National Assembly for Wales
Sustainability Committee

Carbon Reduction from Energy Production

4th report of the Sustainability Committee's Inquiry into Carbon Reduction in Wales

May 2009

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Chair's Introduction

We are lucky in that we have one of the largest renewable energy resources of any country in Europe: we are blessed with a large amount of wind, marine, wave and hydro resources, as well as huge amounts of biomass potential.

David Hood, Consultant and Engineer, Centre for Alternative Technology

If we go for our indigenous renewable resource for Wales with real vigour and commitment, it will be there every year, in perpetuity. I can see that as being the best investment for Wales. For jobs and manufacturing, if we can get that working back down the supply chain for research and academia, we could be talking about a massive Welsh renewable programme on the scale of an Apollo programme.

Paul Allen, Development Director, Centre for Alternative Technology

Energy is at the heart of everything we do. We cannot live our lives without it whether it be for lighting, heating and cooking in our homes, powering the machines and gadgets we use in our work or producing heat and power for making the products we use every day like steel or paper.

Yet traditional ways of producing energy by using fuel such as coal, gas and oil, gives us the biggest single source of carbon emissions. These emissions are now widely acknowledged as making a large contribution to climate change which will inevitably impact on the lives of everyone on the planet.

So what do we do about the fact that something we need to live our lives is contributing to such devastating effects on the environment in which we live? Some people say that we must radically change the way we live and that our current lifestyle is totally unsustainable. Many of the people who have given us evidence for our inquiry, however, have argued that, with small changes in our lifestyles, such as making our homes more energy efficient, using energy saving devices in the work place, cleaning up our industrial processes and using renewable ways of generating our energy, we will need to produce far less fossil fuel based energy than we do at the moment.

I believe that these changes, coupled with the use of new technologies for fossil fuel energy generation and the rapid expansion of the renewable energy sector will mean that a low carbon energy sector does not mean us living in cold, dark houses or having to give up our technologically advanced ways of working. Instead, it should lead us, as policy makers, employers and individuals to be aware of the choices we have when producing and using energy and the ability to make those choices based on what is best not only for our immediate needs but also for the long term future.

I would like to thank all those who have given us written and oral evidence for sharing their knowledge and expertise with us and for their openness and frankness in expressing their views to us.

This report will form part of our final report which will be published in the spring of 2009. We have also published an introductory document which is designed to be read as an introduction to any of the topic reports that we produce on carbon reduction in Wales and contains our terms of reference and the policy background to carbon reduction. The introduction document can be found on our website at:

http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third-assem/bus-committees-third-sc-home/inquiries/inquiries_-_carbon_reduction_household.htm

We welcome your thoughts and comments on this report, which can be sent to us at: Sustainability.comm@Wales.gsi.gov.uk or write to us at:

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We would like to publish some of your ideas and views on our website so that other people can read them.

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Chapter 1 – Introduction

Carbon reduction from energy production

1. Introduction

Energy generation - the production of electricity, heat and fuels to provide services such as lighting and transport – is one of the biggest sources of carbon dioxide (CO_2) emissions in Wales. Achieving large reductions in Welsh CO_2 emissions requires increased energy efficiency measures and a shift towards generating electricity using methods that emit lower levels, such as renewables.

Policies at the EU, UK and Welsh levels have been formulated with the aim of reducing carbon emissions: a key European target is that 20 per cent of all energies are to be supplied by renewables by 2020[1]; within this the target for the UK is 15 percent by 2020. At the UK level, the target is for 10 per cent of all UK energies to be supplied by renewables by 2010. The headline target in Wales is the annual production of 4 Terawatt hours (TWh) of renewable electricity by 2010, rising to 7 TWh in 2020[2].

2. CO_2 Emissions from energy

Electricity generation contributed around 33.7 per cent of the total Welsh carbon dioxide emissions in 2005, which is slightly higher than the UK proportion of 31.1 per cent. Emissions from electricity generation in Wales increased by 24.8 per cent compared with a fall of 15.6 per cent in UK emissions over the period 1990 to 2005[3].

Wales is a net exporter of electricity, i.e. it produces more than it uses. In 2005 Wales exported 13 per cent of its electricity to England. This fell to 11.1 per cent in 2006[4]. The majority of generation capacity is in North Wales. There are no electricity grid transmission links between North and South Wales at the moment, energy is mainly exported from North Wales whilst South Wales is a net importer of electricity.

In 2006, 7.5 per cent of electricity generated was lost[5] through transmission, distribution and theft. In 2005, this rate was 8 per cent, 19 per cent of which

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[1] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: 20 by 2020: Europe's climate change opportunity, 23* January 2008, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0030:FIN:EN:PDF

[2] Welsh Assembly Government *Planning Policy Wales ,Technical Advice Note 8: Planning for renewable energy* 2005, p.5, http://new.wales.gov.uk/desh/publications/planning/technicaladvicenotes/tan8/tan8main1e.pdf?lang=en

[3] AEA Technology, *Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2005*, August 2007, p14 http://www.airquality.co.uk/archive/reports/cat07/0709180907_DA_GHGI_report_2005.pdf

[4] DBERR, *Energy trends December 2007*, p. 18, http://www.berr.gov.uk/files/file43304.pdf

[5] DBERR *Energy Trends Marc 2008* p.16 http://www.berr.gov.uk/files/file45397.pdf

was lost through high voltage transmission systems, 76 per cent through distribution and 5 per cent through theft and meter fraud[6].

