accreditation system for installers equivalent to the CORGI registration for gas installers for example. Good Energy added that this has been addressed to some extent and there is now an online register of accredited installers.

The principal message from both projects was that without extra help from Government or energy companies micro-generation will not become more common. Not only are the parts expensive but the grants that are available were difficult to apply for and partnerships with energy companies were not easy to arrange. Good Energy pointed out that although the grant system has been simplified, the grants available have been reduced.

## APPENDIX 7: CORRESPONDENCE

### Letter to Sub-Committee B from Mr Tim Abraham, Director, EU Energy Policy, Department for Business, Enterprise and Regulatory Reform dated 27 June 2008

Further to your letter of 11 June requesting more detail relating to your Committee's inquiry into the EU's 20% renewable energy target, I enclose answers to your questions. I hope you will find this useful; if you require any further information and assistance in your inquiry, please let me know.

I have also included a copy of the UK Renewable Energy Strategy Consultation document that was published yesterday and which contains details of many of the issues you raise. This can also be found on the BERR website at: www.berr.gov.uk/renewableconsultation.

BERR's Energy Trends was published on 26 June although the renewables data within it remain provisional until DUKES (the Digest of UK Energy Statistics) is published on 31 July

1) In much of the evidence we have received it has been estimated that, in order to meet the 15% target by 2020, around 40% of electricity and 10% of heating and cooling will need to be renewably generated. Is this an assumption BERR shares?

Our initial analysis suggests that, if 10% renewable energy in transport is feasible and sustainable, then one possible scenario to reach 15% renewable energy in the UK might be: 10% renewable energy in transport; 14% in heat; and 32% in electricity. If sustainability concerns meant that the transport sector could not contribute 10%, then the contribution from the other sectors would have to higher, or we would have to use other options such as trading with other countries.

It will of course be for the market to determine the actual levels of investment in each sector.

2) What does the Government estimate the cost to the consumer will be of managing intermittency, developing the grid and increasing the assistance given through support schemes? National Grid has estimated that the cost of balancing the grid with 40% renewable electricity will be between £6–£12 to an average household electricity bill of £390.

Policies to increase renewable energy development will add to energy prices and bills. The contribution that renewables components make to energy bills will depend on how the costs of other components of energy prices change. Bills do not necessarily need to rise as much as prices—using less energy, and installing energy efficiency measures can help mitigate these effects. Table 1 below summarises the expected impact on energy bills with 32% of electricity coming from renewable energy sources (as outlined in question1).

*Table 1: Impact on annual electricity prices and bills resulting from measures to achieve 32% renewable electricity.*

| 32% renewable electricity—central fossil fuel prices | Domestic Prices (Annual bills) | Industrial Prices (Annual bills, £000s) |
|---|---|---|
| 2010–2014 | -1 to 4 %<br>(£-3 to £13) | -1 to 4%<br>(£-4 to £19) |

| | | |
|---|---|---|
| 2015–2019 | 1 to 5%<br>(£3 to £19) | 1 to 6%<br>(£4 to £28) |
| 2020–2024 | 9 to 15%<br>(£32 to £53) | 10 to 16%<br>(£46 to £78) |
| 2025–2029 | 10 to 14%<br>(£33 to £48) | 11 to 16%<br>(£48 to £70) |
| 2010 to 2030 | 6 to 9%<br>(£20 to £33) | 6 to 11%<br>(£29 to £48) |

Note: The range reflects the standard error of differences of changes from the status quo. In some years the impact of high penetration of renewables leads to lower short-run marginal costs which reduce wholesale prices. This impact is greater under high fossil fuel price assumptions.

The table shows that the biggest impact on prices and bills will be in 2020 and beyond as the level of renewable generation increases to 2020. These estimates are based on central fossil fuel prices in line with BERR central projections with an oil price of $70 per barrel. Under higher fossil fuel prices (in line with $95 a barrel) the percentage increase in electricity bills could fall by around a half, while under fossil fuel prices consistent with $150 per barrel, the increase could fall by around three-quarters of that shown above.

3) What estimates has the Government made about the effect of increasing renewable energy generation on the UK's energy import level?

Our initial estimates suggest that meeting the renewable energy target in the UK could reduce gas imports by 12–16% in 2020. We also estimate that this could reduce our total use of gas by 9–12% and fossil fuels use by 10%.

4) What was the renewable electricity generation figure before the introduction of the Renewables Obligation?

The RO was introduced in April 2002. In 2001, 9,549 GWh of electricity was generated from renewables in the UK equal to 2.62 per cent of generation. Excluding types of generation that were ineligible for the RO (e.g. large scale hydro) gives figures of 4,884 GWh and 1.52 per cent. Note that since the RO is an obligation on suppliers, the second set of figures are expressed in term of electricity sales.

5) What is the UK's current level of (a) renewable electricity generation, and (b) renewable heat generation?

a) In 2007 19,664 GWh of electricity was generated from renewables in the UK equal to 5.0 per cent of generation. Including only those renewables that are eligible for the RO these figures are 15,953 GWh and 4.9 per cent. Note that since the RO is an obligation on suppliers, the second set of figures are expressed in term of electricity sales.

b) In 2007 renewables amounting to 729 thousand tonnes of oil equivalent were used to generate heat.

