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The Welsh Affairs Committee

The Welsh Affairs Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Office of the Secretary of State for Wales (including relations with the National Assembly for Wales.)

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1 Introduction

1. Our inquiry is a timely and important contribution to the Energy debate, and provides a context for the analysis and evaluation of the implications of the UK Government's Energy Review for Wales. Given its position as a net exporter of energy, with an abundance of natural resources, Wales faces a unique opportunity to continue to play a vital role in the United Kingdom's energy supply. In particular it has the potential to develop and establish a leading indigenous, clean energy industry in the United Kingdom. The careful development and management of those natural resources could help to address the current energy dilemmas facing the United Kingdom, not least in providing clean, safe, secure, reliable and efficient sources of energy.

2. Our report provides an overview of the current energy mix in Wales. It makes recommendations on issues that need to be addressed to maximise the development of existing energy sources and renewable energy in Wales, in order to promote and secure the future of Welsh traditional and new renewable sources of energy.

3. We have deliberately focused on energy production in Wales, so that we can provide a Welsh dimension to the evaluation, merits and impact of the Government's Energy Review on Wales; and Wales' contribution to recommendations that will be published in that Review. Our inquiry concentrated specifically on energy supply, rather than energy consumption. Energy consumption and efficiency, particularly in relation to housing and transport, would merit a separate inquiry. Similarly, whilst we acknowledge the significant potential that microgeneration has for contributing to energy supply in Wales, this inquiry does not include an in-depth study of the issues involved.

4. During our inquiry we canvassed widely for information and expertise. We held nine formal meetings at which we took oral evidence from officials, organisations and individuals. In addition to those meetings we received a large body of written evidence, on a wide range of issues from companies, organisations and individuals. We thank everyone who has taken the time to give us their views on the current state of energy in Wales.

5. In addition to our formal meetings we also held a large number of informal meetings around Wales. In Wales we visited Cefn Croes onshore wind farm, Ffestiniog hydroelectric power station, Wylfa nuclear power station, Aberthaw coal-fired power station, Tower Colliery, Bangor University, Technium OpTIC, and the Centre for Alternative Technology. We also took the opportunity to gain first hand knowledge of a range of energy issues from world leading institutions such as the National Renewable Energy Laboratory, the Colorado School of Mines and the Argonne National Laboratory when we visited the United States of America. For information, we have published outline programmes for these visits as Annexes to this report.

6. We also thank David Hudson, a work experience student from the Department of International Politics, University of Wales, Aberystwyth who helped to compile the evidence for our Report during his attachment to the Welsh Affairs Committee.

2 UK Government and Welsh Assembly Government Policy

Government Policy and the Energy Review

7. Energy policy in the United Kingdom is a strategic issue that is set at the National level. Therefore, energy policy is predominantly a non-devolved matter. The UK Government set out its thinking on the future of the UK's energy policy in its White Paper "Our Energy Future- Creating a Low Carbon Economy" which was published in 2003. The White Paper was based on the outcome of the 2002 Energy Review, and set out four goals for energy policy in the UK.

- i. to put the UK on a path to cut carbon dioxide emissions by some 60% by about 2050 with real progress by 2020;
- ii. to maintain the reliability of energy supplies;
- iii. to promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and improve our productivity; and
- iv. to ensure that every home is adequately and affordably heated.¹

8. On 29 November 2005, the Government announced the terms of reference for its second Energy Review. The intention of the second Energy Review was to assess the level of success in achieving the goals set by the 2003 Energy White Paper, and to take into account new research and the "important international context".² At the time of writing this report we understand that the Energy Review will be published in the very near future.

9. The Energy Review is taking place at the same time as a number of related reviews all of which will have an impact upon its conclusions and recommendations. The UK Climate Change Programme was published in November 2000, and focused on measures to help meet the Kyoto target, and the UK's domestic goal of reducing carbon emissions to 20% below 1990 levels by 2010. The Climate Change Programme Review (CCPR) is currently reviewing progress and expected to report this year. Furthermore, the Committee on Radioactive Waste Management CoRWM has published its interim report, and its final recommendations are expected in July 2008.

1 www.dti.gov.uk/energy/policy-strategy/energy-white-paper/page21223.html

2 DTI Press notice P/2005/378, Energy Review- a secure and clean energy future, 29 November 2005.

Welsh Assembly Government Policy and Strategy

10. The Welsh Assembly Government has identified five strategic strands for energy policy in Wales.³ Those strands were developed in Welsh Assembly Government's Energy Route Map, which was put out for consultation in September 2005.⁴ The outcome of that consultation will be published following the publication of the UK Government's Energy Review.⁵ The five strands identified were:

- i. "securing 4 TWhr per annum of renewable electricity production by 2010 and 7 TWhr by 2020;
- ii. driving much greater energy efficiency in all sectors, as described in our 'Energy Saving Wales' energy efficiency action plan published in October 2004;
- iii. pursuing more electricity generation from cleaner, higher efficiency fossil-fuel plants;
- iv. stimulating significant energy infrastructure improvements; and,
- v. on a holistic basis, achieving measurable carbon dioxide emission reduction targets for 2020".⁶

11. Those policy strands will have to be developed in conjunction with the UK Government's Energy Review. In addition to that discussion we have identified several additional areas in which the UK Government and the Welsh Assembly Government will need to work together to improve the framework in which policy will be developed.

Carbon Trading in the UK

12. The EU Carbon Trading Scheme is one of the policies being introduced across Europe to tackle emissions of carbon dioxide and other greenhouse gases, and to combat the serious threat of climate change. The scheme will work on a 'Cap and Trade' basis. EU Member State governments are required to set an emission cap for all installations covered by the Scheme.⁷ It works in conjunction with Renewable Obligation Certificates to provide incentives to companies to develop renewable Energy. While the ROC mechanism has been a qualified success, our witnesses identified further mechanisms to build on those incentives, in particular, the establishment of a carbon trading scheme within the UK. Not only would this offer incentives to develop low carbon technologies, but it would also significantly reward Wales for its contribution in that area. Professor Dennis Hawkes, former Director of the Sustainable Environment Research Centre, University of Glamorgan, argued that, "we need some kind of competition to get the CO₂ levels down. If it is measured regionally it would be better. If it is measured in even smaller areas than that

3 Ev 193

4 Ev 193

5 Ev 195

6 Welsh Assembly Government: Energy Route Map: www.wales.gov.uk

7 www.defra.gov.uk

it might be even better to get some competition into the system”.⁸ Professor Phil Bowen, Division of Mechanical Engineering and Energy Studies, Cardiff, and a Member of the Welsh Development Agency’s Energy Centre of Excellence, agreed: “I think the incentive thing is the major issue. It is monitoring CO₂ at a smaller level, raising awareness and getting incentives going”.⁹

13. Kevin Mowbray from the Welsh Energy Research Centre highlighted the positive impact such a scheme could have on the renewables sector in Wales. He said that “if you are looking at compensation for reducing CO₂ in England, if we actually invested in the renewable energies in Wales then by that you would be compensated for by supplying clean energy into other parts of the United Kingdom”.¹⁰ He argued that if Wales did not develop its wave, tidal, biomass, and photovoltaic industries it would not only lose out on the benefits of an indigenous industry but it would also have “to buy it in from outside”.¹¹

14. David Wagstaff, Director, Energy Strategy Development and Delivery, Department of Trade and Industry told us that while the Carbon Trust had also suggested a UK trading scheme, the DTI’s position was that “there is not at the moment any plan to have that kind of internal market”.¹² Furthermore, he added that the Carbon Emissions Reduction Target was “a UK-wide target and it does not specify what contribution needs to be made by which parts of the UK to meet that target”.¹³

15. The key to developing this type of internal trading scheme is to collect carbon data at the Welsh level. However, at present the data is not collected in this way. Gordon James, from Friends of the Earth Cymru, told us that producing figures on CO₂ emissions in Wales was “quite difficult” and that his organisation was the first to produce them.¹⁴ He added that “it would be good to have more data available in Wales on our energy performance on those CO₂ emissions and other emissions and to have this more readily available to the public”.¹⁵ David Wagstaff, from the DTI maintained however, that it was quite difficult to measure carbon emissions and that breaking down the data into “lots of regions”, complicated the measurement task further.¹⁶ Professor Dennis Hawkes disputed that claim. He protested that “I do not see any reason why it could not be done at a lower level but at the moment it is not”.¹⁷ He added that “I think we could monitor it at as small a level as possible, because that might give some incentives to individual counties”.¹⁸

8 Q 129

9 Q 130

10 Q 130

11 Q 130

12 Q 3

13 Q 7

14 Q 404

15 Q 404

16 Q 7

17 Q 132

18 Q 132

16. Whilst acknowledging that Welsh renewable energy schemes may make a valuable contribution to UK carbon reduction targets, we consider that this could be further enhanced and developed should an internal carbon trading scheme be developed in the UK. The Government endorses the principle of a carbon trading scheme and participates in such a scheme at the EU level. We see no reason why a similar incentive structure would not be successful at a national level within the UK.

17. We are unconvinced by the Department of Trade and Industry's assertion that carbon data cannot be collated below the UK level, and recommend that the Government develop procedures to monitor emissions data at the national level (Wales, Scotland and England) or below, within the UK.

Renewable Obligation Certificates

The Role of Renewable Obligation Certificates

18. In its evidence to us, the Department of Trade and Industry stated that “the UK benefits from vast natural renewable resources particularly wind, wave and tidal”.¹⁹ Wales was considered to have a significant proportion of those resources and would play an important role in delivering renewable energy to the UK. The DTI noted that Welsh wind power would play an important role in meeting the UK's renewables targets²⁰ and that it also had significant wave and tidal resources.²¹ It further recognised the expertise that Wales had developed in the field of photovoltaic solar energy.²²

19. At present, wind is the most developed of those renewable energy sources, but wave, tidal and solar energy in Wales will play a significant role in the future, if given appropriate encouragement and support. Later in this report we assess each of these renewable energy resources, and their relevance to Wales. During our inquiry witnesses have suggested that the position of wind owed much to the framework set up by the UK Government for the promotion of renewable energy in the UK.

20. The principal government tool to promote renewable and clean energy are Renewable Obligation Certificates (ROCs). The Energy White Paper set out the principles underlying those Certificates:

“The Government has placed a Renewable Obligation on licensed electricity suppliers to deliver a specified amount of their electricity from eligible renewable sources.

Eligible renewable generators receive Renewable Obligation Certificates (ROCs) for each MWh of electricity generated. These certificates can then be sold to suppliers. In order to fulfil their obligation, suppliers can either present enough certificates to cover the required percentage of their output, or they can pay a ‘buyout’ price of £30

19 Ev 5

20 Ev 5

21 Ev 6

22 Ev 6 and Q 838

per MWh for any shortfall. All proceeds from buyout payments are recycled to suppliers in proportion to the number of ROCs they present”.²³

Reform of Renewable Obligation Certificates

21. The All Wales Energy Group argued that Renewable Obligation Certificates provided a means whereby producers of certain categories of renewable energy can obtain a subsidy directly proportional to the amount of energy produced. The Group argued that the main beneficiary of ROCs was wind energy which it asserted “enjoys unlimited access”. By contrast the Group asserted that “solar energy is excluded and hydro electric [is] limited to 20 MW per site”.²⁴

22. Dr Constable, Policy and Research Director of the All Wales Energy Group argued that while the intention was good, ROCs were a blunt instrument which made “no distinction between the intrinsic merits of renewable technologies” but rewarded “the least capital intensive sources of energy [] at present wind energy”.²⁵ Dr Constable believed that the situation had resulted in investors concentrating on wind to the exclusion of other forms of renewable energy. He concluded by asserting the ROC system needed to be finessed to help “incentivise capital to move towards technologies that happen to be more capital-intensive and which have higher intrinsic merit, for example tidal and biomass”.²⁶ Joe Verdi from Marine Current Turbines Ltd., argued that the Government could take a significant step forward in promoting confidence in marine technologies by extending the Renewable Obligations Certificate beyond 2027. He claimed that extending the ROCs would “give a good signal to investors and also to the City because at the moment, in terms of project finance, all we can do is take it up to 2027”.²⁷

23. Express Power also highlighted problems with the Renewables Obligation Certificate process. It told us that accreditation of the proposed fuel for Renewable Obligation Certificates could not be obtained before construction of the project was complete. As such the financial risk and uncertainty for biomass projects was increased and represented a disincentive for shareholders to invest.²⁸ Maurice Price, Chief Executive of Express Power told us that Ofgem were now prepared to indicate accreditation for the fuel on planning consent.²⁹

24. David Lewis echoed that view when believing that ROCs “distort the economic factors of energy production”. In particular, he argued that wind energy was unduly subsidised by the Certificates.³⁰ Conwy Locals Opposing Unnecessary Turbines (CLOUT) also argued that ROCs represented an indirect subsidy to wind farm developers.³¹

23 Energy White Paper, page 131

24 Ev 175

25 Q 674

26 Q 674

27 Q 603

28 Ev 81

29 Q 375

30 Ev 280

31 Ev 359

25. Malcolm Wicks MP, Minister for Energy, Department of Trade and Industry, defended Renewables Obligation Certificates as “an interesting mechanism in place to make the generating companies source so much of their electricity from renewables”.³² He was aware that they were considered to be a “blunt instrument” and stated that the Energy Review would address concerns that ROCs were simply a mechanism that had brought on wind farms but were not “disaggregated enough or sophisticated enough” to bring on other forms of renewable energy.³³

26. Although the Renewable Obligation Certificates are a UK wide mechanism, they have played a significant role in stimulating the development of wind farms across Wales. There is however, an increasing concern that ROCs have skewed the market in favour of wind farms to the detriment of other renewable energy sources. Wales has an abundance of natural resources that can make a significant contribution to the UK’s clean energy needs. We recommend that the Renewable Obligation Certificates be refined to ensure that they stimulate renewable energy sources in a more balanced way, so that the wave, tidal, biomass and photovoltaic resources, and other renewable resources, are able develop and play their full part in providing clean renewable energy in Wales.

Tripartite Group on Energy Consents

The division of powers between the UK Government and the Welsh Assembly Government

27. At present, planning is a policy which is divided between the UK Government and the Welsh Assembly Government. Our witnesses from the Department of Trade and Industry explained that it was responsible for energy consents under Section 36 of the Electricity Act for proposed generating stations which were in excess of 50 megawatts.³⁴ Where a generating station produced below 50 megawatts, it was a matter for the Welsh Assembly Government and the local planning authorities.³⁵ Although the National Assembly is consulted by the DTI on proposals for power stations in excess of 50 megawatts, it plays no formal part in the decision-making process.³⁶ We explore this division of powers in greater depth during our examination of wind energy in Wales.³⁷

28. In 2003, the Welsh Assembly Government requested a formal transfer of those powers. A Tripartite Working Group comprising officials from the Wales Office, the DTI and the Welsh Assembly Government was established to consider the request and to present options and recommendations for Ministers to consider.³⁸

32 Q 836

33 Q 836

34 Q 69

35 Q 69

36 Ev 4

37 See paras 141 to 150

38 Ev 4

The Tripartite Group on Energy Consents

29. In 2004, our predecessor Committee conducted an inquiry into Manufacturing and Trade in Wales. That inquiry considered the work of the Tripartite Group. Jacqui Smith MP, the then Minister of State for Industry and the Regions, Department of Trade and Industry, told our predecessor Committee that the working group had consulted with stakeholders and was due to put advice to Ministers by the end of 2004.³⁹ Our predecessor Committee came to the following conclusion:

“We welcome the establishment of a working group to consider the Welsh Assembly Government’s request for increased powers over energy consents. We expect the Government to look favourably on this request and recommend that the Government update the committee on the findings of that working group at the earliest opportunity”.⁴⁰

30. We published the Government’s response to that report on 20 July 2004.⁴¹ In it the Government stated that:

“The Working Group is still considering the implications of the proposal from the Welsh Assembly Government for the transfer of energy consents powers and will produce its report as quickly as possible. We will let the Committee know when a decision has been made on the proposal”.⁴²

31. The Government’s target for the Group to make recommendations to Ministers by the end of 2004 was not met and no recommendations have been made to Ministers. In its written evidence to us the Welsh Assembly Government reaffirmed its position in favour of devolving that planning function, and that its desired outcome of the Energy Review would be a correction of “the anomaly of some of the Electricity Act 1989 etc. powers continuing to be reserved to the UK Government and not being devolved to Wales”.⁴³ When he gave evidence to us, Andrew Davies AM asserted that the reason for the delay was the Energy Review and he believed that any decision had been “been put on hold until the outcome of the Review is known”.⁴⁴

32. When we discussed the timetable for reporting to Ministers with the UK Energy Minister, he confessed that he was unaware of the 2004 target for the Group to report.⁴⁵ John Williams of the Wales Office was able to shed more light on the reasons behind the delay. He told us that, in part, the delays were due to the changing landscape of energy

39 Second Report from the Welsh Affairs Committee, *Manufacturing and Trade in Wales*, HC 329 of Session 2004-05, para 116.

40 Second Report from the Welsh Affairs Committee, *Manufacturing and Trade in Wales*, HC 329 of Session 2004-05, para 117.

41 First Special Report from the Welsh Affairs Committee, *Manufacturing and Trade in Wales and Public Services Ombudsman (Wales) Bill: Government Responses to the Committee’s Second and Third Reports of Session 2004–05*, HC433 of Session 2005-06.

42 First Special Report from the Welsh Affairs Committee, *Manufacturing and Trade in Wales and Public Services Ombudsman (Wales) Bill: Government Responses to the Committee’s Second and Third Reports of Session 2004–05*, HC433 of Session 2005-06, para 15.

43 Ev 198

44 Q 711

45 Q 850

policy in the United Kingdom and a greater volatility in energy prices. Furthermore, he agreed with Andrew Davies AM, that the Government's Energy Review had overtaken events and that it was now "best to await the outcome of that review before progressing with the work of the Tripartite Working Group so that it can be fully informed of the outcome of the review".⁴⁶

33. The Tripartite Group considering the devolution of energy consents to the Welsh Assembly Government has been working for nearly three years. In an earlier report, our predecessor Committee was told that it would report to Ministers in 2004. That target was missed and it appears that little, if any, tangible progress has been made since that inquiry. A supplementary memorandum from Tom Watson MP confirmed that the Group had only met six times in the past three years. Furthermore, the Minister stated the target timetable for the Group to complete its work was "as soon as possible following publication and full consideration of the outcomes of the Energy Review".⁴⁷ However, the UK Energy Minister stated that he would be "reluctant to concede" powers over energy consents for power stations above 50 MW.⁴⁸

34. There is a clear impression that the work of the Tripartite Group on Energy Consents has been left to wither on the vine. The DTI as the decision-maker on this issue has to take an active and more purposeful lead. Whatever the outcome, a decision on where the powers on consents lie, needs to be taken very soon. We recommend that the UK Energy Minister give a clear statement on the current status of the Tripartite Group and set out in his response to this Report, a detailed timeframe for the conclusion of the Group's work, including dates by which the Group will report to Ministers and when any decision will be made.

UK Government Funding for Energy Research in Wales

35. David Wagstaff, Director Energy Strategy Development and Delivery at the Department of Trade and Industry told us that while the DTI gave money to specific projects, it did not "categorise that by geographical location".⁴⁹ In a supplementary memorandum the Department of Trade and Industry, reaffirmed that it "does not keep figures on particular spend on renewable energy research and development in Wales". However, it confirmed that the University of Wales, Bangor, the University of Glamorgan and the Institute of Grassland and Environmental Research had all been recipients of some level of UK Government funding.⁵⁰ **While we welcome the provision of that funding, a more detail assessment of the spread and level of UK Government funding for energy research in Wales would be welcome.**

46 Q 850

47 Ev 239

48 Qq 848-9

49 Q 837

50 Ev 239

The Centre for Alternative Technology

36. Despite being asked, the DTI made no reference to UK Government funding for the Centre for Alternative Technology. The Centre for Alternative Technology was founded in 1973 on the site of the disused Llwyngwern slate quarry near Machynlleth, in Mid Wales. The Centre offers a range of activities, information and teaching on renewable energy, environmental building, energy efficiency, organic growing and alternative sewage systems.⁵¹

37. The Centre for Alternative Technology has a Visitor Centre which is open seven days a week, and provides interactive displays that demonstrate a range of global issues such as energy generation and transport, and offers practical, everyday solutions to those issues. It also runs a free information service, answering enquiries from the public and has a consultancy service for larger commercial projects. Furthermore, the Centre for Alternative Technology runs a range of residential courses up to and including a Masters degree course on Advanced Environmental and Energy Studies.⁵²

38. When we visited the Centre for Alternative Technology, we saw at first hand, the excellent work that was undertaken by the Centre. We were also appraised of its plans to expand and enhance its educational work by building a new teaching and residential block. We were disappointed to hear that the Centre had received little, if any, support from the Department of Trade and Industry in relation to that work. **We recommend that the DTI fully appraise itself of the valuable work being undertaken at the Centre for Alternative Technology.**

51 www.cat.org.uk

52 www.cat.org.uk/education/education.tmpl?subdir=education§ion=cq

3 Clean Coal Technology

Background

39. International Energy Agency forecasts have indicated that some 38% of the world's electricity will still be generated from coal by 2020.⁵³ That reliance was reinforced by many of our witnesses who had identified a global switch back to coal.⁵⁴ The reason for that switch back to coal can be, in part, attributed to an increase in the price of oil, and concerns over the security of the supply of natural gas. Indeed, during our visit to the United States, we were told that the coal industry was “the most buoyant and optimistic” of the US energy sectors.⁵⁵ A global desire to cut carbon emissions alongside the expansion of Chinese and Indian economies with heavy reliance on coal, meant that “the importance of clean coal technology cannot be underestimated”.⁵⁶ The key to the long term viability of the coal industry, both globally and in Wales, is the promotion of those technologies.

40. The Renewable Energy Foundation claimed that fossil fuels will necessarily continue to provide the bulk of energy in the UK, for some time to come.⁵⁷ Indeed, Malcolm Wicks MP told us that on average, 30% of the UK's electricity was fuelled from coal,⁵⁸ and in the winter months of December 2005 through to March 2006, coal contributed an average of 50% of the UK's electricity generation.⁵⁹ Ensuring that this fossil fuel is used efficiently and without emissions is therefore essential.⁶⁰ Wales TUC Cymru told us that in order to make a significant contribution towards cutting greenhouse gases, more clean coal plants needed to be built in the UK.⁶¹

41. Clean Coal Technology could therefore play a vital role in addressing Wales' future energy needs.⁶² The Renewable Energy Foundation claimed that Wales was a likely beneficiary of the now inevitable coal rebuild in the United Kingdom's energy portfolio.⁶³ Andrew Davies AM, Minister for Enterprise, Innovation and Networks, told us that: “there is no doubt that large-scale fossil-fuelled stations will remain the mainstay of electricity production in Wales for the next 20 years”.⁶⁴ Malcolm Wicks MP, the UK Government Energy Minister confirmed that most of that coal is imported.⁶⁵ The Welsh Assembly Government was optimistic that new technologies for the exploitation of underground coal

53 Ev 342

54 Ev 98

55 Visit to the United States, Annex 1.

56 Ev 342

57 Ev 183

58 Q 871

59 Q 871

60 Ev 183

61 Ev 344

62 Ev 343

63 Ev 184

64 Ev 197

65 Q 871

reserves, combined with carbon capture and storage, could create a major indigenous Wales coal industry.⁶⁶ Tyrone O’Sullivan, the Chairman of Tower Colliery in Hirwaun, south Wales, shared the Welsh Assembly Government’s optimism for the future of Welsh coal. He believed that if the political will was there, the future of coal-mining could be a “booming industry in Wales”.⁶⁷ RWE npower as a consumer also expressed its desire for locally-mined coal rather than imports from around the world.⁶⁸

Generating Electricity from Coal

42. There are two main methods for generating electricity from coal: combustion and gasification. The most common type of combustion plant is often called a Pulverised Fuel (PF) station since the coal is finely ground before it is injected with air into the plant’s combustion chamber. The burning particles produce heat, from which high pressured steam is produced to drive a steam turbine, which in turn produces electricity. All UK coal-fired power stations are combustion plants and were designed over 30 years ago.⁶⁹ The plants currently operate at relatively low pressures and temperatures (so called ‘subcritical’ steam cycles) and therefore operate at efficiencies of between 36– 39%.⁷⁰

43. The second type of power stations are integrated gasification combined cycle (IGCC) plants which employ gasification technology. IGCC is a newer and more efficient technology than Pulverised Fuel, and there are currently only four coal-fired IGCC plants around the world.⁷¹ Gasification can be used on many solid or liquid fuels, including coal. It converts the energy source into a gas, the major components of which are hydrogen and carbon monoxide. This raw ‘syngas’ is cooled and scrubbed several times to remove pollutants. That process makes gasification a cleaner process than PF combustion. IGCCs operate a ‘combined cycle’.⁷² First, the fuel is partially burnt during gasification, using controlled amounts of air or oxygen, and combustion is completed when the resulting gas is burned later in a gas turbine to generate electricity. In addition, the hot exhaust gases can then be used to produce superheated steam to drive a steam turbine, producing further electricity.⁷³

Reducing Carbon Emissions: Clean Coal Technology

44. Clean coal technologies (CCTs) are defined as those that facilitate the use of coal in an environmentally satisfactory and economically viable way. To date CCTs have focused on reducing levels of acid gases and particulates from flue (waste) gas emissions. In response to concerns about climate change, attention is turning to CO₂ emissions.⁷⁴ Friends of the

66 Ev 197

67 Q 484

68 Ev 49

69 Post note 253, Parliamentary Office of Science and Technology.

70 Post note 253, Parliamentary Office of Science and Technology.

71 First Report from Science and Technology Committee, *Meeting the UK Energy and Climate Needs: The Role of Carbon Capture and Storage*, HC 576-1 of Session 2005-06, p. 8

72 Post note 253, Parliamentary Office of Science and Technology.

73 Visit to the United States, Annex 1.

74 Post note 253, Parliamentary Office of Science and Technology

Earth Cymru welcomed this development as the power station sector continues to be the single largest source of carbon dioxide emissions in the UK. It stated that a limited role for more efficient and less polluting coal systems would be acceptable.⁷⁵ Roger Shepherd added, “clean coal technologies make possible the use of coal in an environmentally acceptable and economically feasible manner”.⁷⁶

45. Three ways have been identified to reduce carbon emissions from coal combustion and gasification in order to produce electricity from more efficient coal. They are biomass co-firing, improving efficiency, (so that less coal is burned per unit of electricity generated) and the development of carbon capture and storage technologies.⁷⁷

Biomass and Co-firing

46. Biomass, such as energy crops and forestry waste, are considered carbon neutral⁷⁸. Co-firing of biomass with coal is currently seen as a transitional stage in the process of replacing fossil fuels and reducing carbon emissions. Several UK power stations with PF combustion technology now co-fire up to 10% biomass with coal, but research is underway to raise the level of co-firing to 50%. It is estimated that a 10% saving of carbon could be made by co-firing with biomass.⁷⁹ In the longer term, the application of CCS to power plants that use biomass would be a means of removing CO₂ from the atmosphere permanently.⁸⁰

Improved Efficiency

47. Both the DTI and the European Union are involved in a number of feasibility studies exploring possible retrofitting of advanced supercritical boiler and turbine technologies (along with Carbon Capture and Storage) to existing coal-fired power stations. However, there is a debate among industry experts and academics about the economic viability of such retrofitting. Efficiency could also be improved through building new plants that employed advanced technologies. Supercritical plants operating in Denmark and Germany reach efficiencies of 47%. Ultrasupercritical designs purported to reach efficiencies in excess of 50% have been proposed, but the advanced materials necessary to implement such technologies have not yet been fully tested.⁸¹ It is estimated that a 20% carbon saving could be made from employing this technology.⁸² Currently the four IGCC plants run at efficiency rates of between 37–43%. The US Government predicts that its new \$1 billion Futuregen project— an integrated power and hydrogen generation and carbon storage project announced in 2003—could improve on these efficiency levels and ultimately provide IGCC technologies that reach levels in excess of 60% efficiency.