One of the factors influencing Wales' high per capita emissions is the existence of carbon-intensive electricity generators. According to 2006 data for installations captured under the EU Emissions Trading Scheme (EUETS)[7] Aberthaw and Connah's Quay power stations accounted for 42 per cent of the emissions by the top eleven participants of the scheme in Wales. Overall, electricity generation accounted for 56 per cent of the emissions by these top eleven participants.

Table 1: Top 11 CO_2 Emitters in the EUETS in Wales

		CO2 Emissions (tonnes)	
Installation Name	Installation Type	2005	2006
Aberthaw Power Station	Electricity generation	5,264,973	7,340,340
Port Talbot Steelworks	Industry	6,132,851	6,589,194
Connnahs Quay Power Station	Electricity generation	3,434,321	3,158,476
Chevron Limited - Pembroke	Industry	2,320,641	2,251,765
Total Milford Haven Refinery	Industry	1,038,345	1,234,371
Baglan Bay Power Station	Electricity generation	1,104,318	1,142,501
Uskmouth Power Station	Electricity generation	993,930	866,926
Deeside Power Station	Electricity generation	978,825	640,379
Padeswood Works	Industry	300,016	623,006
Shotton Combined Heat and Power Station	Electricity generation	542,497	485,252
Barry Combined Heat and Power Station	Electricity generation	321,303	237,008
Totals		22,432,020	24,569,218

Source: Environment Agency Wales

3. The Welsh Energy Mix

The current energy mix in Wales consists primarily of fossil fuel and nuclear powered centralised generating stations. In 2006, 34,914 GWh of electricity were produced in Wales, compared with 398,326 GWh for the UK overall[8].

[6] DBERR, *Digest of United Kingdom energy statistics 2006*, http://www.dtistats.net/energystats/dukes06_c5.pdf
[7] The EU ETS captures the largest carbon dioxide emitters in Wales. A total of 61 installations in Wales are members of the EUETS.
[8] DBERR, *Energy trends December 2007*, p. 19, http://www.berr.gov.uk/files/file43304.pdf

According to a report prepared for DEFRA, the Welsh Assembly Government, the Scottish Executive and the Northern Ireland Department of the Environment by AEA Technology in 2007[9]:

> There is now only one nuclear power station in Wales whilst there has been a growth of Combined Cycle Gas Turbines stations (CCGTs) partly to replace the generating capacity from Trawsfynydd Nuclear Station, which closed in 1991. The increase in generation capacity in Wales comes from the opening of a 500 MW CCGT at Deeside in 1994, a 1,420 MW CCGT at Connahs Quay in 1996, a 250 MW CCGT at Barry in 1998, and a 575 MW CCGT at Baglan Bay in 2002. The remaining fossil fuel generation is from two conventional coal stations. One power station (oil-fired) at Pembroke has closed. The coal-fired station at Uskmouth closed and subsequently reopened as Fifoots after being upgraded and fitted with Flue Gas Desulphurisation. Aberthaw is the other conventional coal station.

Table 2: Percentage shares of electricity generation in Wales as at end 2006[10]

Generation method	Percentage share
Gas	40.3
Coal	25.8
Nuclear	20.1
Pumped Storage	7.6
Renewables	4.0
Other	2.2

Source: DBERR

Renewable electricity

Wales had an installed renewable electricity capacity of 543 megawatts (MW) of electricity generation in 2006[11]. Most renewable sources are intermittent and, therefore, do not operate at their installed capacity - most operate at a percentage, which in the case of onshore wind is about 20 to 40 per cent of the installed capacity[12]. By comparison, in 2006, nuclear power stations operated at a load factor of 69 per cent, combined cycle gas turbine stations at 54 per cent, and coal-fired stations at 66 per cent[13].

The actual contribution of renewable resources to Wales's electricity production is 4 per cent (see Table 2). The 4 per cent figure accounted for 1,409 GWh, of which 275 GWH were hydropower, 867 GWh were wind and

[9] AEA Technology, *Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2005*, August 2007, p14 http://www.airquality.co.uk/archive/reports/cat07/0709180907_DA_GHGI_report_2005.pdf
[10] DBERR, *Energy trends*, December 2007, p. 20, http://www.berr.gov.uk/files/file43304.pdf
[11] DBERR, *Energy trends September 2007*, p16 http://www.berr.gov.uk/files/file41460.pdf
[12] Sustainable Development Commission. *Wind power in the UK: A guide to the key issues surrounding onshore wind power in the UK.* (May 2005) pp.17-18 http://www.sd-commission.org.uk/publications/downloads/Wind_Energy-NovRev2005.pdf
[13] DBERR, *Digest of United Kingdom Energy Statistics 2007*, p. 136, http://stats.berr.gov.uk/energystats/dukes07.pdf

wave power, 182 GWh were landfill gas and 84GWh were other biofuels[14] (see also Fig.1).