6) What is the UK's (a) total energy demand, and (b) electricity demand?

a) Total primary energy demand in the UK in 2006 was 244.1 million tonnes of oil equivalent. Final energy consumption in 2006 amounted to 157.8 million

tonnes of oil equivalent. Provisional figures for 2007 are 236.0 mtoe and 154.9 mtoe, respectively.

b) Total electricity demand in the UK in 2006 was 406,121 GWh. Provisionally demand in 2007 is put at 402,611 GWh

7) How is the current total demand split between electricity, heating and cooling, and transport?

In 2006, in terms of final energy consumption, 22 per cent was for electricity, and 37 per cent for transport, and the residual (41 per cent) was deemed to be for "heat". Note that electricity used for transport is included under electricity and not transport and electricity used for heat is included under electricity and not heat.

## Letter to Sub-Committee B from Mr Tim Abraham, Director, EU Energy Policy, Department for Business, Enterprise and Regulatory Reform dated 11 September 2008

Further to your request for information relating to how much achieving the renewables target will cost the consumer, for your Committee's inquiry into the EU's 20% renewable energy target, I hope you will find the attached information useful. If you require any further information and assistance in your inquiry, please let me know.

We have estimates of the impact of different fuel prices on electricity bills assuming 37% renewable electricity at both the central and high fuel price levels, but do not have the same estimates for 32% renewable electricity, which is the scenario used in the table in question.

I attach a table from our impact assessment on renewable electricity that shows the central case estimates and those under the 'high high' fossil fuel price assumptions, which are consistent with oil prices of $150bbl by 2020. More information on the electricity impacts can be found in the IA published alongside the consultation document—link below.

In terms of impact on gas bills, the Heat Impact Assessment contained estimates of the impact of 11% and 14% renewable heat under different fossil fuel price assumptions. The Heat IA document can also be found at the link below.

http://renewableconsultation.berr.gov.uk/related_documents

I hope the information provided will be of use.

*Table 2a: Impact on Domestic Electricity Bills*

| % increase in Domestic Prices (Bills) | 32% renewable electricity—central fuel prices | | 37% renewable electricity—central fuel prices | | 37% renewable electricity—high fuel prices | |
|---|---|---|---|---|---|---|
| | RO | FITs | RO | FITs | RO | FITs |
| 2010–2014 | 1 to 4 % (£4 to £13) | -1 to 2% (£-3 to £7) | 1 to 4% (£4 to £15) | -1 to 2% (£-4 to £7) | 1 to 2% (£6 to £11) | -1 to 0% (£-5 to £2) |
| 2015–2019 | 3 to 5% (£10 to £19) | 1 to 4% (£3 to £12) | 3 to 6% (£12 to £22) | 2 to 5% (£7 to £17) | 0 to 1% (£1 to £6) | - 4to -3% (£-22 to £-15) |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2020–2024 | 12 to 15% (£43 to £53) | 9 to 11% (£32 to £41) | 9 to 12% (£34 to £44) | 9 to 12% (£33 to £44) | 5 to 6% (£24 to £29) | 3 to 4% (£14 to £20) |
| 2025–2029 | 10 to 12% (£33 to £42) | 11 to 14% (£38 to £48) | 17 to 20% (£57 to £67) | 16 to 19% (£54 to £65) | 2 to 3% (£7 to £12) | 3 to 4% (£12 to £18) |
| 2010 to 2030 | 7 to 9% (£23 to £33) | 6 to 9% (£20 to £30) | 8 to 11% £29 to £39 | 7 to 10% £24 to £35 | 2 to 3% £9 to £14 | 0 to 2% £0 to £7 |

*Table 2b: Impact on Industrial Electricity Bills*

| % increase in Industrial Prices (Bills 000s) | 32% renewable electricity—central fuel prices | | 37% renewable electricity—central fuel prices | | 37% renewable electricity—high fuel prices | |
|---|---|---|---|---|---|---|
| | RO | FITs | RO | FITs | RO | FITs |
| 2010–2014 | 1 to 4% (£5 to £19) | -1 to 2% (£-4 to £9) | 1 to 5% (£6 to £22) | -1 to 2% (£-5 to £11) | 1 to 3% (£8 to 15) | -1 to 0% (£-6 to 3) |
| 2015–2019 | 3 to 6% (£14 to £28) | 1 to 4% (£4 to £18) | 4 to 7% (£17 to £32) | 2 to 5% (£10 to £26) | 0 to 1% (£1 to £9) | -5 to -3% (£-32 to £-23) |
| 2020–2024 | 13 to 16% (£64 to £78) | 10 to 13% (£46 to £61) | 10 to 14% (£49 to £65) | 10 to 13% (£48 to £64) | 6 to 7% (£34 to £41) | 3 to 5% (£20 to £29) |
| 2025–2029 | 11 to 14% (£48 to £62) | 12 to 16% (£56 to £70) | 19 to 22% (£83 to £99) | 18 to 21% (£79 to £95) | 2 to 3% (£9 to £16) | 3 to 5% (£16 to £25) |
| 2010 to 2030 | 7 to 11% (£34 to £48) | 6 to 10% (£29 to £44) | 9 to 13% (£42 to £57) | 8 to 11% (£35 to £51) | 2 to 3% (£13 to £20) | 0 to 2% (0 to £9) |

Note: Price increases are estimated above the status quo, using the same price assumptions. High fuel prices are consistent with oil prices at $150bbl, central fuel prices are consistent with oil prices at $70bbl. The range reflects the standard error of differences of changes from the status quo. In some years the impact of high penetration of renewables leads to lower short run marginal costs which reduce wholesale prices. The effect is greater under high fossil fuel price assumptions.