75 Ev 98

76 Ev 244

77 Postnote 253, Parliamentary Office of Science and Technology.

78 See Section 8 of Report

79 Carbon Abatement Technologies (CAT) Strategy for Fossil Fuel Use (June 2005)

80 Postnote 253, Parliamentary Office of Science and Technology.

81 Post note 253, Parliamentary Office of Science and Technology.

82 Carbon Abatement Technologies (CAT) Strategy for Fossil Fuel Use (June 2005).

Carbon Capture and Storage

48. Carbon Capture and Storage (CCS) refers to the capture and storage of carbon dioxide from emissions to prevent it from entering the atmosphere.⁸³ The DTI's Carbon Abatement Technologies (CAT) Strategy for Fossil Fuel Use (June 2005) estimated that an 85% carbon saving could be made from fossil fuels by employing this technology.⁸⁴ Brian Morris, Assistant Director, Carbon Abatement Technologies, Department of Trade and Industry, explained to us that “the idea of carbon capture storage is that if you are burning a fossil fuel like coal or gas you capture the carbon dioxide [and then] transport it to a point where you can geologically store it away from the atmosphere”.

49. During our visit to the United States, we heard of several examples of research and development projects focused on reducing the cost of carbon capture technology. For example, Mr Ron Carty of the Illinois Clean Coal Institute highlighted a state wide survey which explored ways in which CO₂ could be safely stored when captured.⁸⁵ Mr Massoud Rostam-Abadi, responsible for the Illinois State Geological Survey, told the Committee how a \$30 million project was focused on using clean coal technology to reduce the 90% of carbon emissions in Illinois that came from coal powered plants in the Illinois basin.⁸⁶ He cited a further example of a project in which academics were working on ways that the carbon could be captured pre-combustion (rather than post-combustion), which was cheaper and more efficient as the coal could also be used to produce steam and other forms of energy. 90% of the costs of carbon capture were in transportation and storage and these were not expensive. Therefore, research was focused on reducing the cost of carbon capture itself. It was estimated that reducing the cost of carbon capture by 50% would give the carbon capture technologies a significant competitive and commercial edge.⁸⁷

50. Brian Morris from the DTI explained that there are a number of ideas for carbon storage:

“The depleted oil and gas fields in the North Sea are potential sites for disposal of the carbon dioxide. The aquifers, provided they are the right type of aquifer... once filled up...you can seal it, and the theory is that it will stay down there for millennia. We want to store this stuff away for basically hundreds of thousands of years, so nine years is nothing really, but the evidence suggests that it does appear to be working”.⁸⁸

Disused coal mines have been suggested as a potential option for the storage of carbon, and Friends of the Earth Cymru told us that they supported research to identify suitable capture and storage sites in geological structures with proximity to Wales.⁸⁹ However, Wayne Thomas from the National Union of Mineworkers explained that once you extract the coal you break the rock strata and therefore break the natural seals within the rock.

83 A detailed technical appraisal of CCS technology can be found in the Intergovernmental Panel on Climate Change (IPCC) Special Report on Carbon Dioxide Capture and Storage, Autumn 2005. www.ipcc.ch/activity/srccs/index.htm

84 Carbon Abatement Technologies (CAT) Strategy for Fossil Fuel Use (June 2005).

85 Visit to the United States, Annex 1.

86 Visit to the United States, Annex 1. See also www.isgs.uruc.edu

87 Visit to the United States, Annex 1. See also www.isgs.uruc.edu

88 Q 59

89 Ev 98

Breaking the rock strata, and the fact that mines in south Wales were “close to the surface”, led him to conclude that the storage of carbon in south Wales mines was not best option for government or industry to explore.⁹⁰

Clean Coal Technologies in Wales

51. The National Union of Mineworkers (South Wales Area) told us that if clean coal technology was researched and developed to a high standard in the UK, Wales would be in a position to market those skills into other economies to the further benefit of Wales. In their view the UK had the potential to be a world leader.⁹¹ The All Wales Energy Group agreed. It asserted that those technologies represented “a great market opportunity for Wales”.⁹²

52. RWE npower has invested significantly in Flue Gas Desulphurisation technology (FGD) which is currently operational at Uskmouth power station: described to us as one of the “cleanest coal plants in the UK”.⁹³ Similar technology is due to be fitted at Aberthaw power station and Phil White, Marketing Director of Tower Colliery told us that £100 million had been invested in installing FGD at Aberthaw.⁹⁴

53. RWE npower has also invested in co-firing technology and the use of carbon neutral biomass fuels in the main boiler plant at Aberthaw. In 2004, following extensive plant trials, approval was obtained from the Environment Agency to also co-fire coal with tallow and sawdust. A total of 11.5KTe of tallow and 13.5KTe of sawdust were fired during 2004.⁹⁵ Friends of the Earth Cymru supported that development and estimated that biomass co-firing could significantly reduce emissions from coal.⁹⁶ However, on our visit to Aberthaw, we were informed that they were no longer permitted to burn tallow.⁹⁷ However, Malcolm Wicks MP assured us that the Waste Incineration Directive did not ban the use of tallow as fuel. He stated that “installations may burn tallow provided they comply with regulatory requirements. If [...] the tallow is waste within the EU Waste Framework Directive, the regulatory requirements allow for a permit to be issued under the Pollution Prevention and Control Regulations 2000 incorporating the requirements of the EU Waste Incineration Directive”.⁹⁸ **We welcome the clarification given by the UK Energy Minister that power stations are permitted to co-fire with tallow.**

54. Tower Colliery has been working on a number ways of producing lower-carbon coal through coal-firing.⁹⁹ It has also developed technologies for the capture and re-use of methane, and has built a briquetting plant to combine coal and wood waste into part

90 Q 514

91 EV 128

92 Ev 174

93 Ev 196

94 Q 507

95 www.rwenpower.com/cr/docs/powerstations/Aberthaw.asp

96 Ev 98

97 Visit to South Wales, Annex 3.

98 Ev 241

99 Q 492

biomass fuel.¹⁰⁰ However, Phil White expressed disappointment that the blended coal and biomass produced at Tower was not allowed in to be used at Aberthaw power station because “Ofgem insisted on more rigorous quality control checks”.¹⁰¹ He believed that Tower had been “let down from developing where we have been for the last few years because of a clash of interests between Ofgem, the regulator, and the DTI themselves, who actually hand out the programmes on clean coal technology”.¹⁰²

55. We welcome the investment into the development of clean coal technologies in Wales, in particular at Tower Colliery and Aberthaw power station. We are concerned that apparent differences of approach between Ofgem and the DTI on the use of biomass is frustrating further development in this area. We recommend that the Government investigate this matter and update the Committee in its response to this report.

Government Strategy and Approach

56. Over the last three years the DTI has published three reports on Clean Coal Technology and Carbon Capture and Storage. They were:

Review of the Feasibility of Carbon Dioxide Capture and Storage in the UK (September 2003)¹⁰³;

Implementing a Demonstration of Enhanced Oil Recovery Using CO₂ in the North Sea (May 2004)¹⁰⁴;

Carbon Abatement Technologies (CAT) Strategy for Fossil Fuel Use (June 2005).¹⁰⁵

57. The CAT Strategy stated that fossil fuels would be a major source of energy for decades to come and, if the UK was to meet its climate change targets, it would have to be used much more cleanly than at present. It further acknowledged that technologies to make fossil fuels more environmentally acceptable needed to be developed and brought to market. Government support was also necessary to enable carbon capture and storage to become commercially viable.¹⁰⁶

58. Clean coal technologies are currently promoted as part of the UK Government’s Carbon Abatement Technologies Strategy, published in June 2005. The Government has committed to spending just over £50 million between 2002 and 2008 to help emerging renewable and low carbon technologies.¹⁰⁷ Brian Morris from the DTI, explained that since

100 Q 492

101 Q 506

102 Q 506

103 DTI, *Review of the Feasibility of Carbon Capture and Storage in the UK*, Cleaner Fossil Fuels Programme, September 2003.

104 DTI, *Implementing a Demonstration of Enhanced Oil Recovery Using CO₂ in the North Sea*, Cleaner Fossil Fuels Programme, May 2004.

105 DTI, *A Strategy for Developing Carbon Abatement Technologies for Fossil Fuel Use*, Carbon Abatement Technologies Programme, June 2005.

106 HoC Science and Technology Committee, First Report of Session 2005-06. *Meeting the UK Energy and Climate Needs: The Role of Carbon Capture and Storage*, HC 576-1, p. 13.

107 Ev 5

1999 the DTI had allocated about £13.5 million on about 45 R&D projects related to clean coal technology. Under the new technology strategy arrangements within the DTI, there was also a share of roughly £20 million which could be allocated to some sustainable fossil technologies.¹⁰⁸

59. Brian Morris told us that “in June Malcolm Wicks MP announced a carbon abatement technology strategy which sees how we should be developing these technologies over the next 20 or so years...In fact he was also at that time able to announce the £25 million that we have been given by the Treasury. That sets our framework in developing clean fossil technologies up to 2020 and just beyond. The aim is really working through more efficient technologies – using the coal more efficiently, therefore less emissions – biomass through to carbon capture storage, where there is huge potential for large cuts in carbon emissions”.¹⁰⁹

60. However, ScottishPower told the House of Commons Science and Technology Committee that the “£25 million committed to funding demonstration projects was “small relative to the funding already committed by the US Government”.¹¹⁰ Our meetings in Chicago with U.S. coal experts supported that conclusion. For example, on our visit to the US, we found that in 2003 U.S. invested \$1.8 million into research into the feasibility of capturing CO₂ from power plants. A further \$50 million had been invested in 2005, with a third phase of funding promised for 2010.¹¹¹ In its Report, the Commons Science and Technology Committee concluded that that the piecemeal allocation of funding suggests a worrying lack of strategic vision in UK Government decision making.¹¹²

61. Representatives of the Welsh coal industry expressed similar concerns about the level of funding. Phil White, Marketing Director of Tower Colliery told us that the amount of money allocated to clean coal technology through DTI programmes was “minimal”.¹¹³ He expressed further concern that while new technologies were “advancing in most other countries throughout the world”, he had not seen “any DTI clean coal technology programme which has moved on from where we set them out ten or 15 years ago”.¹¹⁴ He argued that the only advance had been “FGD being installed on a number of our coal-fired power stations in the UK”.¹¹⁵ He concluded that :

“We have not got much of a coal industry to turn up our production but we could produce more coal in three, five or ten years’ time from where we are today. To do that we need also to understand the type of technology which is going to be suitable and the cleanest technology and the type of technology which provide the jobs and

108 Q 55

109 Q 58

110 HoC Science and Technology Committee, First Report of Session 2005-06. *Meeting the UK Energy and Climate Needs: The Role of Carbon Capture and Storage*, HC 576-1, p29.

111 Visit to the United States, Annex 1.

112 HoC Science and Technology Committee, First Report of Session 2005-06. *Meeting the UK Energy and Climate Needs: The Role of Carbon Capture and Storage*, HC 576-1, p29.

113 Q 511

114 Q 510

115 Q 510

the employment. I think it is fair to say that, as an industry, we are very disappointed at the lack of moving forward with further research in this clean coal technology”.¹¹⁶

Welsh Assembly Government

62. As part of their Energy Route Map, the Welsh Assembly Government has identified clean coal as a key priority.¹¹⁷ It told us that clean coal technologies could greatly assist in fulfilling the Welsh Assembly Government’s sustainable development duties. Andrew Davies AM, Minister for Enterprise, Innovation and Networks, added that pursuing those opportunities at the research, demonstration and full commercial levels needed to be a high priority and declared that he would welcome the development of demonstration projects in Wales”.¹¹⁸

63. Our inquiry has found widespread support for the Welsh Assembly Government’s objective to establish Wales as an attractive location for coal/carbon capture and storage initiatives. The Countryside Council for Wales told us that the development of carbon capture and storage technology within Wales could, in the long term, provide major economic and environmental benefits. The Council argued that “the sooner the technology and feasibility of this is explored and developed the better”.¹¹⁹

64. Those sentiments were echoed by Andrew Davies AM of the Welsh Assembly Government, who expressed his frustration that “Wales has hundreds of years of coal reserves, we feel very strongly that clean coal has a role to play in that. Maybe, if as much investment had been made in developing clean coal technology as has occurred in gas, we would be in a much better position in Wales when dealing with the challenges faced by energy production”.¹²⁰

65. We are disappointed at the low levels of DTI funding into the research and development of clean coal technologies. We are concerned that the Government’s lack of foresight is compromising Wales’ potential to be a world leader in clean coal technologies, and is frustrating the potential to revive a rich and experienced indigenous coal industry in Wales. Furthermore, we endorse the Science and Technology Committee’s view that the piecemeal allocation of funding suggests a worrying lack of strategic vision in Government decision making, in contrast to the clear vision and commitment to coal given by the United States Government.

66. Brian Morris of the DTI, was aware of activity on clean coal technology in Wales but was unable to cite any specific examples because “with all these projects, Wales and England and Scotland are all taken as one”.¹²¹ Malcolm Wicks MP, told us “we have £35 million for a carbon abatement programme which will be sponsoring a number of quite

116 Q 510

117 Welsh Assembly Government Energy Route Map, www.wales.gov.uk

118 Ev 197

119 Ev 285

120 Q 726

121 Q 56

small-scale projects to develop this kind of technology. There are now one or two commercial plans to exploit clean coal technology in this country.¹²²

67. Phil White, Marketing Director of Tower Colliery expressed his frustration at the Government's lukewarm approach to clean coal technology. He said "while we have been sitting back in the UK, with a lead 20 years ago, we have sat back for 20 years, every other country which has got an interest with its own indigenous resource of coal is pushing forward on clean coal technology".¹²³

68. We share our witnesses' frustration at the Government's laissez-faire approach to the development of clean coal technology in Wales. Wales has considerable indigenous supplies of coal, which, if accessed through clean coal technology could provide a major indigenous clean and secure energy source. Urgent action is required now to ensure the future of clean coal in Wales and we look to the Government to provide that leadership.

69. The Department of Trade and Industry needs to prove, through a more urgent and pro-active approach, that clean coal technologies have a major role to play in the United Kingdom's future energy mix.

122 Q 882

123 Q 507

4 Coal in Wales

Background

70. The twentieth century has witnessed a dramatic decline in coal production in Wales. In 1948, 22.5 million tons of coal was mined and there were plans to increase that amount to 32 million tonnes by 1950.¹²⁴ Today there are only seven surface mines and three deep mines in operation in Wales. Together they produce around 2 million tonnes of coal per year.¹²⁵ Approximately 1,000 people are directly employed in the Welsh coal industry, 60% in the open cast mining and 40% in deep mines.¹²⁶ Celtic Energy Ltd., Wales' largest open cast mining company, produces over 1.5 million tonnes of coal per year from its sites in south Wales.¹²⁷ Tower Colliery produces in the region of 600,000 tonnes of coal per year.¹²⁸ While 400 of the deep mining jobs are currently at Tower Colliery (which is set to close in 2008), it is envisaged that new projects at Aberpergwm and possibly Margam will absorb most of those jobs.¹²⁹

71. We did not consider open cast mining as part of this inquiry, but we did receive one submission relating to the open cast mine at Kenfig Hill, which raised concerns about the environmental impact of open cast mining on the local community.¹³⁰ At present, open cast mining produces the majority of coal in Wales. Should open cast mining in Wales be extended further, an in-depth assessment of the environmental impact of that process would be worthwhile.

72. The potential of clean coal technologies has clear implications for the future of the coal mining industry in Wales. On our visit to the United States, the Illinois Clean Coal Institute noted the dual advantage of clean coal technologies, locally and globally, of both reducing carbon emissions, and re-invigorating the indigenous coal industry and sustaining jobs in the coalfield.¹³¹

73. Indeed, the Welsh Assembly Government told us that there was the potential, with appropriate support, “for at least half of the coal used to be of Welsh origin”.¹³² RWE npower was also in support of the Welsh coal industry supplying Aberthaw”.¹³³ Despite that support no commitment to securing that supply was forthcoming from the Government. Brian Morris from the DTI, acknowledged that Aberthaw took most of its coal from Tower Colliery but suspected that it would import coal unless “other projects start to show opportunities for fresh supplies of [Welsh] coal”. Malcolm Wicks MP told us

124 John Davies, *A History of Wales*, p617.

125 Ev 5

126 Ev 197

127 www.coal.com

128 Q 481

129 Q 879

130 Ev 376

131 Visit to the United States, Annex 1.

132 Ev 196

133 Ev 49

that he wanted to see a future for indigenous coal but declared that he would be “reluctant to imply that has to be a new public spending programme”. His preference was a framework “incentivising carbon free sources, and therefore clean coal technology”.¹³⁴ Tyrone O’Sullivan disagreed and laid down a challenge to politicians:

“The rest of the world has decided to go for coal and the production is going to double in the next 15 years. Go for foreign coal if you want to. What we could do is go for our own coal, we could develop our own technology, we could start building the things and manufacturing things using clean coal technology, and if we do not do that, with India and China, we are gone. We are fiddling while Rome burns”.¹³⁵

74. The promotion of coal in Wales is not about “a new public spending programme” as suggested by the Minister. While we would not deny the need for government investment and grant support, the key argument is based on economics. Unfortunately we found considerable confusion on that issue when we took oral evidence from the UK Minister and his officials. Malcolm Wicks MP acknowledged that “it does not seem to make sense that importing coal often from as far away as Australia is economically more sensible than exploiting our natural resources” but asserted nevertheless that importing coal appeared to be more economic.¹³⁶ However, that view was in contrast to the facts given by his officials. Clare Harding, Assistant Director, Coal Policy and Benefits, Energy Industries and Technology Unit, Department of Trade and Industry, told us that in 2005, the price of imports were in the order of £1.60 per gigajoule, while the price for UK coal was in the order of £1.30 per gigajoule.¹³⁷ Indeed, she confirmed that at present, UK coal was earning prices which were significantly below the costs of importing coal from elsewhere.¹³⁸ She added that the open cast sector in the UK was “cheaper than the world market consistently”.¹³⁹ In a supplementary memorandum the UK Minister stated that “UK produced coal currently costs coal-fired electricity generators less than imported coal does”.¹⁴⁰

75. Tyrone O’Sullivan starkly expressed his view of the situation facing the Government

“The choice you have got is you are going to have to import 30 million tonnes, or more, and that puts us again in the hands of other people, or we can produce it at home [...] at the end of the day, this Government is going to go down the road of clean coal technology, it is going to spend money on clean coal technology...and they are going to do all that to bring in foreign coal? I find that crazy. I think we should be looking seriously at our coal”.¹⁴¹

134 Q 880

135 Q 506

136 Q 871

137 Q 872

138 Q 873

139 Q 875

140 Ev 240

141 Q496

76. **The inability of the Department of Trade and Industry to present a consistent position on the economics of indigenous coal does not fill us with confidence in the Government's ability to make key strategic decisions about the future of the coal industry in Wales. It is disappointing that the UK Energy Minister's emphasis on security of supply and the reliance on coal, much of it imported, for 50% of our electricity generation during the cold winter 2005–06 has not led to a greater appreciation of the potential of indigenous coal. The Government's attitude to the coal mining industry in Wales is at best apathetic, and at worst dismissive. The Energy Review will need to demonstrate a far greater commitment to the indigenous Welsh coal industry in order for us to revise our view.**

Coal Investment Aid

77. The UK Government currently provides Coal Investment Aid (CIA) for Tower Colliery (total awards £3.06 million), and Aberpergwm Colliery (awarded £3.51 million).¹⁴² While Tower Colliery will close in 2008, as it has exhausted the mine, it turned a failing coalmine into a profitable business. Clare Harding also highlighted the example of Aberpergwm, which she argued “having supported the initial stages of that investment, the company has now attracted significant new financing which should enable that project to go forward and should enable that mine to come into full production within the next 12 to 18 months”.¹⁴³ Tyrone O’Sullivan of Tower Colliery added that Aberpergwm could be developed to produce probably 450,000 tonnes a year for the next ten years.¹⁴⁴ He added that this was only possible because of the increase in demand for coal today. This would not have been viable three years ago.¹⁴⁵ Further evidence of the resurgence of coal can be found in the possible re-opening of the Margam coking coal prospect adjacent to the steel works in Margam, for which Corus have been awarded a licence. Clare Harding suggested, “again, it is a project which could result in a new deep mine and a continuation of deep mining in south Wales”.¹⁴⁶ However, when asked whether Coal Investment Aid was bearing fruit, Malcolm Wicks MP replied that it was a “strategy that has been tried now for a number of years and so far does not seem to have been producing results”.¹⁴⁷

78. **We acknowledge the undisputed success of Tower Colliery. It is very rare that upon closure, a colliery has exhausted all of its accessible reserves, and it is to the credit of this cooperative enterprise that Tower Colliery has proved such a success.**

79. **We also recognise the value of Coal Investment Aid, and its success in providing an initial boost to both Tower Colliery and Aberpergwm, both commercially successful mines. We urge the Government to provide similar aid in the future, where a sufficient economic case has been made. The Government should lead by example in promoting investor confidence in this important industry.**

142 Ev 22

143 Q 879

144 Q 490

145 Q 490

146 Q 879

147 Q 883

Securing the Future of Welsh Coal

Identification of Coal Reserves

80. In the UK, 85% of the workable coal reserves are still in place, and modern technology allows them to be reached.¹⁴⁸ Furthermore, the Coal Authority has indicated that substantial coal reserves remain in south Wales, a significant proportion of which are suitable for surface mining.¹⁴⁹ Indeed, Tyrone O’Sullivan told us that a British Coal document from around 1980, identified Welsh reserves of 250 million tonnes of coal in the South Wales coalfield alone. Wayne Thomas from the NUM, argued that the key in securing the future of indigenous coal as an energy sources in Wales was to properly survey and identify those reserves. He stated “it would be in the national interest for us to get those boreholes down”.¹⁵⁰

81. Wayne Thomas argued that the second step was to identify future sources of funding in order to administer these reserves. He called for “joined-up thinking” for Scotland, England and Wales, which needed to be addressed as “urgently as the energy policy itself”.¹⁵¹

82. RWE npower expressed a particular concern “that opportunities to extend the productive life of the Welsh coalfield could be frustrated by changes in the planning regime for coal mines”.¹⁵² Friends of the Earth Cymru has argued for a Welsh Assembly Government Coal (Technical Advisory Note) TAN to be produced at the earliest possible opportunity,¹⁵³ and that now appears to be coming. The Welsh Assembly Government confirmed that it had now completed a Planning Consultation on a new Welsh Assembly Government Technical Advice Note (TAN) on coal extraction. It was hoped that the TAN would enable developers to secure more easily sites of potential future coal extraction and add economic value to the communities concerned.¹⁵⁴

83. The future of the Welsh coal industry is dependant upon clear policy, funding and planning frameworks. We welcome the Welsh Assembly Government’s timely publication of a Coal Planning Technical Advisory Note. However, assistance and guidance will also need to be given by the UK Government in the form of a UK wide strategic plan for the future of coal. We recommend that the Government provide appropriate resources for a detailed exploration and assessment of the UK’s coal reserves.