The majority of renewable electricity capacity installed in Wales is wind, followed by hydro (Fig 1). Solar photovoltaic accounts for a very small amount of generation but has grown rapidly since 2004. Based on the assumed capacity factors above, and assuming that no more renewables came online since the data were collected, the total output for renewables in 2007 was 1.787 TWh.

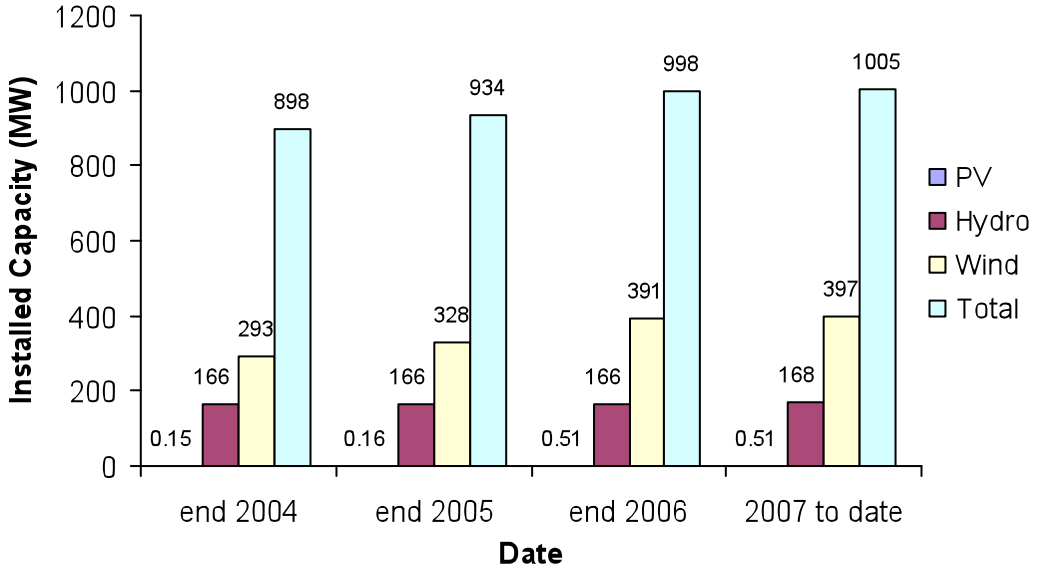

Figure 1: Growth in installed capacity electricity generation in Wales since the end of 2004.
Sources: Scottish Power Manweb and Western Power Distribution. (PV = Solar Photovoltaic)

Renewable heat

Due to the lack of a distribution network and the localised and generally small scale nature of heat generation, there are no Wales-specific data concerning the total consumption of renewable heat. The Renewable Energy Route Map for Wales highlights some of the larger biomass installations over 25 MW_{th}[15] but there are a number of smaller generation devices, such as solar thermal for individual homes for which data are not available.

[14] DBERR, *Energy trends*, December 2007, p. 20,http://www.berr.gov.uk/files/file43304.pdf
[15] Welsh Assembly Government, *Renewable Energy Route Map for Wales.* February 2008. p.11. Some of the sites are at the construction stage and are not yet operational.

4. Government Policies

Welsh Assembly Government

The Welsh Assembly Government target for renewable energy is as follows[16]:

> The Assembly Government has a target of 4TWh of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020. In order to meet these targets the Assembly Government has concluded that 800MW of additional installed (nameplate) capacity is required from onshore wind sources and a further 200MW of installed capacity is required from off shore wind and other renewable technologies.

Figure 2 shows progress in meeting this target. This demonstrates that whilst the output from renewables is increasing, it is not currently at the rate necessary to reach the 2010 Welsh Assembly Government target.