148 Gerwyn Williams, Chairman Horizon Mining. ‘Gaining Unity is the Future for Welsh Coal.’ Jonathan Guthrie in The Financial Times, 29 May 2006.

149 Ev 5

150 Q 493

151 Q 487

152 Ev 49

153 Ev 98

154 Ev 197

Skills Base

84. Tyrone O’Sullivan also identified continued training and jobs in the coal industry as vital to the health of mining in Wales.¹⁵⁵ He argued that:

“If we lose those skills we cannot pick them up in Tesco, or Woolworth [...] there is an opportunity in Wales, and we want the Government to support it”.¹⁵⁶

The work of Tower Colliery has been crucial in this area and John Anthony acknowledged that “if it had not been for Tower Colliery, important underground skills would have been lost”.¹⁵⁷ David Wagstaff from the DTI attempted to assure us that the Energy Review would address those issues and suggested that “under any proposals or any suggested options, there will need to be issues about the people elements and the skill elements as well as the technology and funding elements”.¹⁵⁸ Phil White from Tower Colliery impressed upon us the urgency of a framework and long term plan, he warned that “if we do not start getting the Energy Review sorted sooner rather than later, we might not have a deep mine industry left to supply the skills”.¹⁵⁹

85. Wales currently has a cadre of excellent specialised mining skills that have well served the UK coal industry. But if deep coal mining in Wales is not supported there is a danger that those key skills would be lost forever. The Government needs to take urgent action to address this issue, and we expect the Energy Review to specifically recognise and nurture that expert skill base in Wales.

155 Q 490

156 Q 490

157 John Anthony, Director Horizon Mining, ‘Gaining Unity is the Future for Welsh Coal.’ Jonathan Guthrie in The Financial Times, 29 May 2006.

158 Q 65

159 Q 493

5 Nuclear Power

Introduction

86. The 2003 Energy White Paper acknowledged that nuclear power was an important source of carbon-free electricity, but concluded that the “current economics make it an unattractive option for new carbon-free generating capacity”.¹⁶⁰ The White Paper did not rule out the possibility that at some point in the future, new nuclear build might be necessary,¹⁶¹ but it did state that any proposal for new nuclear build would be subject to the “fullest public consultation and a White Paper setting out Government proposals”.¹⁶² That position has become more fluid during 2006, with the Prime Minister making a number of speeches that leant more towards nuclear power. At a recent CBI annual dinner the Prime Minister stated that nuclear power was “back on the agenda with a vengeance”.¹⁶³ That change of position was not lost on the National Union of Mineworkers who believed that the Prime Minister was “jumping to the conclusion that the nuclear option will be the saviour of energy requirements for generations to come”.¹⁶⁴

87. Any decision to pursue new nuclear power will affect the UK as a whole, and there is already a wide-ranging debate over the benefits or otherwise of new nuclear build. As a select Committee, we are not alone in considering these issues. The Environmental Audit Committee, in its Sixth Report of this Session *Keeping the lights on: Nuclear, Renewables and Climate Change* has considered in depth the issues surrounding any future UK fleet of nuclear power stations.¹⁶⁵ Furthermore, the Trade and Industry Committee is currently undertaking an inquiry into issues that will need to be addressed in advance of any decision on new nuclear build.¹⁶⁶ Our report provides a Welsh perspective of that debate.

Nuclear Power in Wales

88. Wales has two nuclear power stations, Wylfa power station on Anglesey, and Trawsfynydd power station in Gwynedd. Both are Magnox power stations.¹⁶⁷ Trawsfynydd was the United Kingdom’s only inland nuclear civil magnox power station and was built in the heart of the Snowdonia National Park. It opened in 1965 and ceased operating in 1991.¹⁶⁸ Wylfa power station is situated on the north coast of Anglesey at Cemaes Bay.¹⁶⁹ It opened in 1971 and is due to cease operating in 2010.¹⁷⁰ According to British Nuclear

160 Ev 4

161 Energy White Paper, para 1.24

162 Energy White Paper, para 1.25

163 news.bbc.co.uk/1/hi/uk_politics/4987196.stm

164 Ev 128

165 HC584 of Session 2005-06.

166 Minutes of evidence from the Trade and Industry Committee, HC 1122-i-v of Session 2005-06

167 The Magnox-type nuclear power stations were the first generation of nuclear reactors in Britain. The stations were built between 1956 and 1971 for the Central Electricity Generating Board (CEGB), United Kingdom Atomic Energy Authority (UKAEA) and the South of Scotland Electricity Board (SSEB).

168 www.britishnucleargroup.com

169 www.britishnucleargroup.com

170 Q 307

Group, in terms of output Wylfa supplies 23 million Kilowatt hours of electricity per annum, enough to meet the needs of a population of a city of the combined size of Liverpool and Manchester.¹⁷¹

89. Both sites are owned by the Nuclear Decommissioning Authority (NDA). British Nuclear Group, operating under licence from the NDA, manages the Wylfa nuclear power station. It also is the site manager for the decommissioning of the Trawsfynydd nuclear powers station.¹⁷² British Nuclear Group told us that it was bidding for the contract for the decommissioning of Wylfa. The final decision on that contract will be made by the NDA.¹⁷³

The decommissioning of Wylfa Power Station

90. The Nuclear Decommissioning Agency was formed on 1 April 2005 under the Energy Act 2004 as a non-departmental public body. Its primary purpose is to manage the United Kingdom's civil nuclear legacy. It has an annual budget of around £2 billion and owns the assets and liabilities of the 20 nuclear sites which were previously in the ownership of British Nuclear Fuels Limited and the United Kingdom Atomic Energy Authority. Its primary role is the safe and efficient clean-up of those sites.¹⁷⁴

91. The current plan for the decommissioning of Magnox power stations including Wylfa has been set out in the Nuclear Decommissioning Agency's strategy for decommissioning.¹⁷⁵ Wylfa will continue to generate electricity until 2010. Between 2010 and 2012, the fuel at Wylfa will be removed. That will be followed by a period of preparation for care and maintenance which will include all of the facilities outside of the actual reactor core itself. That process will continue until 2025. Between 2025 and 2116, the core and its contents will be removed.¹⁷⁶ The NDA estimate that the lifetime cost of decommissioning of Wylfa would be in the region of £1.7 billion.¹⁷⁷

Options for Wylfa Power Station

92. The Welsh Assembly Government has made the case for an extension of the lifespan of Wylfa because of its direct relationship with Anglesey Aluminium, one of the major employers on Anglesey.¹⁷⁸ Anglesey Aluminium consumes roughly 50% of the electricity generated at Wylfa, and the Welsh Assembly Government has raised serious concerns over the ability of Anglesey Aluminium to secure a similar level of supply, at an affordable rate, from the grid.¹⁷⁹ When we took oral evidence from Andrew Davies AM, the Minister for Enterprise, Innovation and Networks, Welsh Assembly Government, he told us that a

171 www.britishnucleargroup.com

172 Q 306

173 Q 307

174 Q 777

175 www.nda.gov.uk/documents/nda_final_strategy,_published_7_april_2006.pdf

176 Q 781

177 Q785

178 www.comalco.com/freedom.aspx?pid=442

179 Ev 198

formal request for an extension to Wylfa power stations had been made to the UK Government.¹⁸⁰ Following that request, he confirmed that there had been meetings and an exchange of correspondence between himself and the First Minister, and the Department of Trade and Industry, promoting the case for such an extension.¹⁸¹

93. Andrew Davies AM explained the rationale behind that request:

“I think there is a difference between the extension of an existing nuclear power station and a new build. Our position on Wylfa is also heavily influenced by the fact that Anglesey Aluminium is a major employer on the island. It is a significant contributor towards the island’s wealth as well as its employment, and it is heavily dependent on a supply of affordable electricity from Wylfa. If that were not the case, we might not necessarily argue for an extension of the life of Wylfa. Nevertheless, we have pressed the UK Government; they are very aware of our view, and they have a great deal of sympathy with it, but clearly they are considering that very carefully. There are very significant issues to be addressed”.¹⁸²

94. British Nuclear Group also highlighted the importance of Wylfa nuclear power station asserting that it “provides around 30% of the power consumed in Wales”.¹⁸³ In that context, British Nuclear Group set out the implications of the proposed 2010 closure of Wylfa:

“On supply security. The capacity from Wylfa will need to be replaced – at least in part – in order to meet demand;

On the Welsh economy. Wales is currently a substantial exporter of power to England, yet if the Wylfa capacity is not replaced Wales will switch to becoming an electricity importer, at a time when power prices have seen substantial upward movement; and

On carbon emissions. The output from Wylfa, being generated by nuclear power, produces very low emissions of carbon dioxide. Unless the capacity can be replaced with another low-carbon technology, carbon dioxide emissions in Wales look set to rise substantially”.¹⁸⁴

180 Q 729

181 Q 730

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Feasibility of extending the life of Wylfa

95. When we took evidence from British Nuclear Group (BNG) we discussed the feasibility of extending the life of Wylfa power station. Adrian Bull from British Nuclear Group told us in principle it was possible but that two technical problems would need to be overcome – the continued production of Magnox fuel and the subsequent disposal of the spent fuel.¹⁸⁵

Fuel from Springfields

96. The fuel used by Magnox stations, including Wylfa, is manufactured at the Springfields nuclear facility near Preston.¹⁸⁶ Wylfa consumes in the region of 600 tonnes of fuel per core¹⁸⁷ and Springfields was currently manufacturing the last batch fuel for Wylfa.¹⁸⁸

97. The supply of fuel beyond that date is not a simple matter to resolve. The Magnox closure plan was announced in 2000 and the closure of the Springfield facility was based on that date. That process is already in hand and, certain parts of the facility have already been taken out of service. Furthermore, we were told by the NDA that the supply routes for uranium material and magnesium alloy which are manufactured into fuel at Springfields, had been run down. Should the facility be extended to manufacture additional fuel for Wylfa, supply routes for the raw materials would need to be re-established. That scenario was further complicated by the fact that Magnox fuel was unique to the United Kingdom. Dr Burnett, Regional Director of the Nuclear Decommissioning Authority, told us that the decision to close Springfield's could be reversed but it would not be easy and would present "considerable challenges" to the NDA.¹⁸⁹ He concluded however, that it could be done.¹⁹⁰

Processing of Spent Fuel at Sellafield

98. The second challenge highlighted by British Nuclear Group, was the disposal of spent nuclear fuel. At present all spent fuel from Magnox power stations is reprocessed at the nuclear facility at Sellafield.¹⁹¹ The spent fuel is removed and transported in heavily protected flasks up to Sellafield for treatment. Since 1971, an estimated 5,000 tonnes of spent fuel has been sent to Sellafield from Wylfa,¹⁹² an average of roughly 140 tonnes a year.¹⁹³ Of those 140 tonnes, only a small percentage was high level waste and Richard Waite, Engineering Director of the Nuclear Decommissioning Authority confirmed that it was "of the order of less than two per cent".¹⁹⁴

185 Q 308

186 [www.nda.gov.uk/About_the_NDA--Locations--Springfields_\(961\).aspx?pg=961](http://www.nda.gov.uk/About_the_NDA--Locations--Springfields_(961).aspx?pg=961)

187 Q 786

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189 Q 805

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191 Q 310

192 Q 786

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99. When the spent fuel arrives at Sellafield it goes into a series of facilities. First, the fuel is placed in cooling ponds where it sits for a number of months to cool off. It is then ‘decanned’ which involves the removal of the fuel’s magnesium alloy coating. The remaining uranium metal fuel is put into a magazine and transferred into a nitric acid dissolution process. Plutonium and uranium are extracted and turned into oxide powders for safe storage in Sellafield. The remaining fission products are then concentrated down during a series of evaporation processes and ultimately stored as heat generating high-level waste inside the Sellafield complex. That material would then be vitrified – stored in glass blocks – which was the long term storage and disposal concept for dealing with high level waste.¹⁹⁵ The current target for the completion of the vitrification process at Sellafield was 2015.¹⁹⁶

100. Dr Burnett, Regional Director of the NDA, told us that should the life of Wylfa be extended, it would require the extension of the life of Sellafield, and with that came “all the costs, problems and challenges that that presents”.¹⁹⁷ He was also of the view that a slower rate of decommissioning of Sellafield would not be a practical solution to the problem.¹⁹⁸ He argued that while the NDA “will finesse it as best we can” but the critical thing was the despatch of the last fuel element.¹⁹⁹

101. Richard Waite from the NDA made us aware of a further factor that affected the timing of the closure of Sellafield was the United Kingdom’s position as a signatory to the OSPAR Convention.²⁰⁰ The Convention requires signatories to reduce radioactive levels in the marine environment of the north east Atlantic near to zero by 2020.²⁰¹ The NDA was using that date as the end date for decommissioning and had worked back from there to establish when operations at the plant would need to cease.²⁰² A major question remained over the ability to extend the life of Sellafield while still meeting the OSPAR agreement.²⁰³ Adrian Bull from British Nuclear Group explained that “under the terms of our commitments to the OSPAR agreement [the United Kingdom has] to end marine discharges from the Sellafield site by 2020, so the closure date for that reprocessing facility

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200 The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the Oslo and Paris Commissions in Paris on 22 September 1992. The Convention has been signed and ratified by all of the Contracting Parties to the original Oslo or Paris Conventions (Belgium, Denmark, the European Community, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland) and by Luxembourg and Switzerland. The OSPAR Convention entered into force on 25 March 1998. It replaces the Oslo and Paris Conventions, but Decisions, Recommendations and all other agreements adopted under those Conventions will continue to be applicable, unaltered in their legal nature, unless they are terminated by new measures adopted under the 1992 OSPAR Convention.

201 For further information on the OSPAR convention see www.ospar.org

202 Q 795

203 Q 308

is set at 2012”.²⁰⁴ Preceding that date would be the conclusion of receiving the flow of fuel from Wylfa which has been set at 2010.²⁰⁵

Costs of Extending the Life of Wylfa

102. In addition to the UK’s commitments under the OSPAR Convention there would also be costs and associated activity of keeping an aging facility maintained for a longer period of time.²⁰⁶ However, as well as additional costs, there would be addition revenue streams derived from any extended electricity produced by an extension of the working life of Wylfa. Richard Waite from the NDA acknowledged that one of the responsibilities of the Nuclear Decommissioning Authority under the Energy Act was to “seek out net revenue beneficial opportunities from using our existing assets, wherever they may lie”.²⁰⁷ Indeed, the NDA confirmed that it was already considering the financial benefit of a modest extension of the life of Wylfa from April 2010 to December 2010.²⁰⁸ Furthermore the NDA confirmed that the DTI had asked it to carry out a feasibility study on further extensions beyond 2010, where the revenue that could be generated, would be taken into account alongside the costs of potential extensions of Wylfa, Springfields and Sellafield facilities.²⁰⁹

103. Dr Burnett, the NDA’s Regional Director, estimated that a two year extension of Wylfa until 2012 would generate between £330 million and £380 million in income.²¹⁰ He was of the view that a modest extension of Wylfa would avoid any impact on the UK’s obligations under OSPAR.²¹¹ However, it was not clear whether the two year extension requested by the Welsh Assembly Government was considered to be a “modest extension”.

104. When Malcolm Wicks MP, Energy Minister at the Department of Trade and Industry, came before us he confirmed the Welsh Assembly Government’s request for an extension, and the fact that the NDA was undertaking further work on the feasibility of that request.²¹² However, he appeared less than enthusiastic about such an extension. In his opinion, the Nuclear Decommissioning Authority “will be a little loath to extend the project” and that the costs involved would be “considerable”.²¹³ While he took on board the concerns over the impact of the closure of Wylfa on the economy of Anglesey his language was, again, less than supportive:

“There is a sense in which I am not sure it is my decision as such, because you are talking about the NDA and private companies; but I hope we can bring this matter to a conclusion as soon as possible. I am reluctant to let this interfere with the huge

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strategic challenge of nuclear decommissioning, and I would also be loath to involve the NDA or anyone else in huge costs, which perhaps could not be justified”.²¹⁴

105. **Wylfa nuclear power station plays a vital role in the Welsh economy, both as a major electricity generator, and as the supplier of energy for Anglesey Aluminium, a significant employer on Anglesey. The proposed closure date of 2010 presents Wales with significant power generation issues. With only four years left before Wylfa is due to close, it appears unlikely that an alternative Welsh electricity source will be found. The removal of Wylfa will have significant effects on electricity generation in Wales both in general, and specifically for Anglesey Aluminium. We urge the Department of Trade and Industry to explore all alternative sources of electricity supply for Anglesey Aluminium.**

106. **However, in the absence of any credible alternative, an extension of Wylfa nuclear power station is not only the most pragmatic solution, it is vital to the economic well-being of Anglesey. We understand that a decision on the extension of Wylfa will be made shortly and we fully support the proposal for an extension. The Energy Minister has a responsibility to take a lead on this issue. We look to the UK Energy Minister to act with a greater resolve than he showed to this Committee and act for the interests of Anglesey and Wales.**

New Nuclear Build in Wales

107. The extension of Wylfa represents a short term pragmatic solution to a specific Welsh problem. Outside of that, there is also the wider issue of possible a new generation of nuclear power in Wales. The debate in Wales is not unlike the debate in rest of the United Kingdom and during the course of our inquiry we received a number of submissions both in favour and against both existing nuclear power and new nuclear build in Wales.

108. Not all of our witnesses were in favour of a new nuclear build in Wales. Andrew Davies AM acknowledged the fact that any proposal for a nuclear power station in Wales would be a matter for the developers and the UK Government, but was of the opinion that the “overwhelming majority view in Wales” agreed with the Welsh Assembly Government’s position in favour of a nuclear free Wales.²¹⁵ That view was supported by two Welsh organisations PAWB (Pobl Atal Wylfa B/People Against Wylfa B) and the Welsh Anti Nuclear Alliance.²¹⁶ The Welsh Anti-Nuclear Alliance was formed in 1980 as an umbrella organisation for individuals and groups of people opposed to the expansion of nuclear power,²¹⁷ while PAWB was established in 1988 in response to the proposal to build a second nuclear power station at Wylfa – Wylfa B.²¹⁸

109. PAWB declared itself against both existing and new nuclear power for Wales and highlighted the example of Chernobyl as a salutary lesson on the dangers of nuclear power

214 Q 856

215 Q 728

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stations.²¹⁹ They also argued that the costs of nuclear power undermined any argument for its future use.²²⁰ Dylan Morgan, the Secretary of PAWB was strongly of the view that should the DTI decide in favour of a new generation of nuclear power stations, “no such stations should be forced by London diktat upon the people of Wales”.²²¹ Furthermore, PAWB was opposed to any extension of Wylfa describing the proposal as akin to “running an old vehicle near enough into the ground”.²²² Friends of the Earth Cymru were also opposed to either an extension at Wylfa or new build.²²³

110. The importance of the current supply of nuclear power in Wales was not lost on many of our witnesses. Wales TUC Cymru highlighted the fact that Wylfa supplied over 25% of Wales’ electricity and that a replacement electricity supply would need to be found for the Welsh economy to stand still. It was also of the view that “if the economy and society of Wales is to prosper, the possible use of nuclear power has to be fully explored”.²²⁴

111. That view was echoed by Dr John R Etherington, a former Reader in Ecology at the University of Wales. Although he was not an advocate of nuclear power he argued that if the UK Government was to proceed with new nuclear development “it would be a mistake for Wales to take a separate course”.²²⁵ Janet C Moseley, a Community Councillor from the Mawr ward of the City and Council of Swansea, believed that the ambition of a nuclear free Wales in a nuclear powered United Kingdom would deny the people of Wales the “benefits of predictable, adequate amounts of electricity from modern advanced-state nuclear power stations which are far from the suspect safety standards of earlier types of stations”.²²⁶ Paul Spare argued that “it would appear highly desirable to undertake feasibility studies for a second nuclear plant at Wylfa to begin generating when Wylfa closes”,²²⁷ while David Lewis believed that the closure of Wylfa would cause “serious problems” to the Welsh economy unless it was replaced with “a new nuclear unit of the latest efficient design”.²²⁸

112. A central concern aired by opponents of nuclear power was the safety of nuclear power, both in terms of accidents and as a potential target for terrorist attack. Professor Dennis Hawkes, from the Welsh Energy Research Centre declared that he had yet to be persuaded that “the storage methods and the safety against terrorist attacks, [...] were adequate” in order to be convinced that nuclear was safe.²²⁹ Neither were Friends of the Earth Cymru convinced that a terrorist attack by a hijacked airliner could be dealt with safely. It claimed that “no nuclear reactor would be able to withstand a direct hit from a 747 crashing into it”.²³⁰ PAWB also drew attention to the possibility of a terrorist attack and

219 Q 542

220 Q 524

221 Ev 152

222 Ev 139

223 Ev 95

224 Ev 344

225 Ev 264

226 Ev 310

227 Ev 270

228 Ev 282

229 Q 169

230 Ev 97

also dismissed suggestions that a nuclear power facility could survive a terrorist attack using an aircraft.²³¹

113. We put those concerns to our representatives from British Nuclear Group. Adrian Bull assured us that security procedures at nuclear facilities had been fully reviewed in the light of the evolving climate of global security,²³² and declared himself satisfied that nuclear facilities could withstand such an attack.²³³ He also told us of work that had already been undertaken in the United States to address that specific scenario, including flying a Phantom military jet fully loaded with fuel into a wall built of similar concrete to that of a nuclear power station. The plane was destroyed but there was only “a six inch indentation in the concrete wall”.²³⁴ Adrian Bull also cited the work of the Electric Power Research Institute in the United States – which he described as “the best and most authoritative in the world” – which had studied similar scenarios. The Institute had concluded that there would be no release of radioactivity from any credible aircraft impact.²³⁵

114. When we visited the United States earlier in the year, we discussed the potential effects of an aircraft crashing into a nuclear facility with representatives of Exelon, the operator of the largest nuclear fleet in the United States, and the third largest fleet worldwide.²³⁶ Our hosts at Exelon graphically described the effect of flying a plane into a nuclear power station as akin to “dropping a watermelon on a fire hydrant”.²³⁷

115. PAWB also opposed new nuclear power build on the grounds of general safety.²³⁸ Friends of the Earth Cymru also argued that the potential of a nuclear accident to pollute large areas with radioactive materials undermined any argument in favour of nuclear power.²³⁹ It considered nuclear power “a costly and hazardous technology”,²⁴⁰ and saw “no role for it in meeting future energy needs” in the UK.²⁴¹ British Nuclear Group asserted that the nuclear industry had “an exemplary record” in respect of safety and security, with rigorous standards in place. Furthermore, Adrian Bull argued that modern reactor designs had advanced safety features which provided further confidence in their safe operation.²⁴² However, he acknowledged that it was impossible to give an absolute guarantee of safety for nuclear power.²⁴³

231 Q 567

232 Ev 70

233 Q 327

234 Q 327

235 Q 326-7

236 For further information on Exelon see www.exeloncorp.com

237 Visit to the United States, Annex 1

238 Q 542

239 Ev 95

240 Ev 92

241 Ev 92

242 Ev 70

243 Q 326

116. **The threat of an accident or terrorist attack is one that resonates deeply when the public considers nuclear power. We do not try to explain the complexities of the threats or of the safety of nuclear power here. Rather we have set out the two sides of the argument. When the Government makes its decision it should do so on the basis of clear evidence on the perceived and actual risks that may be posed by new build nuclear power stations. That evidence should be the basis for the wider debate in the country and we look to the Government to ensure the highest level of accessibility to the threat assessments of nuclear power.**

117. A decision to undertake a new build of nuclear power stations would signal the start of a long process which Adrian Bull from British Nuclear Group believed that it would last up to ten years. That was broken down as follows: three years to gain the appropriate licenses for the new technology even in the event of a new build;²⁴⁴ two years for public inquiries to look at the local issues; and five years to build and commission the power stations. Therefore, Adrian Bull argued that in respect of Wales, and in particular Wylfa, there would be a period of non-nuclear electricity generation in Wales.²⁴⁵

118. Locating new nuclear build on the sites of existing nuclear power stations had the potential to shorten that process. Adrian Bull saw sense in that approach because existing sites had nuclear site licences and there was also existing Grid infrastructure. While Trawsfynydd was no longer an option—because the infrastructure had already been removed from the area—Wylfa would represent a suitable location in Wales for any future new nuclear build.²⁴⁶

119. Another factor highlighted in favour of locating new nuclear build on existing sites was that those sites had both a high level of support for nuclear power— and a highly skilled workforce.²⁴⁷ Even PAWB acknowledged that if there was to be support for a new generation of nuclear power stations, that the support would come from “communities immediately surrounding the nuclear plants [which] derive some benefit from the employment at the plant”.²⁴⁸

120. Should there be a new generation of nuclear power stations, there is a strong argument in favour of those power stations being located on existing nuclear power sites. Anglesey already has the necessary infrastructure and skill base to service any future nuclear build. There is also an established understanding of nuclear power between the local community and the nuclear industry, through the experience of Wylfa nuclear power station. Should the UK Government decide in favour of new nuclear build, Anglesey would represent an obvious location for any new build in Wales.

244 Although they are licensed for use in their country of origin, they are not yet licensed for use in the UK, so there would have to be a review by the safety inspectors to satisfy them about these designs which do not have the equivalent kite mark of approval.

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Conclusion

121. The debate that surrounds the use of nuclear power remains one that divides. In this report we have concentrated on nuclear power in Wales. The decision to commit to a new generation of nuclear power stations is one that will be taken by Parliament and the debate will be for the UK as a whole. However, in Wales that debate may include an added dimension should the UK Government decide in favour of nuclear power, while the Welsh Assembly Government retains its policy aspirations of a non-nuclear future for Wales. If the debate is to take place, it will need to be based on fact and placed within the wider context of Wales' and the UK's energy needs, a point highlighted by the Renewable Energy Foundation. The Foundation declared itself neutral on the nuclear issue but remained concerned that there should be a full and transparent public debate "so that the UK and its people can reach a sound decision in prompt order".²⁴⁹

122. In contrast to that view we became increasingly aware that a significant strain of the nuclear debate was focusing on the belief that it was a simple choice between nuclear power and wind power. Alison Davies, Chairman of Conservation of Upland Montgomeryshire argued that wind farms could never be an alternative to nuclear power stations and "still many years on the general public still imagine that this is where the choice lies".²⁵⁰ Her views were echoed by the Wildland Network who asserted that it was "very misleading to pretend that wind energy will prevent the building of nuclear capacity".²⁵¹ Both Alun John Richards²⁵² and David Insall were dismayed at what they considered to be the false argument of a choice between either wind or nuclear.²⁵³ The Secretary of State for Wales is in danger of becoming embroiled in that debate. His anti-nuclear credentials are well-known, and well respected. But it is unwise for him to argue that: "it's not good enough just to oppose nuclear - we need strong leadership on renewables too".²⁵⁴ In a recent Newsnight interview he argued that new nuclear build would only be supported if it had been demonstrated that despite putting absolutely everything into clean green renewable energy there was still a gap between energy supply and demand.²⁵⁵

123. In its 2003 White Paper the UK Government stated that a proposal for new nuclear build would be subject to the "fullest public consultation" prior to any decision being made by Parliament. That consultation, and the debate that will surround any decision will need to be handled carefully by both the UK Government and the Welsh Assembly Government. It is possible that the two institutions will take different positions in the debate. Any debate on the future of nuclear power in Wales has to be evidence-based and it has to take place in the context of the United Kingdom's energy needs, security of supply, wider energy mix and the global threat of climate change.

249 Ev 183

250 Ev 349

251 Ev 276

252 Ev 249

253 Ev 260

254 Wales Office press notice 30 March 2006.

255 BBC Newsnight, Friday 30 June 2006.

124. We look to Government to ensure that there is an open and mature debate on nuclear power in Wales and in the UK, and that it is conducted to the benefit of Wales and the Welsh people, within the wider UK context.

6 Liquefied Natural Gas

125. Currently in Britain there are a number of existing Liquefied Natural Gas (LNG) sites which have been in operation in excess of 30 years. In these plants natural gas is taken from the National Grid network, liquefied into LNG, and stored in large tanks to ensure that there is enough gas available to meet the peak demand of UK householders and businesses during the winter.²⁵⁶ The industry as it is known today started in 1960 when Britain signed a 15-year contract to take less than 1 million tonnes per annum (mtpa) from Algeria. This import to the UK began in 1965 but stopped in the early 1970s when the North Sea started production of natural gas.²⁵⁷

126. LNG is currently stored in Wales at Dynevor, Aberdare in south Wales. Dragon LNG is currently building a Liquefied Natural Gas terminal at Milford Haven, thereby increasing Wales' LNG facilities significantly. There is also another LNG terminal being constructed at Milford Haven by South Hook LNG.²⁵⁸ The new Dragon LNG facilities were due to be completed by the end of 2007.²⁵⁹ John Burley, General Manager of LNG, told us that this new facility would provide 5% or 6% of the UK national supplies of gas.²⁶⁰ He explained to us that there were three steps in the LNG process:

First, was liquefaction, cooling of the natural gas to change it into a liquid;

Second, the transportation by ship of the liquefied natural gas; and

Third, the storage, and re-gasification, or the warming of the LNG, to convert it back to gas, and to deliver it into the national pipeline network.²⁶¹

He added that LNG was a very pure form of natural gas and was not carcinogenic. LNG was odourless, colourless, non-corrosive and non-toxic.²⁶²

127. While the Renewable Energy Foundation told us that they had been an “early voice arguing against too heavy dependence on gas,” they recognised that Liquefied Natural Gas, if correctly scaled, was a valuable part of the energy portfolio. Indeed, they impressed on us that “there may well be wealth-generation opportunities for Wales in handling its importation”.²⁶³

128. John Burley pointed out the multiple benefits of LNG. He claimed that “it helps to enhance the security of supply for the energy infrastructure into the UK”.²⁶⁴ He added that “Trinidad, Malaysia, Egypt, Nigeria, to name but a few, Australia, Indonesia, Qatar”, all

256 Ev 208

257 Ev 208

258 Ev 208

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260 Q 739

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262 Ev 208

263 Ev 183

264 Q 747

export LNG at present, and that there is therefore, “a wide variety of sources”.²⁶⁵ He added that LNG therefore “allows us to bring natural gas from a wider variety of locations. It provides a reliable source of energy to replace the declining production in the North Sea”.²⁶⁶

129. Richard Abel, Director, Domestic Energy at the DTI agreed that these new import facilities were “very important, looking forward, for the overall security of gas supplies for the whole of the national transmission system in Great Britain, because, when they are up and running, on present plans they will have the import capacity to supply about 20% of UK demand averaged out over a year”.²⁶⁷ He added that “along with storage facilities to deal with the fact that we use a lot more gas in winter than we do in the summer, the ability to import the gas is very important. The Milford Haven projects are an extremely valuable contribution to that”.²⁶⁸

130. In its written evidence, Dragon LNG highlighted the further benefit of the positive impact of the plant for the Pembrokeshire Economy. It claimed that the number of people working during the construction phase of the Dragon LNG site was expected to peak at between 400 and 500 people. At the time of its written submission, there were 155 people on site, 62% of whom were local. In addition, Dragon LNG had linked up with the Prince’s Trust to establish a “Get into Construction” programme for young people in the area. Once operational Dragon LNG expected to employ 35 people with up to 15 people employed providing services to the site.²⁶⁹

131. John Burley added a final benefit to the whole of south Wales from the construction of the LNG plant, was the pipeline to export the gas to the National Grid. As previously identified in this report, south Wales has been on the extremity of the Grid system and, therefore, to help relieve that extremity it is necessary to provide additional pipelines. He argued that the construction of the pipeline would “help relieve the natural gas infrastructure in the UK and provide natural gas to south Wales as well and provide that extra benefit”.²⁷⁰

132. Friends of the Earth Cymru acknowledged those advantages, and told us that “LNG is an essential part of the fuel mix for the UK for the medium term future”.²⁷¹ However, they added that they considered it to be only a “bridging fuel” that emitted less carbon dioxide than coal or oil rather than the solution to climate change”.²⁷² They explained to us that they were opposed to the proposals to site two LNG terminals and storage facilities at Milford Haven on safety grounds, particularly upon the location of facilities dealing with hazardous fuel so close to a populated area.²⁷³

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266 Q 748

267 Q 53

268 Q 53

269 Ev 209

270 Q 745

271 Ev 97

272 Ev 97

273 Ev 98

133. In its written evidence to us, Dragon LNG emphasised the safety record of LNG. John Burley claimed that “since 1945, there has never been an incident at a Liquefied Natural Gas import terminal that has affected members of the public or the environment”. He added that in over 450,000 ship journeys, no ship carrying LNG has ever lost cargo from its containment.²⁷⁴ He further assured us that the LNG Terminal would be subject to the Control of Major Accident Hazards (COMAH) Regulations, and a safety report would be required by the Health and Safety Executive (HSE) before the plant can be operated. Furthermore, he assured us that the LNG Terminal has been designated as an economic key point with priority 1 status by the UK National Security Services and the DTI.²⁷⁵

134. Friends of the Earth Cymru told us that “at the Waterston power station, 250 MW of the 900 MW of waste heat would be used to re-gasify the LNG”.²⁷⁶ It further provided the practical example of the two oil refineries, located near to the plant both of which have a constant demand for process heat in the form of steam. There was therefore potential for that heat to be used.²⁷⁷

135. We welcome the contribution of the new South Hook and Dragon LNG facilities near Milford Haven, and their potential contribution to a diversified and secure gas supply in Wales and the UK. Furthermore, we recognise the positive economic impact of these projects for west Wales, and the fact that they represent another example of Wales providing a lead in the provision of energy for the UK.

274 Ev 208

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276 Ev 98

277 Ev 98

7 Wind Energy

Introduction

136. In Section 1 of our report, we highlighted the view that the United Kingdom, and Wales in particular, benefits from “vast natural renewable resources”.²⁷⁸ Of those resources, the Government predicts that wind, both onshore and offshore, will make the biggest contribution towards the 2010 target for 10% of electricity supplies coming from renewable sources.²⁷⁹ When Officials from the DTI gave evidence to us they argued that Wales’ geography and wind patterns meant that Wales would play an important role in the delivery of the wind power required to meet those targets.²⁸⁰ That view was echoed by Dr Legerton from RWE npower, a leading developer of wind energy in the United Kingdom. Dr Legerton argued that “at present, wind power on the west coast of the United Kingdom was a very attractive resource”,²⁸¹ and that the north coast of Wales in particular offered a good wind resource in comparison to the rest of the United Kingdom.²⁸²

137. In addition to the wind resource, the economics of wind power has also led many to consider wind energy, and specifically onshore wind, as “the only renewable technology that is both economically viable and has scope for expansion under the current Renewables Obligation regime in the UK”.²⁸³ Rod Edwards from Dulas Ltd., Wales’ leading indigenous renewable energy company, echoed that view. He believed that wind was currently the “only economically viable, readily deployable renewable energy technology” available to the United Kingdom.²⁸⁴

Wind Energy in Wales

138. Wales already has a significant proportion of the United Kingdom’s wind farms. Cathy Allen, Assistant Director, Consents Policy and Delivery at the DTI told us that Wales had 22 operational on-shore wind farms out of a total of 113, which represented 19% of the United Kingdom’s total wind farms. In terms of output, onshore wind farms in Wales accounted for 23% of the 1123 megawatts produced.²⁸⁵ During our inquiry we visited Cefn Croes, the largest onshore wind farm in Wales.²⁸⁶

278 Ev 5-6

279 The UK Government target is that by 2010 10% of electricity supplies should come from renewable sources, with an aspiration to double this by 2020.

280 Ev 5

281 Q 226

282 Q 227

283 Ev 5

284 Q 183

285 Q 66

286 Visit to Mid and North Wales, Annex 2.

139. In respect of offshore wind, Wales's position was further ahead. Cathy Allen from the DTI confirmed that the first offshore wind farm – located at North Hoyle – was sited off the north Wales coast. Two other off shore wind farms have since been built in the UK,²⁸⁷ but Wales continued to provide a significant contribution of offshore wind energy. That figure currently stands at 33% and North Hoyle accounts for 60 megawatts out of 214 megawatts of the UK's offshore wind energy produced.²⁸⁸ That figure will increase as two further offshore wind farms – Rhyl Flats,²⁸⁹ and Gwynt y Môr,²⁹⁰ – have been proposed for north Wales. Both wind farms would be close to the existing offshore wind farm at North Hoyle.²⁹¹ RWE npower, the owner of the two developments, argued that Rhyl Flats and Gwynt y Môr²⁹² offered the potential to put Wales in “a leading position in the United Kingdom market”.²⁹³

140. Dr Legerton stated that in respect of offshore wind, the Welsh coast and in particular the north Wales coast was preferable to the east coast both in terms of wind resource and Grid connection.²⁹⁴ He further argued that the combination of wind resource with relatively sparse populations in those areas also made it possible to “site wind farms of a reasonable size a good distance away from nearby residents, which you do not get in some other parts of the country”.²⁹⁵

Welsh Assembly Government Policy

141. The exploitation of wind power is being actively pursued in Wales. Andrew Davies AM, the Minister responsible for Energy Policy in Wales, set out the view of the Welsh Assembly Government that wind would be the predominant renewable energy resource for the foreseeable future. In particular, wind energy would be the principal energy source to meet the Welsh Assembly Government's targets for 4TWh of renewable energy generation by 2010 and 7TWh of renewable energy by 2020”.²⁹⁶

142. Andrew Davies AM defended the Welsh Assembly Government's promotion of wind power in Wales, and in particular onshore wind. Along with the UK Government he asserted that wind was “by far the form of renewable energy production that is most exploitable, commercially, in Wales”.²⁹⁷ However, he did acknowledge that other renewable sources could play an important role in the future:

287 The other two operational wind farms in the UK are situated at Scroby Sands near Great Yarmouth and at Kentish Flats near Whitstable.

288 Q 66

289 We discuss the positioning of the Rhyl Flats wind farm in paras 151 to 159.

290 Ev 5

291 A map of the wind farms can be found at www.npower-renewables.com

292 Ev 49

293 Ev 49

294 Q 227

295 Q 227

296 Ev 195

297 Q 705

“I suppose our view is that [wind power] is likely to be an interim technology until such time as other forms of renewables reach a commercially exploitable stage of development”.²⁹⁸

The Planning Process

143. In an earlier section, we discuss the division of powers between the UK Government and the Welsh Assembly Government over planning consents for power plants.²⁹⁹ That division is seen clearly in relation to wind energy. As we mentioned earlier, the DTI is responsible for energy consents under Section 36 of the Electricity Act for proposed generating stations which were in excess of 50 megawatts.³⁰⁰

144. Due to the size of offshore wind farm developments, they are handled by the DTI. Cathy Allen from the DTI told us that in the first round of offshore wind farms, developers had the ability to choose their sites anywhere within the UK. As a result a number of developers chose sites in Wales.³⁰¹ That approach had been refined for the second round of off-shore wind farms which were now focused on the development of three strategic areas: the Greater Wash; the Outer Thames Estuary; and the North-West, going from the north Wales coast up to the Solway Firth.³⁰²

145. Where a generating station produced below 50 megawatts, it was a matter for the Welsh Assembly Government and the local planning authorities.³⁰³ In respect of onshore wind, the majority of wind farms in Wales have been through the Welsh Assembly Government planning procedures.

Technical Advice Note (TAN) 8

146. The principal planning guidance for wind farms under 50 MW is the Welsh Assembly Government’s Technical Advice Note (TAN) 8 (Planning for Renewable Energy). TAN8 provides “a steer to developers as to where [the Welsh Assembly Government] would like them to focus their projects”.³⁰⁴ In its written evidence, the Welsh Assembly Government explained that TAN 8 was intended to “facilitate the measured development of renewable energy in the most appropriate locations and to provide surety and clarity to developers and local authorities”.³⁰⁵ In particular, TAN 8 set out seven Strategic Search Areas (SSAs) which, subject to possible minor local refinement, are considered suitable for the location

298 Q 705

299 See paras 27 to 34.

300 Q 69

301 Q 67

302 Q 67

303 Q 69

304 Q 68

305 Ev 196

of large wind-farms.³⁰⁶ Those areas are Clocaenog Forest, Carno North, Newtown South, Nant-y-Moch, Pontardawe, Coed Morgannwg and Brechfa Forest.³⁰⁷

147. Dr Legerton from RWE npower told us that TAN8 had been welcomed by the wind industry as being a very proactive and positive message for wind energy.³⁰⁸ That said, RWE npower remained concerned that the inclusion of a requirement for Local Authorities to take into account landscape, visual and cumulative impacts would “take time and could delay decision-making”.³⁰⁹ We return to this point later in this section.

148. Dr Legerton acknowledged that the seven strategic areas for onshore wind farm development identified in the TAN8 would lead to a concentration of wind farms in particular areas. He argued that “I guess it is a degree of judgment and a point of view whether you consider that an over-saturation or not”.³¹⁰ On the other hand, he also believed that the strategic areas meant that “some areas are going to be left relatively free from wind farm development”.³¹¹ Rod Edwards from Dulas Ltd., concurred. He stated that “the concentration of wind development will mean a concentration of opposition”.³¹²

149. Although TAN8 is a National Assembly matter, several witnesses highlighted their concerns over the way in which it worked, a flavour of which we set out below:

- The Ramblers Association believed that TAN8 constrained the ability of local authorities to resist inappropriate development;³¹³
- PACT and DART believed that TAN8 documentation blurs the distinction between the Kyoto Agreement (reducing greenhouse gases including CO₂) and the separate EU Renewable Energy Directive (renewable energy production to safeguard future energy supplies);³¹⁴ and
- The Glyncorrwg Action Group told us that the TAN8 proposals were “ill conceived, naive and of little benefit to Wales or its people”.³¹⁵

150. TAN8 identifies seven strategic areas in Wales where there is a presumption in favour of wind farm developments, while Section 36 of the Electricity Act does not allow for objections to the provision of energy consents. When these two procedures are combined, they leave little—if any—opportunity for local residents in Wales to mount a defence against applications for large wind farms in their locality. Not only is this deeply frustrating, it also undermines the democratic accountability that underpins decision-making in this policy area. We recommend that the Government

306 Ev 314

307 www.wales.gov.uk/subiplanning/content/tans/tan08/newtan8/tan8-pages1-21-e.pdf

308 Q 265

309 Ev 47

310 Q 222

311 Q 222

312 Ev 40

313 Ev 113

314 Ev 330

315 Ev 369

review this position as a matter of urgency in order to give fair access to the decision-making process for individuals affected by large-scale wind farms in Wales.

Consultation with the Public

151. All proposals for wind farms, whether considered by the DTI or by the Welsh Assembly Government, are subject to public consultation. A key part of that consultation is for developers to inform the public of their proposals, and offer the opportunity for members of the public likely to be affected to have an input into the process. During our inquiry failings in that process were highlighted in respect of the Rhyl Flats wind farm in north Wales.

152. Rhyl Flats was developed by Celtic Offshore Wind Limited (COWL) before being bought by RWE npower in December 2002. The proposal for the wind farm received its consent for building in 2002 when it was still owned by COWL. Planning for the construction of the wind farm is currently underway. Thirty wind turbines have been consented for the site, and RWE npower estimated that the hub height of each turbine would be around 80 meters, with the maximum height to blade tip around 134 meters.³¹⁶ Each turbine would be capable of producing between 2.3 MW and 3.6 MW of electricity.³¹⁷ Once operational, RWE npower estimated that the wind farm will produce enough electricity to meet the average needs of approximately 56,000 homes.³¹⁸

153. Rhyl Flats has been a controversial proposal, not only for the visual impact that it will have on the local area, but also for the process for gaining its planning consents. Peter and Carol Roberts, two local residents told us of their objections to the Rhyl Flats development both in their written evidence and when we met with them and other opponents of the development when we visited north Wales.³¹⁹ Rhyl Flats is a well-known maritime feature. By naming the project Rhyl Flats, and advertising the project as such in the local press, residents believed that the wind farm would be located on that feature which is situated off the north Wales coastal town of Rhyl, 20 miles east of Llandudno, Rhos on Sea and Colwyn Bay. In reality the Rhyl Flats development was to be located on another maritime feature, Constable Bank.³²⁰

154. When we discussed the accuracy of the location with Malcolm Wicks MP, he was quick to point out that he was not the Minister for Energy at the time the consents were given,³²¹ but also was equally quick to dismiss any criticism of the consents process for that development.³²² While he declared himself open to any suggestions that would improve the

316 www.npower-renewables.co.uk/rhylflats/components.asp

317 www.npower-renewables.co.uk/rhylflats/components.asp

318 www.npower-renewables.co.uk/rhylflats/index.asp

319 Visit to Mid and North Wales, Annex 2

320 www.npower-renewables.com/rhylflats/location.asp

321 Q 914

322 Q 914

process for future developments,³²³ he refused to reconsider the development of the Rhyl Flats wind farm.³²⁴

155. In a written answer on 9 January the Minister gave a curious response to the question of the exact location of the wind farm. He said that:

“The position of the wind farm could be described as being on the north eastern edge of Constable Bank but it is difficult to define the boundaries of this or any other sea bed feature precisely as they change with time. It is, therefore, best to define the location of the wind farm by fixed co-ordinates rather than its position relative to, what could be, mobile sea bed features”.³²⁵

156. The fixed co-ordinates do feature in the detailed proposal provided by COWL and they do indicate Constable Bank, but the headline title for the development remained Rhyl Flats. To their credit, RWE npower acknowledged that there was a difference on its website:

“Rhyl Flats itself is an area of shallow water directly offshore from Rhyl; the actual location of the wind farm is further offshore and to the west of Rhyl Flats, on the eastern end of Constable Bank between Abergele and Rhos-on-Sea”.³²⁶

157. Malcolm Wicks MP agreed that the statutory notice issued by a wind farm developer should, so far as possible, accurately identify the location of the proposed development.³²⁷ But he refused to concede that the statutory notice for Rhyl Flats gave inaccurate information on the location.³²⁸ In his opinion: “there was a consultation process. As with all these things some people will be pleased by the outcome, some not pleased”.³²⁹

158. The consents process for Rhyl Flats serves as a timely reminder of how quickly public confidence can be undermined. While the UK Energy Minister agrees on the need for accuracy in statutory notices, he has refused to acknowledge the fact that in this case a proposal was inaccurately named after one maritime feature while being located on another, adjacent maritime feature. That was a mistake and it was misleading. While we accept that the true coordinates were contained within the consultation documents, local residents would have not felt it necessary to delve that deep into a document that implied that the proposal would be built away from their immediate area.

159. The Government has a duty to ensure accuracy and confidence in the planning and consents systems. It has not done so on this occasion. Furthermore, it is not acceptable to explain away the fact by arguing that it is “difficult to define the boundaries of this or any other sea bed feature precisely as they change with time”. If wind energy is to be further exploited in Wales, it is incumbent on the DTI, as the commissioner of large

323 Q 914

324 Q 912

325 HC Deb 9 January 2006, Col 297W.

326 www.natwindpower.co.uk/rhylflats/location.asp

327 Q 915

328 Q 916

329 Q 918

projects, to take a far deeper interest in the accuracy and probity of the consultation process. To not do so is to disregard the need to support the views of the local population. We look to the UK Energy Minister to acknowledge the shortcomings of the consultation process on this occasion and set out clear unambiguous guidelines for the accurate description of wind farm locations for the future.

The Debate Surrounding the Benefits of Wind Power

160. This is not the first inquiry by the Welsh Affairs Committee into wind energy. In 1994, our predecessor Committee considered wind energy in Wales.³³⁰ That report was dominated by a fierce debate about the benefits and relevance of wind energy to both electricity production and as a response to global warming. That Committee concluded that:

“The debate over the place of wind generated electricity in the generation mix of the future had become polarised, that arguments had been hijacked by exaggerated and emotional claims. We do not believe that wind energy, or even renewable energy generally, can be expected to be the solution to the problems of global warming and acid rain. We do, however, believe that wind energy has the potential to make a significant contribution to electricity needs”.³³¹

161. Our inquiry has shown that those strong feelings remain in Wales. Of all the evidence and opinion that we received during this inquiry, the majority of submissions related to wind energy and wind farms. In addition to the memoranda we have printed, we also received nearly fifty letters of protest on the offshore wind farms in north Wales.³³²

162. For many, wind power represents a significant step forward towards the goal of renewable energy. WWF Cymru believed that along with other renewable energy sources, onshore and offshore wind were the “most benign” renewable energy sources.³³³ Kevin Mowbray from Welsh Energy Research Centre agreed that wind energy had an important part to play not only in the production of electricity, but also in the future production of hydrogen – an energy source which can be stored.³³⁴ Wales TUC Cymru argued that both on and offshore wind power needed to be part of any energy mix and along with other witnesses identified the geography of Wales as being well-suited for the construction and operation of wind derived power”.³³⁵ Denbighshire Branch of the Campaign for the Protection of Rural Wales was also in favour of wind farms but added the caveat that wind farms should only be sited where they did not damage the landscape. Furthermore, it was broadly supportive of “truly offshore installations away from sensitive coasts”.³³⁶

330 Second Report from the Welsh Affairs Committee, *Wind Energy*, HC 336 of Session 1993-94.

331 Second Report from the Welsh Affairs Committee, *Wind Energy*, HC 336 of Session 1993-94, para 187

332 The authors of those letters are listed at the end of this report.

333 Ev 370

334 Q 150

335 Ev 344

336 Ev 301

163. In the wider view, a number of our witnesses cited public surveys to put forward the argument in favour of wind energy. Our witnesses from Falck Renewables argued that numerous public attitude surveys had shown that the majority of people in the UK were now in favour of wind energy. In particular they cited a survey commissioned by the British Wind Energy Association (BWEA) which revealed that 75% of the people in Wales believed that wind farms were necessary to help the country meet its current and future energy needs.³³⁷ In spite of that apparent support, Falck Renewables acknowledged that wind farm applications continued to be met with objections from “small but well organised and vocal minority groups”.³³⁸

164. Dr Legerton from RWE npower also cited a recent Dragon’s Eye survey whose results indicated a significant majority in favour of wind energy.³³⁹ Andrew Davies AM acknowledged that opinion polls at both a Wales and a UK level had shown that people understood the need for renewable energy and in particular onshore wind. That said, he was also aware of the counter view and acknowledged what he described as a “very vociferous opposition to wind farms” in Wales.³⁴⁰ Andrew Davies AM was aware that as the Assembly Minister with responsibility for Energy, the opposition lobby was quick to caricature his position as one of “trying to cover the whole of Wales in wind farms”.³⁴¹

165. Falck Renewables, owner of the largest onshore wind farm in Wales, agreed with both the UK Government and the Welsh Assembly Government that wind power would be relied upon to meet the 2010 renewable energy target. But it saw two main hurdles to the wind industry’s ability to deliver on that target.³⁴² The first hurdle related to practical issues surrounding the electrical infrastructure. The second related to the public’s perception of wind energy.³⁴³ Both Falck Renewables and RWE npower—the two largest producers of wind energy in Wales—acknowledged that more work needed to be done to convince the public of the merits of wind energy. RWE npower supported that view and declared itself in favour of any initiative to promote public understanding of the issues”.³⁴⁴

166. While support for wind farms is evident, the high levels of support referred to by our witnesses were not reflected in the submissions to this inquiry. Professor Dennis Hawkes from the Welsh Energy Research Centre argued that Wales had “a relatively small but very vociferous lobby against wind farms [...] because of how it has been sold in the past”.³⁴⁵ Rod Edwards from Dulas Ltd., was also aware of opposition, in particular to large wind farms. Despite the contribution that wind farms make to renewable energy he concluded that “some people do not like them”.³⁴⁶

337 The survey was carried out at the time of the opening of the Cefn Croes wind farm in 2005.

338 Ev 52

339 Ev 52

340 Q 712

341 Q 713

342 Ev 51

343 Ev 52

344 Ev 48

345 Q 147

346 Q 189

167. While wind is undoubtedly the most easily accessible form of renewable energy, many of our witnesses questioned its usefulness. Although generally in favour of wind, Dr Valentine believed that the use of wind was less to do with its effectiveness and more to do with the position of wind power as the “low-hanging fruit” of renewable energy.³⁴⁷ That view was echoed in many of the submissions we received in opposition to wind energy. In general terms, those opposed to wind highlighted the questionable contribution of wind energy – in particular its low output and intermittent supply – and the visual and environmental impact of wind farms on their locality.