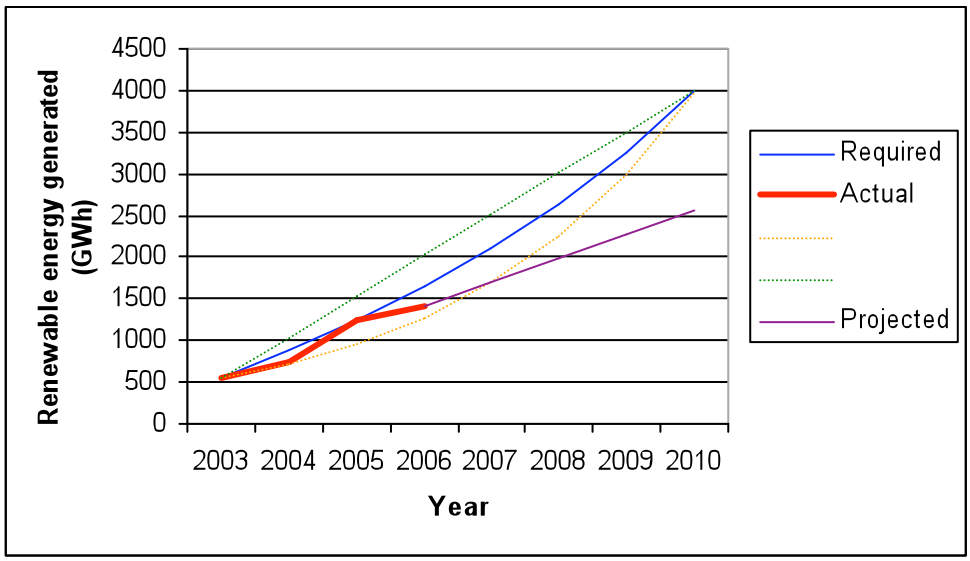

Figure 2: Progress in meeting the 4TWh target for renewable energy generation. The projection assumes that capacity will be added at the average rate from 2003-2006.
Source: DBERR

Other targets are highlighted below:

- The Welsh Assembly Government has set out a commitment to sustainable energy production which will include the drawing up of an Energy Strategy that will cover 'diversified renewable energy generation and biomass'[17].

[16] Ibid.

[17] Welsh Assembly Government *One Wales: A Progressive Agenda for the Government of Wales*, 27 June 2007.

- The *Environment Strategy for Wales* includes a commitment to 'renewable and low carbon energy generation'[18].
- An aim to encourage 800 MW of new on-shore wind electricity development by 2010[19].
- The *Renewable Energy Route Map* sets out the Welsh Assembly Government's intention to increase renewable energy, and estimates that up to 33 TWh of electricity could be generated in Wales by 2025 with a saving of more than 14 million tonnes of CO_2[20].
- Support for renewables through the planning system through Technical Advice Note 8 which includes the designation of areas for onshore wind development and advice to local authorities to adopt policies to encourage the use of renewable energy[21].
- The *Microgeneration Action Plan for Wales* contains the following targets[22]:
    - To install 20,000 microgeneration heating units by 2012, with of the order of 100,000 by 2020,
    - To install 10,000 micro-electricity units by 2012, rising to numbers in the order of 200,000 by 2020, and
    - To have in place 50 combined heat and power and/or district heating systems by 2020.
- The *Bioenergy Action Plan for Wales* proposes:
    - 5 terawatt-hours of electricity and 2.5 terawatt-hours of usable heat energy from renewable biomass by 2020

UK Government

The majority of UK Government's policies are contained in the Energy White Paper[23] and supporting documents:

- Ten per cent of the UK electricity demand to be supplied through renewables by 2010.
- A strengthening of the Renewables Obligation up to 20 per cent. Additionally the RO scheme will be banded so that a mixture of renewable technologies are supported, not merely the least expensive[24].
- Planning reforms to reduce obstacles to renewables[25].

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[18] Welsh Assembly Government, *Environment Strategy for Wales,* May 2006. Link to Strategy
[19] Welsh Assembly Government, *Energy Wales: Route Map to a Clean, Low-Carbon and More Competitive Energy Future for Wales,* June 2005.
http://new.wales.gov.uk/docrepos/40382/4038231141/40382112412/energyroutemape.pdf?lang=en
[20] Welsh Assembly Government, *Renewable Energy Route Map for Wales,* February 2008.
[21] Welsh Assembly Government, *Planning Policy Wales Technical Advice Note 8: Planning for Renewable Energy,* July 2005.
[22] Welsh Assembly Government, *Microgeneration Action Plan for Wales*, March 2007.
http://new.wales.gov.uk/docrepos/40382/4038231141/40382112413/plane.pdf?lang=en
[23] The Stationery Office, *Energy White Paper: Our Energy Challenge – Creating a Low Carbon Economy,* (February 2003).
[24] The Stationery Office, *The Energy Bill*, January 2008.
http://www.publications.parliament.uk/pa/cm200708/cmbills/053/2008053.pdf
[25] *The Planning Bill*, Bill 71 2007-08

- The continuation of the Low Carbon Buildings Programme with an extra £50 million announced in 2006 to provide grants to householders and organisations to install microgeneration technologies[26].
- Removal of current barriers to the connection of microgeneration installations to the National Grid (working with Ofgem and National Grid UK).
- Increased public sector involvement with the private sector to increase research and development of low carbon technologies[27]
- Combined Heat and Power (CHP) installations are to be exempted from the climate change levy and reformed planning guidance will increase the consideration given to CHP in new planning applications[28].
- The establishment of the Energies Technologies Institute to be 50:50 funded between the public and private sector with £600 million[29]. Full operation was announced on 17 December 2007[30].

In addition, the UK Government's White Paper on Nuclear Power states[31]:

> "The Government believes new nuclear power stations should have a role to play in this country's future energy mix alongside other lowcarbon sources; that it would be in the public interest to allow energy companies the option of investing in new nuclear power stations; and that the Government should take active steps to facilitate this".

Europe

- A binding target of a 20 per cent share of renewable energies of overall EU consumption by 2020[32].
- To cut greenhouse gases by at least 20 per cent by 2020 and by 30 per cent in the context of a comprehensive international agreement[33].
- Increased support for renewable technology development through the Directive on Electricity Production from Renewable Energy Sources[34].