Capacity and Load Factor

168. For each wind farm there is a headline figure of installed capacity. That figure relates to the maximum possible amount of energy a wind farm could produce. The actual electricity generated by wind farms – called load factor – differs significantly from the installed capacity. Cathy Allen, Assistant Director, Consents Policy and Delivery, DTI, acknowledged that there could be “an issue about the difference between what the generating capacity of the wind farm is and what it produces, which will be different, or can be different”.³⁴⁸ The difference between these two figures was explored with both our witnesses representing wind farm operators.

169. A good example of this was demonstrated by the Cefn Croes wind farm. Cefn Croes is owned and operated by Falck Renewables. It is a 58.5 MW wind farm which at the time of its opening was the largest onshore wind farm in the UK.³⁴⁹ It remains the largest onshore wind farm in Wales.³⁵⁰ Cefn Croes was completed on 31 March 2005 and was opened by Andrew Davies AM, Welsh Assembly Government on 16 June 2005.³⁵¹ It is located near Devils Bridge, Wales, 15 Km east of Aberystwyth.³⁵²

170. Roger Jones told us that Falck Renewables expected a load factor of between around 32% and 36% – in other words around one third of its installed capacity. Daily targets were not set because “the site it is more windy generally in the winter than it is in the summer, so the profile is generally that we expect more output in the winter than in the summer”. However, he explained that the figures through the winter of 2005 showed that the load factor was 35.8%. In February 2006 the load factor was 41%.³⁵³ Dr Legerton from RWE npower gave a similar level of output for North Hoyle offshore wind farm. He explained that they kept monthly figures and, just as for Cefn Croes, the figures varied throughout the seasons with midwinter months producing approximately twice the summer months.

347 Q 385

348 Q 70

349 Ev 51

350 Ev 51

351 www.falckrenewables.co.uk/current_projects_details.asp?gid=7

352 www.falckrenewables.co.uk/current_projects_details.asp?gid=7

353 Q 230

That said the averaged load factor over the year for North Hoyle was 35%.³⁵⁴ Both acknowledged the increased performance of wind farms during the winter.³⁵⁵

171. The perceived low percentage of output from wind farms has given rise to a view that they are not a useful means of generating electricity. Janet C Moseley, a Community Councillor for Mawr ward of the City and Council of Swansea, described wind power as “the most expensive method of generating a meagre, intermittent and unpredictable supply of electricity”,³⁵⁶ a point echoed by John Hopkinson.³⁵⁷ C. Rees strongly argued for a moratorium on wind energy because of its poor output.³⁵⁸ Dr John R. Etherington argued for a moratorium on wind farm developments to allow for a cost/benefit analysis of what he saw as flawed statistics in favour of wind farms.³⁵⁹ Richard Sheppard strongly argued that:

“The best production figures I can access [for wind farms] are those issued by a department of government which show an average of less than 25% yield. Unfortunately because of the intermittency of wind it will come in random dribs and drabs. A considerable amount of the energy generated will be at night when it is not really needed so this 75% inefficiency rating will be seen to grow in magnitude”.³⁶⁰

Alun John Richards also wrote to us with his belief that “developers massage statistics—cite installed capacity rather than actual output [and] confuse average demand with maximum demand”.³⁶¹

Intermittent Supply

172. Wind has a role to play in contributing to the UK’s energy needs, but the fact remains that it is not 100% reliable. To compensate for the intermittent nature of wind, wind power needs a back-up supply of electricity. That back-up supply was currently provided for by conventional sources of generation, for example coal, gas or oil.³⁶² William Heller, Managing Director of Falck Renewables, told us that that a coal-fired power station for example, used for back-up capacity, would remain on line but would only operate at 5% or 7% capacity factor.³⁶³ Should that back-up be called upon, that power station would be brought up to meet electricity generating requirements and could do so “pretty quickly”.³⁶⁴

173. An accusation against wind was that the need for such back up capacity meant that wind made little contribution to removing fossil fuel generated electricity. David Lewis argued that “wind power is not capable of meeting our energy needs and is having no

354 For the period between November 1994 to November 1995. Q231

355 Q 230

356 Ev 311

357 Ev 356

358 Ev 323

359 Ev 267

360 Ev 246

361 Ev 249

362 Q 247

363 Q 253

364 Q 249

practical effect on climate change”.³⁶⁵ He also argued that wind policy was “costly, unreliable and inefficient”.³⁶⁶ Mynydd Llansadwrn Action Group took the view that wind power was “an unreliable and intermittent source of energy that cannot provide firm predictable generating capacity”,³⁶⁷ while Catrin Edwards from Newtown believed that the problems of global warming “will not be solved by industrialising rural Wales with giant wind turbines”.³⁶⁸

174. Dr Legerton from RWE npower disagreed. He argued that the need for back-up capacity was not a reason to dismiss wind power as irrelevant. He explained that power stations were not used solely as back up for wind energy but were “running anyway because we need back-up for a whole host of situations which can arise such as Sizewell B tripping out, a sudden rise in demand for electricity, so that back-up capacity is there whether we have wind or not”.³⁶⁹ Therefore he argued that wind farms drew on that back-up supply in the same way as any other electricity generator and should not be singled out for particular criticism.³⁷⁰ That said, Dr Legerton conceded that wind power had not replaced any fossil fuel power stations in terms of capacity.³⁷¹

175. The relatively low supply of energy from wind, has not led to any real increase in the requirements for back-up capacity.³⁷² On the other hand, it is evident that back-up capacity has not been reduced by the presence of the wind turbines.³⁷³ That position would change as a result of a significant increase in energy production from wind farms. Dr Legerton explained that if 10% of UK supply was derived from wind power then an additional requirement for back-up would be required. However, he was at pains to point out that the additional back up would be quite small compared to the wind power which would then be available. He pointed out that the back up capacity necessary for 13,000 to 15,000 megawatts was estimated to be about 700 megawatts.³⁷⁴

176. It is evident that misunderstandings remain over the actual contribution that wind power can make to the UK’s renewable energy supply. The Government and wind farm developers trumpet wind energy as the most economically viable and achievable technology. However, there remains a gap between the headline contribution that wind said to make and its actual contribution to electricity generation. Greater clarity is needed over both the level of electricity generated by wind farms, and the amount of net carbon neutral electricity provided.

177. We asked the DTI to set out what information on these areas was available to members of the public. In a supplementary memorandum, the DTI pointed us in the

365 Ev 281

366 Ev 281

367 Ev 288

368 Ev 347

369 Q 252

370 Q 252

371 Q 250-1

372 Qq 250

373 Q 253

374 Q 250

direction of the annual Digest of UK Energy Statistics (DUKES).³⁷⁵ The 2006 Digest will be published on 27 July, and along with previous years is available on the internet.³⁷⁶ However, the Digest is a series of spreadsheets rather than an objective assessment of the contribution wind farms make to the UK's energy supply.

178. Wind energy is often portrayed as a renewable panacea for our energy needs. Whilst it does have an important contribution to make, there remains a worrying difference between the expectation of wind power and its actual output. With the significant expansion of wind farms in Wales, the Welsh public is entitled to be given an objective assessment of its contribution to electricity supply in Wales. The Digest of UK Energy Statistics may provide the raw data on wind energy but it is not sufficient to inform the public on the true contribution made by wind. The UK Government has to play a more intelligent role in setting out the true case for wind energy at both a regional and a national level.

Visual Impact

179. Our predecessor Committee's report on Wind Energy³⁷⁷ concluded that:

“We believe that concerns over visual impact are the most deep-seated and firmly held objections to the development of wind energy”.³⁷⁸

Twelve years on this issue remains the predominant concern for both members of the public and residents near proposed wind farms.

180. In 2003, consent was given to build the largest onshore wind farm at Cefn Croes. The Cefn Croes Action Group was formed to oppose the wind farm.³⁷⁹ In addition to its concerns over “the economic, scientific and engineering arguments” behind the wind farm it strongly argued that the landscape of Wales was being “sacrificed” for little, if any, reward.³⁸⁰ That view was echoed by several groups opposed to further smaller wind farms within the seven strategic areas identified in TAN8. The Cambrian Mountains Society described the development of wind farms in that area as “damaging to the interests of the communities of the Cambrian Mountains”.³⁸¹ Glyncorrwg Action Group argued that while wind farms had a part to play in the energy mix they were “desecrating the Welsh landscape”.³⁸² Lyn James Jenkins of Ceredigion Leisure concluded that wind farms would “totally desecrate the beauty of Wales without achieving anything positive for our beautiful country”.³⁸³

375 Ev 242

376 www.dti.gov.uk

377 Second Report, from the Welsh Affairs Committee, *Wind Energy*, HC336 of Session 1993-94.

378 Second Report, from the Welsh Affairs Committee, *Wind Energy*, HC336 of Session 1993-94, para 83.

379 Ev 296-7

380 Ev 299

381 Ev 339

382 Ev 369

383 Ev 366

181. People Against Corwen/Cerrigydrudion Turbines (PACT) and Denbighshire Against Rural Turbines (DART) are two pressure groups lobbying against the spread of on-shore turbines particularly in north Wales.³⁸⁴ Both groups argued that the visual impact of onshore turbines was extensive because turbines had to be placed on high ground, and that the proposed expansion of turbines would result in it being inevitable that wind farms would be located where they were visible for many miles around.³⁸⁵

The example of Gwynt y Môr wind farm

182. The question of visual impact was not limited to onshore wind farms. The concern over the visual impact of wind farms has been most clearly demonstrated to us in the case of the proposed Gwynt y Môr wind farm – a 750 MW wind farm planned for the north Wales coast.³⁸⁶ Gwynt y Môr will be built and operated by RWE npower and will be located approximately 13 to 15 km off the coast of north Wales – stretching from Prestatyn in the east to Penrhyn Bay in the west.³⁸⁷ The wind farm will incorporate between 150 and 250 offshore wind turbines, each of which will be between 75.5 meters and 98 meters above water³⁸⁸ with a maximum blade tip height of 165 meters.³⁸⁹ The wind farm will sit alongside the existing North Hoyle wind farm and the proposed Rhyl Flats wind farm.³⁹⁰

183. Denise Idris Jones, the Assembly Member for Conwy believed that the visual impact of the Gwynt y Môr scheme would have a significant and detrimental impact on the area and argued that it needed to be replaced with “schemes which do not impinge so drastically on our natural environment”.³⁹¹ Local residents were of the same view. TJ Priestman believed that Gwynt y Môr would “blight the seaward view of a whole stretch of the north Wales coastline”,³⁹² while Russ Sheaf argued that it would have “serious ramifications for the future tourist trade in the area”.³⁹³ Janet Haworth an organiser of the local Save Our Scenery pressure group stated that “the visual impact will be to fence our bay with a wall of steel”.³⁹⁴

184. Those in favour of the Gwynt y Môr scheme were in the minority but it should be noted that the Sustainable Energy Alliance (SEA), was a supporter of the development and argued that offshore wind provided “a clear opportunity to produce clean and sustainable energy [and that] the building of this wind farm provides a great opportunity for Wales”.³⁹⁵

384 Ev 328

385 Ev 332

386 www.npower-renewables.co.uk/gwyntymor/pdfs/nts.pdf

387 www.npower-renewables.co.uk/gwyntymor/pdfs/nts.pdf

388 This is measured from the Lowest Astronomical Tide (LAT) to the top of the turbine hub.

389 www.npower-renewables.co.uk/gwyntymor/pdfs/nts.pdf

390 www.npower-renewables.co.uk

391 Ev 248

392 Ev 359

393 Ev 360

394 Ev 302

395 Ev 366

185. It has been suggested to us that the impact of the wind farm could be lessened should it be moved further out to sea. When we visited the National Wind Technology Centre in the United States, a leading research institute on wind energy, we discussed the feasibility of deep water offshore wind farms with the senior scientists at that laboratory.³⁹⁶ They told us that the United States was already developing tripod designs and floating platforms that could be located in deep water. While this was not new technology – floating platforms have long been used in the offshore gas industry – the current obstacle was cost. However, they were confident that those costs would reduce with increased demand and economies of scale.³⁹⁷

186. Dr Legerton from RWE npower confirmed that there were no technical reasons wind farms could not be built in deeper water.³⁹⁸ However, we were told that moving Gwynt y Môr further out to sea was not a practical solution because “it would run into an area that was heavily used for shipping, navigation and oil and gas exploration”.³⁹⁹

Environmental Impact

187. Allied to the visual impact were concerns about the environmental impact of both onshore and offshore wind farms. Peter and Carol Roberts argued that locating the Rhyl Flats wind farm on Constable Bank had the potential to undermine the Bank’s current role as a natural flood defence.⁴⁰⁰ The Wildland Network wrote that “given the longstanding recognition of the obvious quality of the landscape in the Cambrian Mountains, and the interest and value it has as a national asset, we recommend that no further wind power developments be permitted in the Cambrian Mountains”.⁴⁰¹

188. Mynydd Llansadwrn Action Group argued that wind farms, together with their “associated works and grid connections is a major construction project that inevitably causes environmental damage”.⁴⁰² It further argued that they had a detrimental impact on wildlife habitats, peat bogs, and soil composition.⁴⁰³ Along with other submissions the Group argued that wind farms posed a danger to resident populations of both birds and bats.⁴⁰⁴ The Cefn Croes Action group argued that the damage to the site was considerable: “the peat has been bulldozed, the water table interfered with, the flora and fauna irrecoverably disturbed”.⁴⁰⁵ It concluded that: “it is not an overstatement to describe Cefn

396 Visit to United States, Annex 1.

397 Visit to the United States, Annex 1.

398 Q 285

399 Q 285

400 Ev 322

401 Ev 277

402 Ev 289

403 Ev 292-4

404 Ev 289

405 Ev 299

Croes as an environmental and ecological disaster”.⁴⁰⁶ C. Rees agreed with the Action Group that the environmental impact on the Cefn Croes site had been severe.⁴⁰⁷

189. All proposals for wind farms have to undertake an environmental assessment and the proposal is considered with that in mind. In addition to that, the planning consents process under both the TAN8 and the Electricity Act includes an obligation for the developer to have regard for the environment. Planning permission for wind farms is also granted for a specific period of time, usually in the range of 25 years. Should a company wish to replace the turbines after that period of time, a new planning application would be necessary.⁴⁰⁸ Should a new application not be submitted the company has an obligation to restore the land to its pre-wind farm condition. The financial cost of this was already undertaken by companies who had an obligation to put money aside either in terms of a bond, a trust or an account.⁴⁰⁹

190. When we took evidence from RWE npower and Falck Renewables they emphasised the importance they placed on reducing the environmental impact to an absolute minimum. Falck Renewables told us that it was alive to the environmental impact of its wind farms on the countryside and had procedures in place to limit any unwanted effects of their wind farms. At Cefn Croes, Falck Renewables had put in place a long term plan to restore the natural habitat of the site which, it argued, had been eroded before the development of the wind farm by commercial forestry and intensive agriculture.⁴¹⁰ That plan would be managed together with the National Assembly, the Forestry Commission, ADAS, Countryside Council for Wales, Royal Society for the Protection of Birds and Ceredigion Council.⁴¹¹ In addition, Falck have instituted an community benefit fund at Cefn Croes. It contributed £58,500 per year to a trust fund to be administered by five trustees of whom four trustees were members of the local community. It was the intention that the main beneficiaries of the fund would be the local communities of Pontarfynach and Blaenrheidol.⁴¹²

191. We also received evidence on the impact of wind on the leisure and tourist industries in the south Wales valleys. That sector has helped to transform a once desecrated landscape into an attractive place to work, relax and play.

192. The benefits of wind farms to the environment at a national level are well publicised. Less obvious is the potential impact of those wind farms to their surrounding habitat. For that reason we acknowledge the work that Falck Renewables is doing to restore the natural habitat at Cefn Croes, and welcome the establishment of the local community fund. Such work is a vital part of ensuring that the environmental impact of wind farms is considered on an equal footing to the economic benefits

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407 Ev 32

408 Q 274

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derived from their development. However, the environmental obligation is neither understood widely nor yet proven.

Conclusions

193. Wind energy has an important role to play in the provision of renewable electricity that is carbon neutral at the point of generation. However, the full extent of that role remains open to question. Rightly or wrongly, there is a vocal lobby in Wales which believe that the benefits of wind energy are far outweighed by what they consider to be the disbenefits of wind energy: damage to the environment, minimal return in terms of electricity and damage to the tourist industry in the areas affected. Furthermore, there is a perception that Wales, as a part of the United Kingdom is being overused in the location of wind farms in order to allow the UK to meet its National target of 10% of renewable energy by 2010.⁴¹³

194. In evidence to us, Dr Constable of the All Wales Energy Group summed up that position. He argued that energy policy appeared “to regard renewable energy resources...in Scotland and Wales for example, as common UK properties to be exploited at will” without any appreciation of tangible benefits to the host region or country.⁴¹⁴ That point was reiterated by John G. Phillips from Llandudno who also noted an apparent inequality. He argued that “it would seem churlish to object to the wind turbines if they were to be installed all round the coast of Britain including such places as Eastbourne and Bournemouth [...] but is this likely?”⁴¹⁵ Similarly Conwy Locals Opposing Unnecessary Turbines (CLOUT) questioned the benefits of the Gwynt y Môr development to Wales because they had not been given “a clear answer as to whether the output total will be awarded to England and Wales”.⁴¹⁶ Again CLOUT believed that the benefits derived from the exploitation of wind in Wales would be realised only in England. That view was summed up by the Cefn Croes Action Group, who questioned the benefits to Wales of supplying electricity from such wind farms to the National Grid.⁴¹⁷

195. Both the UK Government and the Welsh Assembly Government remain committed to relying predominantly on wind energy to meet their current targets for renewable energy generation. Wind energy is beneficial to Wales but that benefit should not be overstated. It is unfair to dismiss all opposition to wind energy as nimbysim, without understanding the valid concerns that Wales is being overly populated by wind farms for what those opponents perceive as marginal benefit, set against the possible threat to leisure and tourist industries. Government at all levels will need to improve upon their communications strategy to explain both the benefits and limitations of wind power.

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196. Government Ministers and other supporters of wind energy must recognise that wind energy cannot be a complete substitute for nuclear power. We reiterate our previous concern that wind energy and nuclear energy continue to be presented as simple alternatives. In reality, it is much more likely that both will exist in any future energy mix for the United Kingdom.

8 Wave and Tidal

Introduction

197. The United Kingdom – and Wales in particular – has the second highest tidal range in the world.⁴¹⁸ Therefore, although marine technologies are one of the newer forms of renewable energy technologies, they offer great potential for Wales and the United Kingdom.

198. Kevin Mowbray of the Welsh Energy Research Centre told us that within 15 years, tidal energy could fulfil 20% of Wales’ energy needs.⁴¹⁹ Wales TUC Cymru concurred that Wales had among the best tidal energy resources in the world,⁴²⁰ while Rod Edwards of Dulas Ltd., asserted that “marine technologies were the ones that had a significant future”.⁴²¹ The Renewable Energy Foundation warned “from a Welsh perspective the failure to ensure that tidal energy projects are brought forward borders on the disastrous”.⁴²² The Foundation added that “Wales has numerous, outstanding, tidal opportunities, both for tidal empoundments (lagoons) and for tidal stream devices. Such systems, if successful, could contribute meaningfully to Welsh energy needs...while at the same time becoming an integral part of the Welsh economy”.⁴²³

199. Dr Ian Masters of the Welsh Energy Research Centre believed that Wales was well placed to exploit its natural resources and to develop marine technologies. Furthermore, the Welsh Assembly Government was engaged with device developers with a good track record in this area, while fabrication, heavy industry and electronics companies were already in existence to create a supply chain for the sector. This in combination with environmental expertise, and the unique opportunities for Wales to use skills from the aero/auto sectors for design innovation, would create lean manufacturing and reduced time to market, thereby making Wales a potential world leader in this field.⁴²⁴ Kevin Mowbray asserted that Wales could sell the technology and make an industry.⁴²⁵

Tidal Energy

200. Tidal energy harnesses tidal streams to produce electricity and works on the same principles as a wind-turbine, in that a rotor spins to generate electricity. While wind drives turbines on a wind farm, a tidal stream turbine uses water. Fast flowing water is found in rivers, estuaries and tidal flows and its energy can be converted by the turbine into electricity. The long-term world market for tidal stream power generation is estimated between £115 and £444 billion. Currently, only 1.5 MWe is in the water with forecast

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419 Q 137

420 Ev 345

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installation of 65 MWe by 2010. The Carbon Trust estimated that the UK tidal market was, providing about 3% of the UK capacity or 2.5GWe.⁴²⁶ Tidal systems are intermittent, but extremely predictable, and their output can therefore be planned into the system with a high level of confidence far into the future, thus maximising utility.⁴²⁷

Forms of Tidal Energy

Tidal Turbines

201. Tidal turbines work, in principle, much like submerged windmills, but driven by flowing water rather than air. The technology is currently under development by two companies, Marine Current Turbines (MCT) and Swanturbines. In 2003, MCT installed the world's first tidal turbine off the coast of north Devon. A second larger tidal current device called "Seagen" is now being developed for installation in Strangford Lough, Northern Ireland. Marine Current Turbines also plan to install a tidal stream device in Welsh waters within the next three years. Their conservative estimate is that Wales has a generation capacity of 150 MW from tidal stream generation that could be connected to the National Grid within 6 years. Marine Current Turbines estimate that the timescale from first construction to operation of a commercial tidal current scheme is 2 years.⁴²⁸

Tidal Lagoons

202. Offshore tidal lagoon power generation utilizes the vast potential of the ocean's tides, and produces predictable and sustainable electricity. Peter Ullman of Tidal Electric told us that around the UK, it would be possible to generate 20TWh of electricity (roughly 8% of current UK electricity consumption) using tidal lagoon technology.⁴²⁹

203. The Environment Trust informed us that the technology was similar to conventional low-head hydroelectric technology, but by using tidal pools built from loose rock and located offshore, potential environmental damage was eliminated. Electricity is generated as the tidal lagoon fills and empties on the ebb and flow of the tide. The hydroelectric generating equipment would be housed in a self-contained offshore impoundment structure built from loose rock. Using such an offshore impoundment structure, water would be impounded at high tide and delivered to turbines at low tide, and then the water is held out at low tide and delivered through the turbines at high tide.⁴³⁰ The optimal site for offshore tidal power generation is the shallow water of near-shore areas, away from major shipping lanes that require deeper water. Turbines are situated in a powerhouse that is contained in the impoundment structure and is always underwater. Power would be transmitted to shore via underground/underwater cables and connected to the Grid. The

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structure needed not be more than a few yards beyond the extreme low tide level and the optimal site was one that was as shallow as possible.⁴³¹

204. While Tidal Electric have identified numerous potential sites in UK waters, two have been chosen as suitable for the construction of the world's first tidal lagoon generation scheme: Swansea Bay and the north Wales coastline, near Kinmel Bay. Both areas have high tidal ranges and relatively shallow waters. Swansea Bay has a capacity of 60 MW and north Wales has a capacity of 432 MW. The estimated capital expenditure cost of constructing the Swansea Bay 60 MW lagoon is £79m, and the capex cost for the north Wales scheme is £375m.

205. Peter Ullman identified several advantages to tidal lagoon schemes. First, given the predictability of the tides, the output of tidal lagoons can be accurately predicted. Furthermore, the lagoon impoundment can also be used as a pump storage facility. It thereby complements other renewable, but more intermittent energy sources, for example wind and wave power, by transforming it in to predictable tidal power. He asserted that “unpredictable power is considerably less valuable both in terms of revenue and usefulness to the grid than is predictable power; so in a way you are helping the wind and wave folks and the grid by pumping in this fashion”.⁴³²

206. Peter Ullman claimed that tidal lagoon technology had further social, economic and environmental benefits, which include protection from further costal erosion and flood defences.⁴³³ Friends of the Earth Cymru supported tidal lagoon technology, and argued that tidal lagoons located in areas of high tidal range around the UK, could generate significant quantities of cost-competitive electricity with a low environmental impact.⁴³⁴

207. Gary Shanahan, Assistant Director, Bioenergy and Marine Renewables, DTI, told us that the DTI agreed that tidal lagoons were “technically feasible in terms of being the application of fairly well understood technologies and would be eligible for support as most renewables are through the renewables obligation”. He added however that “the costs of the energy are prohibitively high”.⁴³⁵

Tidal Barrages

208. The largest tidal barrage is at La Rance, near St Malo in Brittany, France; it is a 240 megawatt unit that was put in service in 1965.⁴³⁶ There have been some difficulties there and there but it has essentially been working for 41 years. There was also another barrage at the Bay of Fundy in Canada; a 16 megawatt unit that was installed in 1982 in order to demonstrate a Swiss turbine.⁴³⁷ Peter Ullman, Chairman, Tidal Electric, told us that “it is a

431 Ev 154

432 Q 626

433 Ev 157

434 Ev 102

435 Q 106

436 Q 622

437 news.bbc.co.uk/1/hi/sci/tech/4524774.stm

familiar power source, but it has never been done in the offshore manner that we are planning on doing”.⁴³⁸

Wave Energy

209. Wave energy is a far newer technology, but also is one that has significant potential. Dr Ian Masters informed us that wave energy had the potential to be as large an industry as tidal, especially given the good wave climate of the west Wales coastline. He welcomed the recent announcement that Wave Dragon intend to deploy a device off Milford Haven as “a very positive step forward”.⁴³⁹ The Renewable Energy Foundation expressed scepticism in regard to wave energy, which resembled wind power by being stochastically intermittent in relation to patterns of demand, nevertheless they stated that they had “an open mind is wise on this matter”.⁴⁴⁰

Wave Dragon

210. Friends of the Earth Cymru informed us that a wave energy device – the Wave Dragon – should be tested off the Pembrokeshire coast in the near future. If successful, the present 7 MW unit would be extended to a 70 MW unit in 2008/2009. They argued that “the Assembly’s Economic Development Minister has welcomed the development. We hope they receive adequate support and note that they could be constructed locally”.⁴⁴¹ Dr Masters told us that “they have funding in place from KP Renewables recently, funding from the European Framework Programme and from WEFO to build their first 7 megawatt device, which is going to be approximately 350 metres long and several thousand tonnes in weight. The issue that WaveDragon has is that there are no planning procedures for a multi-unit wave farm in existence, and they want to be applying for that now rather than waiting for the policy to work out, because they have got the funding and they have got the technology. They are in the early stages of building and deploying off Pembrokeshire”.⁴⁴²

Government Strategy and Approach

211. The DTI has recognised Wales’ significant tidal resources and the potential for marine renewable generation projects. It is committed to “work with the Welsh Assembly Government to help exploit these natural advantages”,⁴⁴³ and in November 2005, the DTI published guidance on uniform consenting arrangements for England and Wales for a pre-commercial demonstration phase for marine renewables. That guidance complements the DTI ‘Wave and Tidal Stream Energy Demonstration Scheme’ which is worth up to £42 million and supports the first large-scale wave and tidal farms. The finance comes from the £50 million ‘Marine Renewables Deployment Fund’. The £8 million balance will be used to

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initiate a programme of work in monitoring and environmental research relating to demonstration devices (up to £2 million), resources, and standards and infrastructure. Elements of the consenting arrangements and the funding scheme complement other activities such as the Research Councils, 'Supergen' Marine Consortium and the European Marine Energy Centre.⁴⁴⁴

212. Although financial support for wave and tidal projects had been offered to developers by the Welsh Assembly Government through the structural funds programme for west Wales and the valleys, the DTI failed to provide any further specific information as to how it was developing its work with the Welsh Assembly Government to promote marine technologies in Wales.⁴⁴⁵ Our witnesses claimed that support for marine technologies from the DTI was both patchy and insufficient. RWE npower told us that that the current marine support mechanism only supported tidal stream and wave, and not tidal lagoon technology.⁴⁴⁶ Malcolm Wicks MP acknowledged that tidal lagoons were technically feasible "being the application of available and well understood technology", but little further support was forthcoming.⁴⁴⁷ Peter Ullman from Tidal Electric confirmed that "no money has been dedicated to tidal lagoons, they have been supported exclusively privately".⁴⁴⁸ He concluded, "we have had no support from the DTI".⁴⁴⁹

213. Given the potential of tidal lagoon technology off the Welsh coast, we urge the Government to expand the scope of its Marine Renewables Deployment Fund to include tidal lagoon technology.

214. The Renewable Energy Foundation stated that "the failure to fully explore and incentivise tidal systems is perhaps the single greatest flaw in current policy viewed from a UK level perspective".⁴⁵⁰ Dr Ian Masters told us that the current support of £50–100m "is probably about 10% of that required if the UK is to retain the lead in this industry".⁴⁵¹ He added that "the UK Government should invest the value of one fossil fuel power station (£500m) over the next five years to build a marine energy industry in the UK".⁴⁵² He expanded on this:

"To say that 500 million is not very much when you consider that 3.2 billion people live within 100 kilometres of the sea, all those people need energy, and a lot of those people do not have energy at the moment. They are moving to industrialisation. There is a huge world demand for energy and for devices to generate energy, and if half the world populations live on the coast, then £500 million to develop an industry to export to that industry is peanuts".⁴⁵³

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446 Ev 49

447 Ev 241

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215. Indeed, Joe Verdi warned us that there needed to be a significant number of devices purchased and installed within the next 5 years or the industry would run out of support from investors. He argued that “the consequence will be investment in other energy technologies where the expertise probably does not reside in Wales or even the UK (e.g. wind, gas, nuclear). A multi-billion pound opportunity will have been lost”.⁴⁵⁴

216. Malcolm Wicks MP acknowledged the need for investment. He described marine renewables as “a technology that has enormous potential that needs encouragement and not just pats on the back; it needs financial support”. He added that “there is a lot of excitement, a lot of interest, huge amounts of skill and technological brilliance. We have just got to try and ensure we will do our very best to help bring these things into the commercial market because obviously it is right that if Britain can become a world leader on marine renewables, that would be the right ambition for us to have. I think at the moment, yes, we have got the Renewables Obligation but also this grant aid and I think we are doing our best”.⁴⁵⁵

217. We are disappointed by the absence of a firm Ministerial commitment to wave and tidal energy in Wales. Furthermore, we are concerned that as a result of the lack of foresight and commitment in the area of marine renewables, Wales is in danger, once again, of losing out on pioneering a major source of clean and renewable energy. We strongly support tidal energy as a renewable energy source that has the potential to make a step change in the generation of clean electricity in the United Kingdom. Furthermore, tidal lagoons also have the potential to play a significant role as sea defences. We look to the Government to make tidal energy schemes a priority in its delivery of clean, renewable energy for the United Kingdom.

Marine Technologies: An All-Wales Strategy ?

218. The Countryside Council for Wales argued that the development of the marine renewables sector in Welsh waters requires a process of strategic planning to give an indication of the most appropriate technologies and potentially suitable locations. Adopting a Wales wide strategic approach would allow adequate consideration of potential cumulative impacts of these technologies.⁴⁵⁶ Furthermore, they suggested the need for co-operation between the WAG, the DTI and the Crown Estate to ensure there is an appropriate consenting policy in place to enable the development of marine renewables in Wales.⁴⁵⁷

219. They also recommended that some form of marine spatial planning exercise be undertaken at an appropriate scale to plan for both offshore wind and wave and tidal whilst taking full account of the needs of other sectoral objectives, including nature conservation. Whilst marine spatial planning should enable strategic decision-making in the marine environment it is critical that any planning exercise takes full account of terrestrial considerations as well. That could improve integration between planning for the

454 Ev 153

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management of the terrestrial and marine environment and thus contributing to Integrated Coastal Zone Management and more joined-up thinking. From a Welsh renewables perspective the outcome of this could be in the form of the equivalent of a TAN 8 for the sea.⁴⁵⁸

220. We agree with the Countryside Council for Wales that an all-Wales Marine Renewables strategy is required. Marine Renewables provide a great opportunity for Wales, both in producing a major source of clean and reliable renewable energy, and in developing an indigenous industry around the design, manufacture and export of the technology. We would therefore encourage the DTI to work closely with the WAG in order to develop this strategy, thus maximising both the potential contribution of this sector to the energy needs of Wales and the UK, and the economic benefits to Wales.

Obstacles to the Future Development of Marine Technologies

Cost and Economies of Scale

221. Kevin Mowbray of the Welsh Energy Research Centre reinforced to us that marine technologies could make a viable contribution to Wales' energy needs. He said, "if you harness all the potential for Wales you could supply 20% of the electrical needs for Wales. Current electrical needs for Wales are 16 terawatts - that is 16×10^{12} . You can supply 20% of that, which is 3% of the UK needs. You are looking at a time line of around 12-15 years to be able to achieve that. The DTI came down with tidal turbines at around 12p/kilowatt. Other wave technologies are up to around 24-40p/kilowatt".⁴⁵⁹

222. Both Marine Current Turbines and Joe Verdi stated that within the next few years, marine current turbines would be competitive with other conventional forms of fossil fuel generation.⁴⁶⁰ The Carbon Trust agreed that that with significant economies of scale, the technology could be cost competitive with fossil fuel generation.⁴⁶¹ Furthermore, Kevin Mowbray from the Welsh Energy Research Centre and Marine Current Turbines both asserted that once into production, economies of scale would significantly reduce the cost of electricity from marine technologies.⁴⁶² Kevin Mowbray said, "at the moment it is very costly but if you can get that technology going it will bring down the price and it can add to the base load and it is a constant supply".⁴⁶³

223. Kevin Mowbray from the Welsh Energy Research Centre admitted to us that devices were both costly and time consuming to develop, and pointed out that this "is the crux we are in with Welsh industry at the moment".⁴⁶⁴ He explained, "most of the industries in this area are small companies and they cannot afford to spend £5 million pounds to drop one piece of kit into the ocean. Speaking to BP, exactly what they said was, 'If you came to us

458 Ev 287

459 Q 152

460 Ev 158 and Q 601

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this year with this amount of risk and asked us to put in £2 million then we would not go for it; we are not interested. If you came to us in five years' time with half the amount of risk but costing £20 million we would invest'. Our developers are stuck. They do not have the money to go forward and develop devices; but they do not have enough production to show to investors, BP and Government to actually put money in".⁴⁶⁵

Preparedness of wave and tidal technology

224. A further obstacle to the development and promotion of marine and tidal technologies appears to be confusion about the stage of development and commercial readiness of the technology. Malcolm Wicks MP voiced his support for marine technology and described it as "an obvious one for these islands".⁴⁶⁶ However, he suggested that "it is pretty early days. We have some very good entrepreneurs in this country developing those. They have not been tested for very long in the water".⁴⁶⁷ Andrew Davies AM, Minister for Enterprise, Innovation and Networks agreed with the Minister and stated that "our best assessment at this time ...is that it would be 10 to 15 years, but clearly if there is a technology which is proven technically and which is also attractive to investors, then possibly it could be before then; but our best judgment is 10 to 15 years".⁴⁶⁸

225. Kevin Mowbray concurred that a realistic timeframe for releasing the full potential of marine technology in Wales would be in the vicinity of 12– 15 years.⁴⁶⁹ However, he also pointed out to us that the technology and engineering is there. He predicted that tidal could be up and running in 18 months, providing supply to the grid; and that various wave technologies are looking at having work on-stream by 2008.⁴⁷⁰ Joe Verdi told us that marine current turbines could be generating electricity by 2009.⁴⁷¹

226. However, the All Wales Energy Group expressed a frustration that in looking towards the longer term, opportunities were being lost. They argued that the "Assembly's programme for marine energy technologies should not focus on further technical investigation but on immediate implementation".⁴⁷² They cited an example that the Welsh Assembly Government's pessimistic approach to the future of wave farms had resulted in a missed opportunity, whereas the South West Regional Development Agency (SWRDA) had set up the Wavehub project on the north coast of Cornwall, which was due to generate electricity as early as this year.⁴⁷³

227. We are concerned about the seeming disparity between the time for marine technologies to be commercially viable according to the investors, and the Government's own perception. We are concerned that this (mis)-understanding is

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468 Q 716

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having a detrimental impact on both the funding and the development of a strategic policy development framework for marine renewables. We seek urgent clarity on these issues in order to ensure that crucial opportunities in developing a renewable and clean energy source and a viable indigenous Welsh industry are not lost.

Two case studies of tidal schemes in Wales

The Severn Barrage

228. First suggested in the late 1970s, but stunted by cost and environmental issues, the prospect of a barrage across the River Severn, harnessing the second largest tidal range in the world, and producing around 5% of the UK's electricity demand was back on the agenda. Gary Shanahan, from the DTI, confirmed that the "8½ gigawatt project is being considered again in the context of the Energy Review".⁴⁷⁴ Professor Bowen welcomed this stating that, "the Severn Barrage is something which should be reconsidered".⁴⁷⁵

229. In its written evidence to us, the Welsh Assembly Government claimed that "there is an exceptional opportunity presented by building the Severn Barrage between Lavernock and Brean Down". They explained that:

"Whilst costing £10 billion plus on current estimates and raising many local but serious environmental issues, the barrage would be equivalent to 2 nuclear power stations operating continuously, lasting not 40/50 years with a problematic legacy but operating for 150 years plus. Throughout its life the barrage would produce zero-carbon electricity on a totally predictable, low-cost and reliable basis, which may have considerable long term financial investment attractions in the present economic climate. Whilst not strictly conserving the existing environmental regime (which in any case will be disturbed by increasing global warming effects) it may have the potential, as has been demonstrated by the tidal barrage at La Rance, to significantly enhance the biodiversity of the Severn Estuary as well as providing further flood defences as the effects of increasing global warming come into play. While the construction of any barrage would require overcoming some very significant European Commission driven environmental legislation constraints, the Welsh Assembly Government and the South West England Regional Assembly now consider it appropriate to re-examine the Severn barrage proposals in depth".⁴⁷⁶

230. However, many of our witnesses expressed concerns about the potential environmental impact of the proposed scheme. The Severn Estuary has been designated as a Site of Special Scientific Interest (SSSI), a Special Protection Area, and a Wetland of International Importance.⁴⁷⁷ The Countryside Council for Wales argued that "it is inevitable that features of European and UK importance would be damaged and/or lost if a

474 Q 103

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scheme like the barrage were to go ahead”.⁴⁷⁸ Friends of the Earth Cymru supported that view and argued against any further consideration of a Severn Barrage.⁴⁷⁹

231. Furthermore, work in 2002 on the Severn Barrage noted that “within the basin formed by the barrage the hyper-tidal nature of the estuary would alter significantly and no measures to “compensate for the loss of this particular feature could be engineered”.⁴⁸⁰ Subsequently, under the Habitats Directive it would be necessary to compensate for such losses”.⁴⁸¹ Andrew Davies AM acknowledged that the Severn estuary had a very high level of European designation. He stated that “it is a special area of conservation; and we are very mindful of that”.⁴⁸² Dr Loveland agreed that derogations from EU regulations would have to be obtained before it could be taken forward.⁴⁸³

232. However, Andrew Davies AM concluded by asserting that “the energy situation in terms of the costs and supply of fossil fuels, as well as the almost universal acceptance that global warming is happening” had changed the context of the debate and “any downsides in terms of environmental impact may well be a price worth paying in terms of energy production and environmental protection”.⁴⁸⁴

233. Malcolm Wicks MP concluded that “as ever, these things are controversial, but I am interested in it because 5% [of the UK’s energy supply] is a very considerable proportion in terms of what we are about, but I think I need to be a bit cautious at this stage”.⁴⁸⁵ However, Malcolm Wicks MP also acknowledged the need for “boldness about both energy supply and climate change”. He said, “to hit our targets does not involve a series of very cautious steps, it needs some major step changes in terms of how we use and stop abusing energy and in terms of the investments we need to make”.⁴⁸⁶

234. We acknowledge the concerns with regard to the environmental impact of the proposed Severn barrage scheme. However, we are in the unique position of being able to harness the second largest tidal range in the world in order to provide the long term supply of clean renewable energy and we recommend that the scheme be considered very seriously.

235. We agreed with the Minister that tough decisions need to be taken to secure the UK’s future energy supply and to tackle climate change. We urge the Minister to make the ‘step change’ he claims is necessary, and to be bold when considering the Severn Barrage scheme.

478 Ev 287

479 Ev 103

480 ‘The Severn Barrage- Definition Study for a New Appraisal of the Project’- January 2002, ETSU Report No. T/09/00212/00/REP.

481 Ev 288

482 Q 719

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486 Q 908

Swansea Tidal Lagoon Project

236. Tidal Electric have proposed to build a 48 MW (installed capacity) tidal lagoon scheme, with an average output of 23 MW in Swansea Bay.⁴⁸⁷ The installation concept envisaged an impounded area of some five kilometres square, in a water depth of 1–5 metres at mean low tide, with 24 bi-directional turbines each of 2.5 MW capacity.⁴⁸⁸ The Swansea Bay proposal has been assessed by independent engineering consultants, W.S. Atkins, who regarded it as financially viable at 3.4p/kWh per unit generated.⁴⁸⁹ The Environment Trust told us that the lagoon would save up to 194,332 tonnes of carbon emissions per year, which over the 50 year life of the plant amounts to an impressive 3,886,641 tonnes of carbon.⁴⁹⁰

237. However, Malcolm Wicks MP told us that while the Swansea lagoon project “is one of those ideas that seems sound”, he declared that “independent assessments that have been commissioned by both my Department and the Welsh Assembly suggest the economics of lagoon schemes are not favourable”.⁴⁹¹

238. Peter Southgate from the All Wales Energy Group, told us that while initially the DTI had come to the conclusion that the Swansea scheme was going to be very expensive, they had based that view on a much smaller scheme that had been costed by Tidal Electric in Alaska. He said “it was a totally different scheme. It was far, far smaller and the tidal range was relatively tiny. In short, it had nothing to do with Swansea”.⁴⁹² He continued:

“The main problem – and we were deeply disturbed by this – is that the DTI had used technical expertise which apparently was based on the design of a barrage for the Severn estuary; and therefore they were thinking that the specification for such a barrage would be very similar, to the specification of the embankments around a tidal lagoon. The international firm of engineers that designed the tidal lagoon, W.S. Atkins, put the DTI right in a meeting, which I believe was held on May 20th last year, or perhaps May 18th. As a result of W.S. Atkins’s explanation of the scheme, the DTI apparently agreed that they had been operating under a misapprehension and withdrew their technical objections. That is my understanding of what happened”.⁴⁹³

This has had serious ramifications for the development of the tidal lagoon scheme. Peter Southgate commented that “of course, it has done incredible damage to investor confidence. You can imagine somebody wanting to put money into this project and getting all these reports that (a) it is going to be too expensive, and (b) it does not work - it was just

487 Ev 102

488 Ev 362

489 Ev 103

490 Ev 362

491 Q 901

492 Q 694

493 Q 694

appalling”.⁴⁹⁴ However, despite this, Friends of the Earth Cymru confirmed that the DTI had removed their objections to the Tidal Electric’s planning application.⁴⁹⁵

239. Regardless of merits and economic viability of the Swansea Bay tidal lagoon scheme, we have concerns about the DTI’s handling of the scheme and the damaging effect that this has had on investor confidence and potential commercial development. We are pleased that the DTI has now withdrawn its technical objections to the scheme, but the errors made by the DTI officials have undermined and delayed a highly promising project. We recommend that the DTI takes urgent steps to address the damage it has caused, and to set out clearly its strategy for re-building investor confidence in this scheme.

494 Q 694

495 Ev 103

9 Biomass

Background

240. Biomass comprises any organic material that can be converted into energy including waste materials and refuse, forest residues, agricultural wastes and specifically grown crops. Biomass can be used directly through combustion for heat energy or converted into other forms including gas, electricity and hydrogen.⁴⁹⁶ The Biomass Task force defined biomass in its widest sense literally, any biological mass derived from plant or animal matter. This includes material from forests, crop-derived biomass including timber crops, short rotation forestry, straw, chicken litter and waste material. Planning and Policy Statement 22 defines biomass as “the biodegradable fraction of products, wastes and residues from agricultural (including plant and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste”.⁴⁹⁷

241. At the moment, 4% of the EU’s energy is produced from biomass. However, Dr Valentine described biomass as “the sleeping giant of renewables”.⁴⁹⁸ Indeed, the EU Action Plan states that energy production from biomass could be doubled by 2010. Currently, the United Kingdom lags behind the rest of Europe in the burning of biomass, (excluding energy from waste), which contributes about 1.5% of the UK’s electricity and about 1% of its heat.⁴⁹⁹

242. The Country Land and Business Association and the National Farmers Union estimate conservatively that 25–30% of agricultural land could be used for biomass production by 2020 (approx. five million hectares). This amount of land would be able to produce nearly 200TWh electricity, which is more than 50% of current energy consumption in the UK.⁵⁰⁰

UK Government Strategy

243. Gary Shanahan, Assistant Director, Bioenergy and Marine Renewables, DTI, told us that the Government had committed £66 million towards capital grants for biomass projects two years ago and he highlighted the Combined Heath and Power Plant project in Port Talbot as a beneficiary of that scheme. He added that the Government was considering what further support might be required in light of the report from the Biomass Taskforce.⁵⁰¹ That strategy will be launched in January 2007.⁵⁰²

244. The DTI calculated that biomass has the potential to supply around 6% of electricity demand by 2020 and the UK Government is supporting the bio-energy industry with a

496 www.walesbiomass.org/bio-biomass.htm

497 www.defra.gov.uk/farm/acu/energy/biomass-taskforce/btf-finalreport.pdf

498 Q 378

499 Energy White Paper: Our energy future – creating a low carbon economy, DTI, February 2003, CM 5761

500 Guide to UK renewable energy companies 2003, (2003), James & James (Science Publishers), London.

501 Q 91

502 Ev 241

package of measures to help establish the crops, develop supply chains and create markets. That included working with farmers and industry to develop markets and promote uptake of bioenergy from purpose-grown energy crops, forestry and other sources such as biodegradable waste.⁵⁰³

Welsh Assembly Government Policy on Biomass

245. The Report from the Biomass Taskforce was produced in an England context, because its remit covered matters that are devolved in Wales. However, the principles of the report are applicable to Wales.⁵⁰⁴ The Welsh Assembly Government actively supports biomass and that position is reflected its Energy Route Map, which set out plans to publish a biomass energy strategy for Wales with relevant targets by mid 2006.⁵⁰⁵ Andrew Davies AM told us that the Strategy would take a holistic view of potential biomass developments, taking into account the findings of the recent Gill and Carbon Trust reviews and the existence of the relevant world class expertise at the Institute of Grasslands and Environmental Research (IGER) at Aberystwyth.⁵⁰⁶

246. We look forward to the publication of the Government’s UK-wide Strategy for Biomass, and how that strategy will take forward the conclusions and recommendations of the Biomass Task Force. We also welcome the Welsh Assembly Government’s intention to publish a Biomass Strategy for Wales, and seek clarification from the DTI on how the Welsh Biomass strategy will feed in to the UK Biomass strategy.

Biomass in Wales

247. The All Wales Energy Group placed biomass, along with hydro-electric and tidal schemes, as the most consistent and reliable power supplies of all the renewables.⁵⁰⁷ The Renewable Energy Foundation claimed that the potential in Wales for biomass energy was considerable, and promised “truly sustainable benefits”.⁵⁰⁸ Dr Constable asserted that biomass could offer “real opportunities to generate energy locally, provide affordable heat, reduce consumption of hydrocarbons, and also provide an incentive for sustainable forestry”.⁵⁰⁹

248. The Environment Centre noted that Wales had the potential to provide enough biomass fuel sources to generate over half of the renewable energy targets set by the Welsh Assembly Government. However the Centre believed that, in practice a figure in the region of a quarter of the target was more plausible.⁵¹⁰

503 Ev 5

504 Ev 286

505 www.wales.gov.uk/subitradeindustry/content/consultations/ewrm-map-e.pdf

506 Ev194-6

507 Ev 178

508 Ev 184

509 Q 687

510 www.environmentcentre.org.uk/Projects/abstracts/Biomass_Power_Generation.htm

Energy Crops in Wales

249. Biomass or energy crops are purpose grown crops for the production of biomass material for renewable energy generation. There is a wide range of crops that can be grown as an energy crop; the only requirements being that the crop produce biomass within a short time-frame, and that that it is suitable for conversion into energy, for example low moisture content. The most frequently grown energy crops in the UK include fast growing woody species such as willow and poplar and grasses such as Miscanthus and Reed Canary grass.⁵¹¹

250. There is considerable potential for the growth of energy crops in Wales. Kevin Mowbray of the Welsh Energy Research Centre informed us that Wales consumed about 9.5 million tonnes of oil equivalent. He added that “if you take the biomass, then open land for cultivation is around 700,000 hectares. If you used 10% of that for cultivation of energy crops, you will actually get round about 0.35 million tonnes of oil equivalent in energy crops. That is 30% of the 10% (WAG renewable target) towards 2010”.⁵¹²

251. Despite the potential for energy crops in Wales, no specific energy crop scheme has been developed as the Welsh the Assembly Government has focused its resources on “expanding demand for energy crops rather than risk oversupply of a fledgling market”.⁵¹³ That said, the Welsh Assembly Government has supported the development of a Welsh-based energy crop trial through ‘Willows for Wales’.

252. The ‘Willows for Wales’ project is funded by the European Regional Development Fund.⁵¹⁴ It is co-ordinated by the Institute for Grassland and Environmental Research and also involves Cardiff University, the Forestry Commission, EGNI, Mid-Wales Energy Agency, RWE npower, Renewable Energy Ltd., SW Seed Ltd., and Agrobransle. The objective is to evaluate and demonstrate the potential of short rotation coppice willow as a biomass crop in Wales. The consortium represents interests and knowledge of the crop and its marketing into energy generation systems. An important aspect of the project was that it engaged farmers as partners in establishing crop test sites and as potential commercial producers. Growing Willow for energy will not affect the Single Farm Payment as long as the grower has a contract with an energy user.⁵¹⁵

253. We welcome the investment that has been put in to research projects such as the Willows for Wales scheme. We look to the Government to provide a strategic framework in which energy crops in Wales can become a commercial reality.