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[26] HM Government, *Climate Change the UK Programme,* March 2006 http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/ukccp06-all.pdf
[27] The Stationary Office, *Meeting the Energy Challenge – A White Paper on Energy,* May 2007. pp. 216-234. http://www.berr.gov.uk/files/file39387.pdf
[28] *ibid.* p. 13.
[29] Department of Trade and Industry, *Energy Technologies Institute Prospectus,* September 2006. http://www.energytechnologies.co.uk/assets/files/ETI_Prospectus.pdf,
[30] Energies Technologies Institute website http://www.energytechnologies.co.uk/
[31] Department for Business, Enterprise and Regulatory Reform *Meeting the Energy Challenge: A white paper on nuclear power* January 2008 http://www.berr.gov.uk/files/file43006.pdf
[32] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: 20 20 by 2020: Europe's climate change opportunity, 23* January 2008, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0030:FIN:EN:PDF
[33] *ibid* p. 5.
[34] European Commission, *Directive 2001/77/EC of The European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market*, (September 2001) http://eur-lex.europa.eu/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf

5. Devolved responsibilities

Legislative Competence

Energy does not appear as a separate field in Schedule 5 of the *Government of Wales Act 2006.* The following are all UK Government reserved matters:

- oil and gas (apart from pollution);
- the generation (>50MW), transmission and supply of electricity (apart from pollution);
- energy conservation (apart from the encouragement of energy efficiency otherwise than by prohibition or regulation).

Electricity Consents

Planning application consents for all applications under 50MW rests with local authorities in Wales. At present, responsibility for consenting to power stations with a generating capacity of greater than 50 MW in Wales and England rests with the Secretary of State for Business, Enterprise and Regulatory Reform under the provisions of Section 36 of the *Electricity Act 1989.* The Welsh Assembly Government is a formal consultee in the consents process but has no statutory role in the final decision.

The *UK Planning Bill*[35] proposed a reform of planning for nationally significant infrastructure projects, including energy projects above 50 MW and major gas infrastructure projects in Wales and England. An independent Infrastructure Planning Commission will make decisions on nationally significant infrastructure projects.

The threshold for consents for installations offshore differs, in that the Welsh Assembly Government can only consent to developments under 1 MW. Some changes have also been proposed under the *Draft Marine and Coastal Access Bill*[36]*,* including the creation of a Marine Management Organisation which would have a lead role in consenting applications in Welsh offshore waters between 1 – 100 MW. Table 3 outlines the current and proposed consents powers.

[35] UK Planning Bill http://services.parliament.uk/bills/2007-08/planning.html
[36] Draft Marine Bill http://www.defra.gov.uk/marine/legislation/index.htm

Table 3: Proposed Consent Bodies for Electricity Installations

Installation size	Current consent body	Proposed consent body
Nationally Significant Infrastructure	Secretary of State for Business, Enterprise and Regulatory Reform	Infrastructure Planning Commission
> 50 MW onshore	Secretary of State for Business, Enterprise and Regulatory Reform	Infrastructure Planning Commission
< 50 MW onshore	Local Authorities	Local Authorities
> 100 MW offshore	Secretary of State for Business, Enterprise and Regulatory Reform	Infrastructure Planning Commission
1 - 100 MW offshore	Secretary of State for Business, Enterprise and Regulatory Reform & Welsh Assembly Government	Marine Management Organisation & Welsh Assembly Government
< 1 MW offshore	Welsh Assembly Govenment	Welsh Assembly Government

Infrastructure Planning Commission: Established by the Planning Act 2008
Marine Management Organisation: proposed by the Draft Marine and Coastal Access Bill
For offshore installations, the Welsh Assembly Government's role is in providing licences under the *Food and Environmental Protection Act 1985* and the *Coast Protection Act 1949*

The Minister for Environment, Sustainabilty and Housing has indicated on several occasions that it is the position of the Welsh Assembly Government that responsibility for determining applications for generating stations greater than 50MW onshore and up to100MW offshore[37] should come to Wales.

[37] Sustainability Committee, 4 June 2008, p20 http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third1/bus-committees-third-sc-home/bus-committees-third-sc-agendas/sc20080604qv.pdf?langoption=3&ttl=SC%283%29-12-08%20%3A%20Transcript%20%28PDF%2C%20187kb%29

Chapter 2 – Key issues and recommendations

> "We will aim to achieve annual carbon reduction-equivalent emissions reductions of 3 per cent per year by 2011 in areas of devolved competence. We will set out specific sectoral targets in relation to residential, public and transport areas."

One Wales - A progressive agenda for the government of Wales – Labour and Plaid Cymru Groups in the National Assembly – June 2007.

2.1 We are very pleased to see this commitment to carbon reduction in the One Wales document and fully support the coalition government in their efforts to achieve it.

2.2 In this chapter, we outline six 'headline' recommendations and illustrate the impact we think they could make on achieving the 3 per cent target in Wales.