511 www.walesbiomass.org/bio-biomass.htm

512 Q 133

513 Ev 5

514 www.iger.bbsrc.ac.uk/willow

515 www.iger.bbsrc.ac.uk/willow

Wood Fuel

254. Dulas Ltd. told us that of all the renewable energy technologies, wood fuel biomass was the one that could “bring the highest level of local and regional economic benefit” to Wales.⁵¹⁶ Rod Edwards, the Director of Dulas Ltd., explained that “the wealth generated from the processing and supply of fuel remained within the local economy, rather than leaking out. Moreover, fuel supply offered the prospect of additional income streams for the indigenous forestry contracting industry in Wales”.⁵¹⁷

255. The All Wales Energy Group identified significant potential for developing wood fuel in Wales.⁵¹⁸ Forestry in Wales covers about 14% of the land area, just under 290,000 Hectares. About 195,000 Hectares of that was conifer, and the Mid Wales Energy Agency believed that if converted into wood chips or pellets, it would be sufficient to heat anywhere between 10.3% and 19.6% of the entire housing stock in Wales.⁵¹⁹

256. However, Malcolm Harrison, Business Development Director for Express Power, pointed out that compared with the rest of Europe, “we are pretty well down the league table”.⁵²⁰ In terms of primary energy developed from wood, in 2004 France generated just over 9% of its primary energy, followed by Sweden at just over 8%, Finland at 7%, Germany at 6%, Spain at 4% and Poland at just about 4%. However, the UK generated only 1.2% of its primary energy from wood.⁵²¹ While Malcolm Harrison acknowledged that this could be to do with the wood resource in those countries, he argued that equally it could be down to the different regimes that encourage biomass in those countries.⁵²²

257. There is a great potential for wood fuel in Wales to contribute to energy generation, local wealth generation, and the maintenance of the forestry industry in Wales. We urge both the DTI and WAG to develop a biomass strategy that would maximise that potential.

Biomass for Electricity

258. While the Biomass Taskforce report makes reference to biomass for electricity schemes in both England and Scotland, there are no major biomass electricity plants in Wales. Our witnesses identified several issues as to why the biomass for electricity sector in Wales was under-developed. Rod Edwards from Dulas Ltd., told us, that because of the capital costs of plants and the cost of fuel, it was difficult to generate electricity that could compete. However, he believed that the situation was changing, and the market price for

⁵¹⁶ Ev 38

⁵¹⁷ Ev 38

⁵¹⁸ Ev 178

⁵¹⁹ Ev 178

⁵²⁰ Q 346

⁵²¹ Q 437

⁵²² Q 346

electricity was increasing, hence making biomass more attractive”, and was of the view that it could play a part in electricity generation in the future.⁵²³

Biomass for Heat

259. Although biomass electricity generation is very much in its infancy, biomass for heat was quickly becoming a reality. Rod Edwards from Dulas Ltd. explained that until recently using biomass for district heating had not really been viable because of the relatively low cost of oil and gas. However, the increase in those fuels would make the biomass industry reassess the viability of district heat networks. He described it as “the biggest breakthrough”,⁵²⁴ in biomass and asserted that within Dulas’ biomass business there was a “huge increase” in interest in biomass heating technology.⁵²⁵

260. The Countryside Council for Wales told us that in Wales, the best solution for biomass for heat was to concentrate on smaller scale installations, such as schools or institutions, and small scale local heating and energy generation. The Council highlighted the example of Coed Cymru who have developed a small scale wood pelleting process which supports the development of such initiatives, allowing pellets to be produced locally.⁵²⁶

261. Friends of the Earth Cymru highlighted a second example. In 2000, the Pembrokeshire Energy Agency installed a wood pellet heater at its office based at the West Wales Eco Centre in Newport, Pembrokeshire. A partnership, involving the Agency, the Eco Centre, the County Council, the National Park Authority, a consultant and a local school, was established to promote the fuel. As a result, Ysgol Preseli, Crymych Leisure Centre and the newly refurbished offices of the Pembrokeshire Coast National Park Authority at Pembroke Dock were now heated by wood pellets rather than oil.⁵²⁷ Furthermore the Llanwddyn project installed heating boilers at a school and community centre. The system is fuelled by forest residue wood-chip and provides heat, through district heating to over 30 of the local houses as well as to the school and community centre.⁵²⁸ More recently Western Bioenergy have proposed a 13.8 MW wood-burning biomass power plant in Port Talbot, south Wales, currently going through the planning stages with advice from Sustainable Energy Ltd., Cardiff.

262. Probably the most public example of biomass for heat is the new Senedd Building in Cardiff Bay, which is heated through a 360kW wood-chip or pellet burning boiler.⁵²⁹

263. While Rod Edwards emphasised the fact that the Welsh Assembly Government was fully behind the prospect of using particularly biomass for heat production, he hoped that incentives and requirements would be included in biomass strategies at both the UK and

523 Q 205

524 Q 206

525 Q 207

526 Ev 286

527 Ev 102

528 This project was a joint initiative between Powys (now Mid-Wales) Energy Agency), Forest Enterprise, Dulas, Severn Trent Water and many other parties including a leading role by the local community.

529 www.wales.gov.uk/assemblybuilding/development/index.htm

Welsh level. He said that he understood that “it is under consideration on a UK-wide basis in which case I sincerely hope the Welsh Assembly will reflect that policy because I think it will give an added driver to the renewable heat market which is a very important market”.⁵³⁰

264. We welcome the use of biomass for heat production, and welcome the schemes and initiatives that have proved the success of this technology to date. However, we agree with our witnesses that the UK and Welsh Assembly Governments should formalise their support for biomass for heat by providing incentives for renewable heat generation, and that in any revision of the Renewable Obligation Certificates, biomass for heat should be included, but the impact on other industries competing for the same feedstock should be considered.

The Future of Biomass in Wales

265. Dr John Valentine identified several reasons why biomass was not currently making a greater contribution to Wales’ renewable energy portfolio. They included “the ignorance of the potential, perceived as complex or high risk, a lack of policy clarity and a fragmented approach within government. There was too much emphasis on electricity and not heat and a lack of robust supply chains”.⁵³¹ The Countryside Council for Wales added that lack of confidence appeared to be a major barrier to uptake.⁵³² Dr Valentine concluded that confidence inducing measures and setting targets were essential to kick-start the biomass industry.⁵³³

266. Despite those concerns, Dr Valentine was optimistic about the potential future for biomass in Wales and stated that “there is a realisation that there is a limit to wind and now it is biomass’ turn as it were”.⁵³⁴ He asserted that biomass was more profitable than it had been and that economies of scale and local supply had the potential to further improve that situation.⁵³⁵

267. In conclusion, Dr Valentine recommended the need for a one-stop-shop biomass advice centre for Wales. He noted that “there is a lot of information on biomass spread over a wide range of expertise and no one person knows it all. That information has to be got over. Rather like the Organic Centre Wales, it could be a virtual or it could be real centre and it could also provide the voice to the Assembly”.⁵³⁶ The Countryside Council for Wales supported this, and recommended the expansion and dissemination of best environmental practice guides, for example, for Miscanthus and other energy crops.⁵³⁷

530 Q 182

531 Q 384

532 Ev 286

533 Q 389

534 Q 386

535 Q 394

536 Q 396

537 Ev 286

268. We acknowledge the steps required to promote and secure the future of biomass energy in Wales. We urge the DTI to include these steps in its UK Biomass Strategy, and we recommend that funding be made available to establish a one-stop shop biomass advice centre for Wales at the earliest opportunity.

10 Solar Energy and Photovoltaics

Introduction

269. Solar energy involves capturing and harnessing the sun's energy. There are three main ways of doing this:

- *Passive solar design* ensures that a building's form and fabric captures the sun's energy and reduces the need for artificial light and heating. For example, south facing windows that make sure that excess heat loss is avoided and solar radiation is captured.
- *Active solar water heating* converts solar radiation into heat, which can be used directly or stored; The heat is primarily used for heating water in domestic dwellings, industrial facilities and commercial buildings.
- *Solar photovoltaic (PV) panels* or solar cells convert daylight into electricity. There are a number of PV technologies, including polycrystalline, monocrystalline and thin-film. Solar PV cells can be arranged in panels on a building's roof or walls, and can often directly feed electricity into the building.⁵³⁸

Current use of Photovoltaics

270. Photovoltaics is a growth industry worldwide and one that the National Renewable Energy Laboratory identified as expanding by over 50% per year.⁵³⁹ The Welsh Opto-Electronics Forum (WOF) set out in evidence to us the current distribution of photovoltaic installations world wide. It demonstrated that Germany was currently the world's leading photovoltaic adopter and had the largest share of the global market (with 39%). Along with Japan and the United States it accounted for over three-quarters of the market at the present time.⁵⁴⁰ By contrast, the United Kingdom accounted for less than 5% of the 8% European share,⁵⁴¹ while having similar irradiation levels as Germany.⁵⁴²

271. The Department of Trade and Industry told us that photovoltaic technology had an important contribution to make in reducing carbon emissions at the micro-generation level. It explained to us that the Government had provided funds of £431 million from 2002–06 to expand on that technology and that just over 100 projects in Wales had been offered funding. That view reflected the approach set out in the Energy White Paper which stated that solar photovoltaics represented one of two renewable technologies⁵⁴³ “as areas in which increased investment was particularly likely to lead to step-change breakthroughs”.⁵⁴⁴ That view was reinforced by Andrew Davies AM.⁵⁴⁵ The Welsh

538 www.dti.gov.uk/energy/sources/renewables/renewables-explained/solar-energy/page16366.html

539 Visit to the United States, Annex 1.

540 Ev 375

541 Ev 375

542 Visit to the United States, Annex 1.

543 The other technology is wave power.

544 Energy White Paper 2003, page 46, para 4.15

Assembly Government identified solar photovoltaic systems as having the potential to make “an enormous impact” on renewable energy generation.⁵⁴⁶ Dulas Ltd. expressed fears that if the new DTI low carbon building programme only gave grants to larger community schemes, it would have a detrimental impact on the domestic PV market and the businesses in Wales that supply this market.⁵⁴⁷

272. Malcolm Wicks MP highlighted photovoltaics as a very important renewable technology that had the backing of the UK Government. He acknowledged the fact that the costs associated with photovoltaics was an obstacle to its commercial use but argued that while the science was not in an infant stage it was “struggling to young adulthood”.⁵⁴⁸ Dr Constable from the All Wales Energy Group agreed that photovoltaics were capital intensive and that the economics were not conducive to its exploitation at the present time; but remained positive about its future contribution to renewable energy.⁵⁴⁹

Photovoltaics in Wales

273. Although the United Kingdom is starting from a small base, Wales already has a significant level of expertise in photovoltaics. We received evidence from the Welsh Opto-Electronics Forum (WOF) Photovoltaic Group,⁵⁵⁰ which was formed in recognition of the unique opportunities currently existing for the Photovoltaics (PV) industry to establish a strong base in Wales. It argued that photovoltaics was “a rapidly growing technology industry” and that Wales currently benefited from “the high quality of current Welsh expertise in a large number of major supply chain links”.⁵⁵¹

274. Wrexham is home to Sharp’s principal photovoltaic production site for Europe.⁵⁵² Wales also is developing centres of expertise at Bangor University and the Optic Technium in north Wales, both of which we visited during the course of this inquiry.⁵⁵³ Furthermore, Dulas Ltd. has significant experience in the installation and monitoring of solar photovoltaic systems including installations at Bronllys Hospital and Powys County Hall.⁵⁵⁴

275. While the potential domestic market in Wales was relatively small, the quality and range of expertise and the existing industrial supply base offered an excellent opportunity for its development as a key centre in the worldwide photovoltaic market.⁵⁵⁵ The WOF assert that the PV research capability in Wales was “broadly-based and well-integrated, with particular strengths in fundamental thin-films and materials (Bangor) as well as

545 Q 705

546 Ev 196

547 Ev 39

548 Q 836

549 Q 684

550 Members of the Group include industrial manufacturers and installers, university researchers and Government representatives at both Welsh Assembly and Local Authority level.

551 Ev 373

552 Ev 6

553 Visit to Mid and North Wales, Annex 2.

554 Ev 39-40

555 Ev 375

power electronics (Swansea), energy efficient building design (Cardiff) and hydrogen energy research (Glamorgan)”⁵⁵⁶ Malcolm Wicks MP also acknowledged that Wales had expertise in photovoltaics and believed that it could expand as a result of the “£50 million that the Chancellor gave for micro-generation projects”⁵⁵⁷

276. Photovoltaics is an emerging technology that has the potential to have a significant impact on renewable energy production in the future. We welcome the Government’s acknowledgement that Wales has expertise in photovoltaics, and that Government funds have been allocated to further research in that area. However, it is unclear how much of that funding is being directed to Welsh Centres of Excellence such as Bangor University. We recommend that the Department of Trade and Industry sets out clearly what proportion of the Chancellor’s funding in this area has been directed to Wales, and what support his Department can offer Welsh centres of excellence to build on their valuable research in photovoltaics. We also recommend that the DTI continue to support domestic photovoltaic installations through its low carbon buildings programme.

556 Ev 375

557 Q 838

11 Geothermal Energy

Introduction

277. Geothermal energy works on the same principles as a nuclear power station, with the earth's core playing the part of the nuclear reactor. The energy source in both cases produced steam from which electricity was generated. There are four types of geothermal resources that could be used for energy:

- Hydrothermal – using hot water and steam
- Geo-pressured – using hot water under extreme pressure (which was saturated with natural gas)
- Hot dry rock as an energy source; and
- Magma.

278. To generate electricity temperatures in excess of 120 degrees Celsius were necessary. However, temperatures of above 40 degrees Celsius, could be used to generate geothermal energy which could be used for heating services.⁵⁵⁸ Two types of technology can be utilised to exploit geothermal energy:

— *Deep bore*: energy from far down in the earth's crust as could be done at Southampton and Paris (this is geothermal proper).

— *Shallow ground or water extraction*: extracting the latent heat from the earth or lakes and rivers. Generally, for Wales, it would be second type, shallow ground of water extraction, that is best suited.⁵⁵⁹

The Potential for Geothermal in Wales

279. When we visited the National Renewable Energy Laboratory in Denver, we were given an excellent briefing from the Manager of the Laboratory's Geothermal Programme. That briefing included an appraisal of the potential for geothermal energy in Wales. He explained that Wales had "old geology" and therefore the rock was too cool for electricity production. However, that did not exclude heat generation. Certainly, digging to a level of only a couple of metres would offer heat exchange which could be used to heat single dwellings, a business or even a large grouping of houses. As an illustration of the extent of that use we were also told that 18 cities in the United States now derived their heat from such energy.⁵⁶⁰ Furthermore, we were told that disused coal mines provided excellent potential for warm water reservoirs for geothermal heat, which if pumped, could service a large number of houses.⁵⁶¹

⁵⁵⁸ Visit to the United States, Annex 1.

⁵⁵⁹ Ev 179

⁵⁶⁰ Visit to the United States, Annex 1.

⁵⁶¹ Visit to the United States, Annex 1.

280. The Department for Trade and Industry told us that geothermal energy was an energy source under consideration but it was of the view that cost remained a significant barrier to its exploitation.⁵⁶² Furthermore, the DTI highlighted research undertaken in the 1980s that concluded that there were also significant technical obstacles to pursuing geothermal energy in the UK.⁵⁶³

Geothermal Heating

281. In respect to Wales, the Welsh Assembly Government has been considering the feasibility of using disused mines in Wales but again, there were “significant technical and economic difficulties in terms of that resource that made it unsuitable” at the present time.⁵⁶⁴ That said, Professor Phil Bowen from the Welsh Energy Research Centre believed that geothermal energy was an area that could be exploited. However, it was stressed that there were other areas in the UK that were better suited than Wales.⁵⁶⁵

282. Friends of the Earth Cymru, agreed with the general assessment that Wales did not have “hot rocks which could be used to generate electricity as seen in, for example, New Zealand and Iceland”.⁵⁶⁶ However, it argued that there were many areas in Wales which could benefit from geothermal energy for the provision heating, both for dwellings and commercial buildings.⁵⁶⁷ The Renewable Energy Foundation also conclude that the potential for geothermal energy in the UK, and in Wales remained unclear.⁵⁶⁸ However, both organisations were of the view that geothermal energy merited research.⁵⁶⁹

283. The All Wales Energy Group highlighted existing examples of geothermal energy being harnessed for heat generation: the Royal Festival Hall – which used the latent heat of the Thames – and the Headquarters of the Cooperative Wholesale Society in Manchester – where heat would be taken from the local canal. The All Wales Energy Group acknowledged that it was expensive to install, but as a heat source it was “very efficient, has long-life plant, and could be used with other micro-generation techniques to great effect”.⁵⁷⁰ Campbell Dunford, the Chief Executive of the Renewable Energy Foundation, and a member of the All Wales Energy Group argued that there was a great potential for ground-source heat in Wales and the UK, and considered it to be “a much quicker win”. Although he was of the view that there were very few economic sources for deep drilling in the UK mainland, it had not been discounted.⁵⁷¹

562 Q 97

563 Ev 6

564 Q 99

565 Q 139

566 Ev 201

567 Ev 102

568 Ev184

569 Ev 184

570 Ev 179

571 Q 688

284. The potential for generating electricity from geothermal energy in Wales remains open to question, for both technical and economic reasons. However, geothermal energy offers great potential for heat generation. Disused mines in Wales represent ready-made reservoirs for this. While they would not generate electricity, heating homes would significantly reduce the use of electricity to heat homes. That would reduce demand for electricity in Wales and represent a further move towards renewable energy. We recommend that the Government focuses on the use of geothermal heat as an achievable win in addressing Welsh energy needs.

12 Hydro Electric Power

Hydropower

285. Hydropower is currently the world's largest renewable source of electricity, accounting for 6% of worldwide energy supply or about 15% of the world's electricity.⁵⁷² At present in Wales some 1,700 MW of electricity is generated by hydroelectric power. Friends of the Earth Cymru highlighted the long tradition of hydropower in Wales. The total installed capacity of hydropower schemes is 160 MW, schemes which vary from medium sized grid connected schemes to domestic schemes,⁵⁷³ the largest being the 50 MW Cwm Rheidol scheme ⁵⁷⁴ an interconnected group of reservoirs, dams, pipelines, aqueducts and power stations .⁵⁷⁵

Pumped Storage

286. Wales currently has two Pumped Storage hydroelectric power stations, Ffestiniog and Dinorwig, both of which are located in north Wales.

287. Commissioned in 1963, Ffestiniog power station was the United Kingdom's first major pumped storage power facility. Ffestiniog's four generating units achieve a combined output of 360 MW of electricity, enough to supply the entire power needs of north Wales for several hours. The generation cycle begins at Llyn Stwlan - Ffestiniog's upper reservoir. Large screens inside the intake towers are opened to activate the high-pressure down flow. Twenty seven cubic metres of water per second are then discharged through two high-pressure shafts (each 200 metres in depth), which are connected to four concrete-lined tunnels. Steel penstocks then direct the discharge into the station via inlet pipes and valves to start generation. Water is captured in Tan-y-Grisiau and pumped back to Llyn Stwlan, usually overnight, to complete the cycle.⁵⁷⁶

288. Opened in 1984, Dinorwig power station in Llanberis, north Wales is the largest scheme of its kind in Europe. It is comprised of 16km of underground tunnels, deep below Elidir mountain. The station's six powerful generating units stand in Europe's largest man-made cavern. Adjacent to this lies the main inlet valve chamber housing the plant that regulates the flow of water through the turbines. Dinorwig's reversible pump/turbines are capable of reaching maximum generation in less than 16 seconds. Using off-peak electricity the six units are reversed as pumps to transport water from the lower reservoir, back to Machlyn Mawr.⁵⁷⁷

572 Ev 245

573 Ev 103

574 Ev 269

575 www.aberystwyth-online.co.uk/powergen_hydro_electric_scheme.shtml

576 Visit to Mid and North Wales, Annex 2 and www.fhc.co.uk/ffestiniog.htm

577 www.fhc.co.uk/dinorwig.htm

289. In its original submission the DTI set out its position on hydropower:

“Currently, of the renewable energy supplied across the United Kingdom, in 2003 roughly 30% came from hydropower. However, opportunities to deploy this technology within the UK are now becoming more limited, not only because most of the economically attractive sites for schemes have already been exploited but also environmental concerns are limiting the further development of this technology”.⁵⁷⁸

290. Our inquiry confirmed that view. There was a general consensus that opportunities for large-scale hydro-electric power were largely exhausted in Wales.⁵⁷⁹ Rod Edwards from Dulas Ltd. stated that there were very few schemes of greater than one megawatt available in Wales which were “technologically possible to engineer and environmentally acceptable”.⁵⁸⁰ Gary Shanahan from the DTI concluded that most people were “fairly clear that there are limited opportunities for large scale hydroelectric development in the UK”.⁵⁸¹

291. We recognise the role of hydro-electricity as a major contributor to the Welsh renewable energy portfolio. We also acknowledge the role of the pump storage facility, which we saw on our visit to Ffestiniog, which particularly complements other intermittent renewable energy sources.

Small-Scale Hydro

292. However, we also found that there was a more positive future for the development of small scale hydro-electric schemes in Wales. RWE npower impressed on us that new small hydro should not be neglected as a valuable additional source of renewable electricity. While it emphasised that the potential for hydro development in Wales was modest, RWE npower asserted that hydro-electric generation could provide an important element of diversity in Wales’ renewable energy portfolio. Furthermore RWE npower emphasised the longevity of hydro-schemes, which it argued could be “practically indefinite if...appropriately maintained”.⁵⁸²

293. It is estimated that the further potential for hydro development in Wales could be in the region of around 100 MW. On that basis, RWE npower suggested that an additional 20 MW of hydro capacity in Wales would be feasible by 2010. Most of that capacity was likely to be relatively small run-off river schemes which would not involve large impoundments.⁵⁸³ Given that potential, RWE npower argued that a target should be set to encourage the development of small scale hydro. Rod Edwards also added that the “almost unquantifiable” small, domestic, single on-farm hydro schemes in the ten to 100 kilowatt range could also make a contribution.⁵⁸⁴

578 Ev 6

579 Ev 185

580 Q 209

581 Q 109

582 Ev 49

583 Ev 49

584 Q 209

294. The DTI Clear Skies programme provides grants for very small scale hydro. Gary Shanahan confirmed that the DTI's Clear Skies Programme had supported an estimated 90 micro hydro sites in the UK.⁵⁸⁵ He also stated that further potential grant aid was available under Objective 1 to support local landowners in the construction of hydro schemes with quite a large capital subsidy. He claimed that there was evidence that this was "kick starting that market".⁵⁸⁶

295. The Countryside Council for Wales cited a small-scale hydro electric turbine at Talybont-on-Usk, as an example of good practice the development of small scale hydropower. The scheme will produce an annual energy output in the region of 240 MWh valued at around £17,000. The electricity generated will be sold under the Renewables Obligation to a public electricity supplier via the National Grid. It will be managed by and for local people, and has the potential to be a model for small-scale renewable energy generation.⁵⁸⁷

296. We recognise the potential contribution of small-scale hydro power in Wales, and we agree with RWE npower that a target should be set to promote and encourage development in this area. We further acknowledge the potential role for small-scale hydro in both community and microgeneration schemes, undervalued by the Government. We recommend that the DTI work with the National Assembly for Wales to develop an all Wales small-scale hydro strategy to maximise the development of this form of renewable energy.

297. Furthermore, we recommend that the Welsh Assembly Government and the UK Government provide appropriate grant support to Local Authorities for micro generation projects in public and private housing, and transport and links such initiatives into city and regional energy conservations schemes similar to those developed by the green cities alliance in the US and piloted by the Centre for Alternative Technology.