2.3 As outlined in the introduction to this report, the energy production sector is an area in which the Welsh Assembly Government has limited powers to influence carbon reduction. All decisions on energy installations above 50MW (1MW in the sea) are made currently by the UK Government and will soon be made by the Independent Planning Commission (IPC).

2.4 This has lead not only to Wales being a net exporter of energy but also the highest carbon emitter of any of the countries in the UK.

2.5 Concern was expressed by many of our witnesses about the potential energy gap caused by the delay between the decommissioning of old fossil fuel and nuclear power stations and the commissioning of new energy production facilities.

2.6 There were also concerns expressed about the security of our energy supply as we rely heavily on imported oil and gas for energy production.

2.7 Whilst carbon reduction from large scale energy generation is not within the remit of the Welsh Assembly Government, it has, quite rightly, concentrated its efforts on the renewable energy sector. We consider that renewable energy can play an important role not only in reducing carbon emissions but also in helping to partially address the problems of the energy gap and security of supply.

2.8 Much of our evidence, whilst acknowledging the work already done by the Welsh Assembly Government on renewable energy, expressed disappointment that the Welsh Assembly Government has not done more to realise the full potential of renewable energy in Wales.

Strategic Action

2.9 Much of the evidence we received pointed to a lack of high level strategic direction from the Welsh Assembly Government. Whilst we welcome the

imminent production of the Renewable Energy Routemap (RERM) for Wales, we believe that this does not go far enough in providing a picture of the energy mix that the Welsh Assembly Government wishes to have in Wales (both fossil fuels and renewables) and the preferred locations for them. We therefore recommend:

Headline Recommendation 1: Whilst we acknowledge the lack of powers of the Welsh Assembly Government over fossil fuel energy production in Wales, we recommend that the Welsh Assembly Government, as part of its energy strategy, produce a strategic framework for all energy production in Wales, indicating spatially and in terms of output the preferred energy mix for Wales.

2.10 We received evidence during the inquiry about the importance of the adequacy of existing infrastructure during the construction and connection phase of new energy production facilities.

2.11 Road access for large plant and machinery to sites where new power plant was to be installed had proved difficult for new sites, especially those in more rural areas and had led to long delays in installation work and local disruption.

2.12 Connectivity to the existing electricity and gas supply grids was cited as a particular issue in mid Wales and with links form north to south Wales where there are historically poor grid connections.

2.13 The main infrastructure issues have so far been encountered mainly by developers installing renewable energy projects. The Committee is concerned, however, that new sites for fossil fuel power stations and possible carbon capture and storage technologies could also suffer from a lack of existing infrastructure. We therefore recommend:

Headline recommendation 2: The Welsh Assembly Government undertake a thorough review of the adequacy of the transport infrastructure and grid connection for the construction of both fossil fuel and renewable energy plants in the areas identified in the strategic framework recommended in HL1.

Headline recommendation 3: The Welsh Assembly Government to continue to encourage grid and distribution companies to work co-operatively with developers to develop an integrated approach to connection for large scale renewables.

Renewable energy

2.14 The Welsh Assembly Government has estimated that if the aspirations in the RERM are achieved, up to 4 million tonnes of carbon per year could be saved.

2.15 We are concerned about the fact, referred to in much of the evidence, that there is confusion between the renewable energy targets e.g. those in TAN 8, targets for micorgeneration and the carbon reduction targets and how the two sets of targets relate to each other.

2.16 We are also concerned by the lack of progress towards meeting the current targets for renewable energy.

2.17 We consider that whilst the aspirations in the RERM have the potential to make a substantial impact on Wales' carbon emissions, they will remain as aspirations if more action is not taken by the Welsh Assembly Government to ensure that they become a reality. We therefore recommend:

Headline Recommendation 4: The Welsh Assembly Government simplifies the number and nature of targets set for carbon reduction and ensures that there is consistency and explicit linkages between targets for renewable energy and carbon reduction.

Headline Recommendation 5: The Welsh Assembly Government focuses on the achievement of the targets it has set by:

- **Providing sufficient incentives for the research, development and manufacture of renewable energy technologies in Wales;**
- **Issuing guidance and advice on ways to achieve the targets; and**
- **disseminating widely examples of good practice of organisations and individuals achieving its targets.**

Microgeneration

2.18 Many of those who gave us evidence on microgeneration expressed frustration at the lack of take up of the available technologies, especially by householders and small businesses.

2.19 Dulas Ltd described the market for micorgeneration as:

> "A tap waiting to be turned on. It just needs the right conditions"

2.20 Most of those who submitted evidence identified costs and the perceived length of payback times as a barrier to the installation of microgeneration.

2.21 Witnesses also emphasised that there is huge potential for new businesses to be created in Wales manufacturing, supplying and installing microgeneration technology if the potential market for it can be stimulated. We therefore recommend:

Headline Recommendation 6: The Welsh Assembly Government to explore the potential for local authorities in Wales to issue loans for the installation of domestic microgeneration technology e.g. the Kirklees scheme, or repayment based on feed in tariff revenue.

Chapter 3 – The energy mix

3.1 Although the Welsh Assembly Government does not have any powers over large scale fossil fuel energy generation, we consider that, as a net exporter of energy produced by fossil fuels, we needed to explore the contribution of fossil fuels as well as renewable energy to the overall energy mix in Wales.

Fossil Fuels

3.2 There was general agreement amongst those submitting evidence that, in the short term, fossil fuels (i.e. coal, oil and gas) as well as nuclear will remain the main source of energy generation in Britain.

3.3 Several challenges were identified in moving towards a low carbon economy and low carbon energy production:

- Current fossil fuel power generation is responsible for approximately one third of Wales' carbon emissions and current technologies for producing 'greener' energy processes (e.g. carbon capture and storage, clean coal technology) are not particularly suited to retrofitting to existing power production plant;

- As the majority of our fossil fuel is imported, there is a growing concern about the security of the supply of raw materials from areas of the world which could be politically volatile;

- Fossil fuel resources are not infinite and long term replacements for them will have to be developed;

- It was widely acknowledged that there will be a gap in energy production in Britain between the nuclear resource and old fossil fuel powers stations being decommissioned (a process which is already underway) and new large scale power generation coming on stream;

- Transmission losses from carrying power over a long distance can result in up to 5% of power being lost between where it is generated and where it is used.

3.4 Several witnesses expressed concern about the lack of strategic thinking in the UK's energy policies.

3.5 The World Wide Fund for Nature highlighted the conflicts between the proposals for the construction of new coal fired power stations across the UK which did not take advantage of the potential new technologies for de carbonising the energy production process such as carbon capture and storage (CCS) and the setting of more stringent carbon reduction targets. They said:

"Coal is the major source of the problems to date in terms of the carbon that has already accumulated in the atmosphere, and if you look at the business as usual projection, the rush back to coal globally and in industrialised countries is the main problem we face."

3.6 The Carbon Capture and Storage Association were concerned that the emphasis by the UK Government on post combustion technologies which could be retrofitted to existing power stations and could be sold to countries such as China was holding up policy and regulation for CCS in the new power stations that are being planned. In their opinion, this could result in new stations being built without CCS capabilities.

3.7 Although we did not take any evidence directly on the use of nuclear power to produce energy in the UK, several witnesses pointed to the potential gap between the existing installation at Wylfa being decommissioned and the possible construction of a new nuclear plant there. Concern was expressed by many witnesses about the reliance on nuclear power as a clean energy source and the time lag between the decommissioning of current plants and the building of new ones.

Renewable energy

3.8 We received a great deal of evidence about the potential of renewable energy to address many of the issues raised by fossil fuel energy production such as security of supply and transmission losses as well as carbon reduction.

3.9 The opportunities and barriers for individual technologies are discussed in more details in the next chapter. We would, however, like to make a few general comments here about the potential role of renewable energy technologies in the energy mix for Wales.

3.10 There was general agreement amongst all those submitting evidence that Wales has a great potential for generating renewable energy due to its geographical location.

3.11 There were concerns expressed, however, at the emphasis in the Renewable Energy Route Map and previous Welsh Government policy on wind power and marine renewables. The Wales Energy Research Group (WERG) were critical of the government' approach saying:

> "The initial consultation through the energy route-map suggests that half of that renewable energy should be met from a marine source, whether it is the tidal barrage, or a mix of all the other marine entities. The utility companies always require a balanced portfolio of renewable energies, and they will be critical in this whole decision-making. I think that the decision will be taken out of our hands."

3.12 Much of the evidence stressed the need to have as many renewable technologies contributing to the energy mix as possible.

3.13 Concern was expressed about the reliance on energy from the proposed development of a scheme in the Severn Estuary to help to meet the EU's target of 20% of energy being generated from renewable sources by 2020.

3.14 The projected development time for a scheme in the Severn Estuary means that it may not be producing energy until 2022 at the earliest.

3.15 We were concerned at the evidence from the Royal Society for the Protection of Birds (RSPB) that the UK Government has agreed with the EU that the output from a scheme in the Severn Estuary can be counted towards the 2020 target even if it does not start to produce energy until after the target date. We feel that, given the urgency of the need to address our carbon reductions and slow down the pace of climate change, other renewable energy schemes need to be found to meet the 2020 targets. We therefore recommend:

Recommendation 1: The Welsh Assembly Government indicate the renewable energy mix that will be required in Wales to meet the 2020 targets which does not include a scheme in the Severn Estuary and lobbies the UK Government to do the same.

Strategic approach

3.16 We are concerned abut the apparent lack of strategic direction for the UK's energy policy and the potential for conflict between energy and carbon reduction policies. Although we have no remit to make recommendations to the UK Government on their energy policy, we think that it is important that we get our own house in order in Wales and demonstrate a cohesive and integrated approach to energy production and climate change.

3.17 We believe that the Welsh Government should produce a co-ordinated strategy for energy in Wales, outlining the energy mix that it would want to have. We therefore recommend Headline Recommendation 1.