585 Q 109

586 Q 210

587 Ev 288

Conclusions and recommendations

UK Carbon Trading Scheme

1. Whilst acknowledging that Welsh renewable energy schemes may make a valuable contribution to UK carbon reduction targets, we consider that this could be further enhanced and developed should an internal carbon trading scheme be developed in the UK. The Government endorses the principle of a carbon trading scheme and participates in such a scheme at the EU level. We see no reason why a similar incentive structure would not be successful at a national level within the UK. (Paragraph 16)
2. We are unconvinced by the Department of Trade and Industry's assertion that carbon data cannot be collated below the UK level, and recommend that the Government develop procedures to monitor emissions data at the national level (Wales, Scotland and England) or below, within the UK. (Paragraph 17)

Renewable Obligation Certificates

3. Although the Renewable Obligation Certificates are a UK wide mechanism, they have played a significant role in stimulating the development of wind farms across Wales. There is however, an increasing concern that ROCs have skewed the market in favour of wind farms to the detriment of other renewable energy sources. Wales has an abundance of natural resources that can make a significant contribution to the UK's clean energy needs. We recommend that the Renewable Obligation Certificates be refined to ensure that they stimulate renewable energy sources in a more balanced way, so that the wave, tidal, biomass and photovoltaic resources, and other renewable resources, are able develop and play their full part in providing clean renewable energy in Wales. (Paragraph 26)

Tripartite Group on Energy Consents

4. There is a clear impression that the work of the Tripartite Group on Energy Consents has been left to wither on the vine. The DTI as the decision-maker on this issue has to take an active and more purposeful lead. Whatever the outcome, a decision on where the powers on consents lie, needs to be taken very soon. We recommend that the UK Energy Minister give a clear statement on the current status of the Tripartite Group and set out in his response to this Report, a detailed timeframe for the conclusion of the Group's work, including dates by which the Group will report to Ministers and when any decision will be made. (Paragraph 34)

Government Funding for Research

5. While we welcome the provision of that funding, a more detail assessment of the spread and level of UK Government funding for energy research in Wales would be welcome. (Paragraph 35)

6. We recommend that the DTI fully appraise itself of the valuable work being undertaken at the Centre for Alternative Technology. (Paragraph 38)

Tallow

7. We welcome the clarification given by the UK Energy Minister that power stations are permitted to co-fire with tallow. (Paragraph 53)

Clean Coal Technology

8. We welcome the investment into the development of clean coal technologies in Wales, in particular at Tower Colliery and Aberthaw power station. We are concerned that apparent differences of approach between Ofgem and the DTI on the use of biomass is frustrating further development in this area. We recommend that the Government investigate this matter and update the Committee in its response to this report. (Paragraph 55)
9. We are disappointed at the low levels of DTI funding into the research and development of clean coal technologies. We are concerned that the Government's lack of foresight is compromising Wales' potential to be a world leader in clean coal technologies, and is frustrating the potential to revive a rich and experienced indigenous coal industry in Wales. Furthermore, we endorse the Science and Technology Committee's view that the piecemeal allocation of funding suggests a worrying lack of strategic vision in Government decision making, in contrast to the clear vision and commitment to coal given by the United States Government. (Paragraph 65)
10. We share our witnesses' frustration at the Government's laissez-faire approach to the development of clean coal technology in Wales. Wales has considerable indigenous supplies of coal, which, if accessed through clean coal technology could provide a major indigenous clean and secure energy source. Urgent action is required now to ensure the future of clean coal in Wales and we look to the Government to provide that leadership. (Paragraph 68)
11. The Department of Trade and Industry needs to prove, through a more urgent and pro-active approach, that clean coal technologies have a major role to play in the United Kingdom's future energy mix. (Paragraph 69)

Coal in Wales

12. The inability of the Department of Trade and Industry to present a consistent position on the economics of indigenous coal does not fill us with confidence in the Government's ability to make key strategic decisions about the future of the coal industry in Wales. It is disappointing that the UK Energy Minister's emphasis on security of supply and the reliance on coal, much of it imported, for 50% of our electricity generation during the cold winter 2005–06 has not led to a greater appreciation of the potential of indigenous coal. The Government's attitude to the coal mining industry in Wales is at best apathetic, and at worst dismissive. The

Energy Review will need to demonstrate a far greater commitment to the indigenous Welsh coal industry in order for us to revise our view. (Paragraph 76)

13. We acknowledge the undisputed success of Tower Colliery. It is very rare that upon closure, a colliery has exhausted all of its accessible reserves, and it is to the credit of this cooperative enterprise that Tower Colliery has proved such a success. (Paragraph 78)
14. We also recognise the value of Coal Investment Aid, and its success in providing an initial boost to both Tower Colliery and Aberpergwm, both commercially successful mines. We urge the Government to provide similar aid in the future, where a sufficient economic case has been made. The Government should lead by example in promoting investor confidence in this important industry. (Paragraph 79)
15. The future of the Welsh coal industry is dependant upon clear policy, funding and planning frameworks. We welcome the Welsh Assembly Government's timely publication of a Coal Planning Technical Advisory Note. However, assistance and guidance will also need to be given by the UK Government in the form of a UK wide strategic plan for the future of coal. We recommend that the Government provide appropriate resources for a detailed exploration and assessment of the UK's coal reserves. (Paragraph 83)
16. Wales currently has a cadre of excellent specialised mining skills that have well served the UK coal industry. But if deep coal mining in Wales is not supported there is a danger that those key skills would be lost forever. The Government needs to take urgent action to address this issue, and we expect the Energy Review to specifically recognise and nurture that expert skill base in Wales. (Paragraph 85)

Nuclear Power in Wales

17. Wylfa nuclear power station plays a vital role in the Welsh economy, both as a major electricity generator, and as the supplier of energy for Anglesey Aluminium, a significant employer on Anglesey. The proposed closure date of 2010 presents Wales with significant power generation issues. With only four years left before Wylfa is due to close, it appears unlikely that an alternative Welsh electricity source will be found. The removal of Wylfa will have significant effects on electricity generation in Wales both in general, and specifically for Anglesey Aluminium. We urge the Department of Trade and Industry to explore all alternative sources of electricity supply for Anglesey Aluminium. (Paragraph 105)
18. However, in the absence of any credible alternative, an extension of Wylfa nuclear power station is not only the most pragmatic solution, it is vital to the economic well-being of Anglesey. We understand that a decision on the extension of Wylfa will be made shortly and we fully support the proposal for an extension. The Energy Minister has a responsibility to take a lead on this issue. We look to the UK Energy Minister to act with a greater resolve than he showed to this Committee and act for the interests of Anglesey and Wales. (Paragraph 106)
19. The threat of an accident or terrorist attack is one that resonates deeply when the public considers nuclear power. We do not try to explain the complexities of the

threats or of the safety of nuclear power here. Rather we have set out the two sides of the argument. When the Government makes its decision it should do so on the basis of clear evidence on the perceived and actual risks that may be posed by new build nuclear power stations. That evidence should be the basis for the wider debate in the country and we look to the Government to ensure the highest level of accessibility to the threat assessments of nuclear power. (Paragraph 116)

20. Should there be a new generation of nuclear power stations, there is a strong argument in favour of those power stations being located on existing nuclear power sites. Anglesey already has the necessary infrastructure and skill base to service any future nuclear build. There is also an established understanding of nuclear power between the local community and the nuclear industry, through the experience of Wylfa nuclear power station. Should the UK Government decide in favour of new nuclear build, Anglesey would represent an obvious location for any new build in Wales. (Paragraph 120)
21. We look to Government to ensure that there is an open and mature debate on nuclear power in Wales and in the UK, and that it is conducted to the benefit of Wales and the Welsh people, within the wider UK context. (Paragraph 124)

Liquefied Natural Gas in Wales

22. We welcome the contribution of the new South Hook and Dragon LNG facilities near Milford Haven, and their potential contribution to a diversified and secure gas supply in Wales and the UK. Furthermore, we recognise the positive economic impact of these projects for west Wales, and the fact that they represent another example of Wales providing a lead in the provision of energy for the UK. (Paragraph 135)

Wind Energy in Wales

23. TAN8 identifies seven strategic areas in Wales where there is a presumption in favour of wind farm developments, while Section 36 of the Electricity Act does not allow for objections to the provision of energy consents. When these two procedures are combined, they leave little—if any—opportunity for local residents in Wales to mount a defence against applications for large wind farms in their locality. Not only is this deeply frustrating, it also undermines the democratic accountability that underpins decision-making in this policy area. We recommend that the Government review this position as a matter of urgency in order to give fair access to the decision-making process for individuals affected by large-scale wind farms in Wales. (Paragraph 150)
24. The consents process for Rhyl Flats serves as a timely reminder of how quickly public confidence can be undermined. While the UK Energy Minister agrees on the need for accuracy in statutory notices, he has refused to acknowledge the fact that in this case a proposal was inaccurately named after one maritime feature while being located on another, adjacent maritime feature. That was a mistake and it was misleading. While we accept that the true coordinates were contained within the consultation documents, local residents would have not felt it necessary to delve that

deep into a document that implied that the proposal would be built away from their immediate area. (Paragraph 158)

25. The Government has a duty to ensure accuracy and confidence in the planning and consents systems. It has not done so on this occasion. Furthermore, it is not acceptable to explain away the fact by arguing that it is “difficult to define the boundaries of this or any other sea bed feature precisely as they change with time”. If wind energy is to be further exploited in Wales, it is incumbent on the DTI, as the commissioner of large projects, to take a far deeper interest in the accuracy and probity of the consultation process. To not do so is to disregard the need to support the views of the local population. We look to the UK Energy Minister to acknowledge the shortcomings of the consultation process on this occasion and set out clear unambiguous guidelines for the accurate description of wind farm locations for the future. (Paragraph 159)
26. Wind energy is often portrayed as a renewable panacea for our energy needs. Whilst it does have an important contribution to make, there remains a worrying difference between the expectation of wind power and its actual output. With the significant expansion of wind farms in Wales, the Welsh public is entitled to be given an objective assessment of its contribution to electricity supply in Wales. The Digest of UK Energy Statistics may provide the raw data on wind energy but it is not sufficient to inform the public on the true contribution made by wind. The UK Government has to play a more intelligent role in setting out the true case for wind energy at both a regional and a national level. (Paragraph 178)
27. The benefits of wind farms to the environment at a national level are well publicised. Less obvious is the potential impact of those wind farms to their surrounding habitat. For that reason we acknowledge the work that Falck Renewables is doing to restore the natural habitat at Cefn Croes, and welcome the establishment of the local community fund. Such work is a vital part of ensuring that the environmental impact of wind farms is considered on an equal footing to the economic benefits derived from their development. However, the environmental obligation is neither understood widely nor yet proven. (Paragraph 192)
28. Both the UK Government and the Welsh Assembly Government remain committed to relying predominantly on wind energy to meet their current targets for renewable energy generation. Wind energy is beneficial to Wales but that benefit should not be overstated. It is unfair to dismiss all opposition to wind energy as nimbysim, without understanding the valid concerns that Wales is being overly populated by wind farms for what those opponents perceive as marginal benefit, set against the possible threat to leisure and tourist industries. Government at all levels will need to improve upon their communications strategy to explain both the benefits and limitations of wind power. (Paragraph 195)
29. Government Ministers and other supporters of wind energy must recognise that wind energy cannot be a complete substitute for nuclear power. We reiterate our previous concern that wind energy and nuclear energy continue to be presented as simple alternatives. In reality, it is much more likely that both will exist in any future energy mix for the United Kingdom. (Paragraph 196)

Wave and Tidal Energy in Wales

30. Given the potential of tidal lagoon technology off the Welsh coast, we urge the Government to expand the scope of its Marine Renewables Deployment Fund to include tidal lagoon technology. (Paragraph 213)
31. We are disappointed by the absence of a firm Ministerial commitment to wave and tidal energy in Wales. Furthermore, we are concerned that as a result of the lack of foresight and commitment in the area of marine renewables, Wales is in danger, once again, of losing out on pioneering a major source of clean and renewable energy. We strongly support tidal energy as a renewable energy source that has the potential to make a step change in the generation of clean electricity in the United Kingdom. Furthermore, tidal lagoons also have the potential to play a significant role as sea defences. We look to the Government to make tidal energy schemes a priority in its delivery of clean, renewable energy for the United Kingdom. (Paragraph 217)
32. We agree with the Countryside Council for Wales that an all-Wales Marine Renewables strategy is required. Marine Renewables provide a great opportunity for Wales, both in producing a major source of clean and reliable renewable energy, and in developing an indigenous industry around the design, manufacture and export of the technology. We would therefore encourage the DTI to work closely with the WAG in order to develop this strategy, thus maximising both the potential contribution of this sector to the energy needs of Wales and the UK, and the economic benefits to Wales. (Paragraph 220)
33. We are concerned about the seeming disparity between the time for marine technologies to be commercially viable according to the investors, and the Government's own perception. We are concerned that this (mis)-understanding is having a detrimental impact on both the funding and the development of a strategic policy development framework for marine renewables. We seek urgent clarity on these issues in order to ensure that crucial opportunities in developing a renewable and clean energy source and a viable indigenous Welsh industry are not lost. (Paragraph 227)
34. We acknowledge the concerns with regard to the environmental impact of the proposed Severn barrage scheme. However, we are in the unique position of being able to harness the second largest tidal range in the world in order to provide the long term supply of clean renewable energy and we recommend that the scheme be considered very seriously. (Paragraph 234)
35. We agreed with the Minister that tough decisions need to be taken to secure the UK's future energy supply and to tackle climate change. We urge the Minister to make the 'step change' he claims is necessary, and to be bold when considering the Severn Barrage scheme. (Paragraph 235)
36. Regardless of merits and economic viability of the Swansea Bay tidal lagoon scheme, we have concerns about the DTI's handling of the scheme and the damaging effect that this has had on investor confidence and potential commercial development. We are pleased that the DTI has now withdrawn its technical objections to the scheme, but the errors made by the DTI officials have undermined and delayed a highly

promising project. We recommend that the DTI takes urgent steps to address the damage it has caused, and to set out clearly its strategy for re-building investor confidence in this scheme. (Paragraph 239)

Biomass in Wales

37. We look forward to the publication of the Government's UK-wide Strategy for Biomass, and how that strategy will take forward the conclusions and recommendations of the Biomass Task Force. We also welcome the Welsh Assembly Government's intention to publish a Biomass Strategy for Wales, and seek clarification from the DTI on how the Welsh Biomass strategy will feed in to the UK Biomass strategy. (Paragraph 246)
38. We welcome the investment that has been put in to research projects such as the Willows for Wales scheme. We look to the Government to provide a strategic framework in which energy crops in Wales can become a commercial reality. (Paragraph 253)
39. There is a great potential for wood fuel in Wales to contribute to energy generation, local wealth generation, and the maintenance of the forestry industry in Wales. We urge both the DTI and WAG to develop a biomass strategy that would maximise that potential. (Paragraph 257)
40. We welcome the use of biomass for heat production, and welcome the schemes and initiatives that have proved the success of this technology to date. However, we agree with our witnesses that the UK and Welsh Assembly Governments should formalise their support for biomass for heat by providing incentives for renewable heat generation, and that in any revision of the Renewable Obligation Certificates, biomass for heat should be included, but the impact on other industries competing for the same feedstock should be considered. (Paragraph 264)
41. We acknowledge the steps required to promote and secure the future of biomass energy in Wales. We urge the DTI to include these steps in its UK Biomass Strategy, and we recommend that funding be made available to establish a one-stop shop biomass advice centre for Wales at the earliest opportunity. (Paragraph 268)

Solar Energy and Photovoltaics in Wales

42. Photovoltaics is an emerging technology that has the potential to have a significant impact on renewable energy production in the future. We welcome the Government's acknowledgement that Wales has expertise in photovoltaics, and that Government funds have been allocated to further research in that area. However, it is unclear how much of that funding is being directed to Welsh Centres of Excellence such as Bangor University. We recommend that the Department of Trade and Industry sets out clearly what proportion of the Chancellor's funding in this area has been directed to Wales, and what support his Department can offer Welsh centres of excellence to build on their valuable research in photovoltaics. We also recommend that the DTI continue to support domestic photovoltaic installations through its low carbon buildings programme. (Paragraph 276)

Geothermal Energy in Wales

43. The potential for generating electricity from geothermal energy in Wales remains open to question, for both technical and economic reasons. However, geothermal energy offers great potential for heat generation. Disused mines in Wales represent ready-made reservoirs for this. While they would not generate electricity, heating homes would significantly reduce the use of electricity to heat homes. That would reduce demand for electricity in Wales and represent a further move towards renewable energy. We recommend that the Government focuses on the use of geothermal heat as an achievable win in addressing Welsh energy needs. (Paragraph 284)

Hydro Power in Wales

44. We recognise the role of hydro-electricity as a major contributor to the Welsh renewable energy portfolio. We also acknowledge the role of the pump storage facility, which we saw on our visit to Ffestiniog, which particularly complements other intermittent renewable energy sources. (Paragraph 291)
45. We recognise the potential contribution of small-scale hydro power in Wales, and we agree with RWE npower that a target should be set to promote and encourage development in this area. We further acknowledge the potential role for small-scale hydro in both community and microgeneration schemes, undervalued by the Government. We recommend that the DTI work with the National Assembly for Wales to develop an all Wales small-scale hydro strategy to maximise the development of this form of renewable energy. (Paragraph 296)
46. Furthermore, we recommend that the Welsh Assembly Government and the UK Government provide appropriate grant support to Local Authorities for micro generation projects in public and private housing, and transport and links such initiatives into city and regional energy conservations schemes similar to those developed by the green cities alliance in the US and piloted by the Centre for Alternative Technology. (Paragraph 297)

Formal Minutes

Thursday 6 July 2006 AM

Members present:

Dr Hywel Francis, in the Chair

Mr Stephen Crabb
Nia Griffith
Mrs Siân James
Mr David Jones

Albert Owen
Hywel Williams
Mark Williams

The Committee deliberated.

[Adjourned till this day at Two o'clock.

Thursday 6 July 2006 PM

Members present:

Dr Hywel Francis, in the Chair

Mr Stephen Crabb
Mr David Jones
Albert Owen

Hywel Williams
Mark Williams

The Committee deliberated.

[Adjourned till Tuesday 11 July at half past Ten o'clock.

Tuesday 11 July 2006

Members present:

Dr Hywel Francis, in the Chair

Mr Stephen Crabb
David T.C. Davies
Nia Griffith
Jessica Morden

Mrs Siân James
Mr Martyn Jones
Mark Williams

Draft Report (Energy in Wales), proposed by the Chairman, brought up and read.

Ordered, That the Chairman's draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 297 read and agreed to.

Resolved, That the Report be the Third Report of the Committee to the House.

Ordered, That the Chairman do make the Report to the House.

Ordered, That the provisions of Standing Order No.134 (Select committees (reports)) be applied to the Report

Several Papers were ordered to be appended to the Minutes of Evidence.

Ordered, That the Appendices to the Minutes of Evidence taken before the Committee be reported to the House.

[Adjourned till Thursday 13 July at half past Ten o'clock.]

Annexes

Annex 1

Visit to the United States of America Monday 6 March to Thursday 9 March 2006

OUTLINE PROGRAMME

Monday 6 March

DENVER

- am Visit to the National Renewable Energy Laboratory
 Briefing from the National Wind Technology Center
 Briefing from the Solar Energy Research Facility
 Briefing from the Geothermal Energy Facility
- Working lunch with the President and Director of the Colorado School
 of Mines
- pm Visit to the Colorado School on Mines
 Briefings on Clean Coal Technology, mining technology and the
 current and future state of coal mining in the United States

Tuesday 7 March

- am Meeting with Mayor of Denver
 Meeting with Governor of Denver
- pm Transfer from Denver to Chicago

Wednesday 8 March

CHICAGO

- am Visit to Exelon
 Briefings on the nuclear power industry and new nuclear
 technology
 Working lunch at Exelon
- pm Briefings from the Illinois Office of Coal Development, and the Illinois
 Clean Coal Institute on the coal mining industry in Wales, clean coal
 technology and carbon capture and storage
- Visit to Illinois Center for briefings on biomass technology

Thursday 9 March

- am Briefing from the Welsh Development Agency and Wales Trade
 International
- Visit to the Argonne National Laboratory
 Briefings on nuclear power, nuclear waste management and
 emerging technologies
- pm Transfer from Chicago to London

Annex 2

**Visit to the North and Mid Wales
Monday 24 April to Tuesday 25 April 06**

OUTLINE PROGRAMME

Monday 24 April

am Visit to Cefn Croes Onshore Wind Farm

Visit to Centre for Alternative Technology

Briefings on the Centre for Alternative Technology, climate change,
carbon emissions and energy issues in Wales

Tour of the Centre

Working lunch with the Development Director of the Centre

pm Visit to Ffestiniog Power Station

Briefings on the power station and hydroelectric power

Tour of the site

Tuesday 25 April

am Visit to Wylfa Power Station

Briefings on nuclear power generation, the decommissioning of Wylfa
power station, future design of nuclear power stations and the Nuclear
Decommissioning Authority's Socio Economic Plan and Socio Economic
Impact Study

Tour of the site

Visit to Bangor University

Briefings on the importance of Photovoltaic solar energy in Wales

pm Discussions with local campaigners against wind farms

Visit to Technium OpTIC

Briefings on renewable energy

Tour of the site

**Visit to South Wales
Monday 8 May 06**

OUTLINE PROGRAMME

Monday 8 May

- am Visit to Tower Colliery
 Tour of the site
 Briefing on the Mines Rescue Service
 Briefing from representatives of University of Glamorgan on
 Anaerobic Digestion for the Treatment of Organic Wastes and
 the Production of Renewable Energy
 Briefing from representatives from Cardiff University on Clean
 Coal Utilisation and Related Work at Cardiff University with
 Prospects for the Future
 Briefing from representatives of Tower Colliery and the National
 Union of Miners (NUM)
- pm Oral Evidence Session at the National Assembly for Wales from All
 Wales Energy Group and the Minister for Enterprise, Innovation and
 Networks, Welsh Assembly Government
- Visit to Aberthaw Power Station
 Briefings on the power station, planned investments, coal strategy
 and the use of biofuels
 Tour of the site

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Dr John Valentine, Institute of Grassland and Environment Research (IGER)	Ev 87
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Wayne Thomas, Area Secretary, National Union of Miners (NUM), Phil White, Marketing Director and Tyrone O'Sullivan, Chairman, Tower Colliery Ltd	Ev 129
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Andrew Davies AM, Minister for Enterprise, Innovation and Networks and
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Wednesday 17 May 2006

John Burley, General Manager, Dragon LNG Ev 209

Richard Waite and **Dr Brian Burnett**, Nuclear Decommissioning Authority Ev 215

Tuesday 13 June 2006

Malcolm Wicks MP, Minister of State for Energy, **David Wagstaff**, **Clare Harding**, Department of Trade and Industry, **John Williams**, Wales Office Ev 222

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39	Mynydd Llansadwrn Action Group	Ev 288
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42	Kevin Dibble, First Hydro	Ev 301
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46	Janet C Moseley	Ev 309
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50	Community of Llanfynydd Against Wind-Power Stations (CLAWS)	Ev 319
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55	Graham Paterson, Head of Policy, Institution of Electrical Engineers (IEE)	Ev 336
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60	Wales TUC Cymru	Ev 343
61	Francis John Golden	Ev 345
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67	CBI Cymru/Wales and Wales TUC Cymru	Ev 354
68	Councillor K J G Toy, The Conservative Group, Conwy County Borough Council	Ev 356
69	John Hopkinson	Ev 356

70	Conwy Locals Opposing Unnecessary Turbines (CLOUT)	Ev 358
71	T J Priestman	Ev 359
72	Russ Sheaf	Ev 360
73	John G. Phillips	Ev 360
74	The Environment Trust	Ev 361
75	Lyn James Jenkins, Director of Ceredigion Leisure	Ev 363
76	Jonathan Lincoln, Sustainable Energy Alliance (SEA)	Ev 366
77	Glyncorrwg Action Group	Ev 366
78	WWF Cymru	Ev 370
79	Dr Tim Stowe, Director, RSPB Cymru	Ev 371
80	Dr Carl Iwan Clowes	Ev 371
81	Welsh OPTO-Electronics Forum Photovoltaics Group	Ev 373
82	G M Ball, Protecting and Conserving Together (PACT)	Ev 376

List of unprinted written evidence

Additional papers have been received from the following and have been reported to the House but to save printing costs they have not been printed and copies have been placed in the House of Commons library where they may be inspected by members. Other copies are in the Record Office, House of Lords and are available to the public for inspection. Requests for inspection should be addressed to the Record Office, House of Lords, London SW1. (Tel 020 7219 3074) hours of inspection are from 9:30am to 5:00pm on Mondays to Fridays.

Submissions on Wind Farms

Jonathan Kearsley-Wooller
 Gordan MacDonah
 J.A. Goodwin
 David T Williams
 Dawn Edwards
 Professor Peter Cobbold
 Branwen Davies
 Mrs E Howell
 Mrs Jean Pulling
 Mr and Mrs Rigby
 Colin and Deborah Thompson
 Mrs Michele Oldbury
 J.W.Edge
 June and David Whitehead
 S.R. Hull
 Trevor McGuinness
 B.R. Barker and P. Hohmann-Barker
 Professor B. Mills
 Robert and Lynda Colwell
 Sandra Williams
 Grant Downs

Mrs June M. Flint
Geoffrey Flint
Mark Robinson
Samantha Robinson
Alice Robinson
Charlotte Robinson
Mrs Elaine Pritchard
N. Whiteman
V.C. Whiteman
Mrs R.J. and Mr G.P. Davies
Mrs Sheila Malpass
Elizabeth A. Smyth,
N. Gildart
Stewart Williams
Mrs C Lewis
Debra Spencer
John G. Phillips
F Malem
Jennifer Sly-Benbow
Philip Vallance
Cllr Paul Marfleet, Denbighshire County Council
Eileen Sillitoe
David Haskell
I M and E Haigh
Molly Lear
Naomi Klenerman
Janet Haworth, Save our Scenery
Gary Bick

Other submissions

Welsh Energy Research Centre
Kevin Mowbray, Head of Secretariat, Welsh Energy Research Centre
All Wales Energy Group
David Bellamy
Prof Dennis Hawkes
Jack Harris
Neil S Thomas
Richard Buxton
Ivor Russell,
WWF Cymru
Friends of the Earth Cymru
Tidal Electric
Gillian Walker
Ken Sawyer, Neath Port Talbot Council

Reports from the Welsh Affairs Committee since 2005

The following reports have been produced by the Committee in the 2005 Parliament

Session 2005-06

First Report	Government White Paper: Better Governance for Wales	HC 551
Second Report	Proposed Restructuring of the Police Forces in Wales	HC 751
First Special Report	Manufacturing and Trade in Wales and The Public Services Ombudsman in Wales Bill [HL]: Government Responses to the Second and Third Reports of Session 2004-05	HC 433
Second Special Report	Police Service, Crime and Anti-Social Behaviour in Wales: Government Response to the Committee's Fourth Report of Session 2004-05	HC 514
Third Special Report	Government White Paper: Better Governance for Wales: Government Response to the Committee's First Report of Session 2005-06	HC 839
Fourth Special Report	Proposed Restructuring of the Police Forces in Wales: Government Responses to the Second Report of 2005-06	HC 1431