3.18 We also believe that there is a potential for CCS to play an important role in decarbonising energy production. We agree with the evidence that we were given that a more strategic approach needs to be taken to the research and development of CCS technology and that, if proven, it should be used on all new coal power stations.

3.19 We are concerned, however, that the current emphasis on sites for secure storage is focussed mainly on areas of spent oil and gas deposits in the North Sea. The Carbon Capture and Storage Association told us that there were possible sites for storage off the Welsh coast but these sites have not been investigated as yet.

3.20 We welcome the positive views that the Minister gave us on carbon capture and storage. We therefore recommend:

Recommendation 2: The Welsh Assembly Government to lobby the UK government with its views on the use of Carbon Capture and Storage technology to ensure that any new fossil fuel power stations built in

Wales are CCS ready and that any new fossil fuel power stations built are close to areas where satisfactory carbon storage can take place.

Chapter 4 – Renewable energy

> "If you look at a renewable energy map of Europe, you will see that Wales is the Saudi Arabia of green electricity—we are most well endowed with it."

Paul Allen, Development Director, Centre for Alternative Technology

4.1 One of the clearest messages that we were given by those submitting evidence to us is that Wales has vast potential to be a leader in the development and use of renewable energy technologies.

4.2 We were very pleased to hear from the Minister that Wales is considered as a leader in sustainability and applaud the work that has been done so far by the Welsh government to address the issues around climate change and encourage the development and implementation of renewable energy in Wales. We look forward to the publication of the Renewable Energy Route Map and the Wales Energy Strategy and consider that both of these will be key documents in moving towards a low carbon future.

4.3 We consider that it is now time to put the strategies and plans into action – we in Wales must now 'walk the walk' as well as 'talking the talk'.

4.4 We heard evidence that plans for renewable energy have to be implemented quickly if EU, UK and Welsh targets are to be reached and the inevitable rise in global temperatures is to be slowed to a level at which we are able to adapt to its effects.

4.5 We acknowledge that difficult decisions will have to be made and that the economic downturn could make financial decisions about renewable energy even harder.

4.6 The Environmental Audit Committee said in their recent report on the green economy and the economic recession:

> "The fiscal stimulus measures intended to pull the economy out of recession represent an invaluable opportunity decisively to transform the UK into a low carbon economy. A programme of investments in low carbon industries would help build a modern and sustainable economy, securing Britain's competitiveness and future prosperity in the new global economy that will emerge from this crisis.[38]"

We agree wholeheartedly with the views of the Environmental Audit Committee and firmly believe that the development of a market for renewable energy and the associated research and technology in Wales will provide a valuable too to combat the effects of the current economic downturn.

4.7 Whilst many witnesses shared our welcome for the Renewable Energy Route Map and the proposed Energy Strategy, there was a general consensus in much of the evidence we received that Wales is not realising its full potential for renewable energy. Many witnesses expressed concern and frustration at the missed opportunities for and barriers to the development of a

[38] Environmental Audit Committee*, Pre-Budget Report 2008: Green fiscal policy in a recession*, March 2009

renewable technology market with associated research, development and technology supply sector in Wales.

4.8 Many reasons were given for the lack of progress, but a few key themes emerged form the evidence which we will discuss in the rest of this chapter.

Targets

4.9 In addition to EU, UK and Welsh carbon reduction targets, there are also EU, UK and Welsh targets for renewable energy.

4.10 Several of those who submitted evidence said that there is a great deal of confusion caused by the number of targets for carbon reduction and renewable energy and the relationship between them.

4.11 There appears to be little explicit linkage made between the way in which targets for renewable energy are contributing to carbon reduction targets or to how targets set at the Welsh level are contributing to UK targets and those set at the UK level are contributing to EU targets.

4.12 We believe that any targets set by the Welsh Assembly Government for renewable energy should show an explicit link to how they are contributing to other targets at Wales, UK and EU levels. We consider that the publication of the new renewable Energy Route Map and Energy Strategy will be an excellent opportunity for the Welsh Assembly Government to simplify its targets and put them into context. We therefore recommend Headline Recommendation 4.

4.13 The Welsh targets for renewable energy are:

- TAN 8
    - 4TWh of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020;
    - encourage 800 MW of new on-shore wind electricity development by 2010;
- Microgeneration Action Plan
    - To install 20,000 microgeneration heating units by 2012, with of the order of 100,000 by 2020;
    - To install 10,000 micro-electricity units by 2012, rising to numbers in the order of 200,000 by 2020;
    - To have in place 50 combined heat and power and/or district heating systems by 2020;
- Bioenergy Action Plan for Wales
    - 5 terawatt-hours of electricity and 2.5 terawatt-hours of usable heat energy from renewable biomass by 2020;
- Renewable Energy Route Map
    - Up to 33TWh per year of electricity from renewable sources by 2030. Half from marine, a third from wind and the rest mainly from sustainable biomass. Up to 3TWHt of renewable heat.

4.14 Figures published by the Department for Business Enterprise and Regulatory Reform for 2007 showed that the of electricity generated from renewable sources in Wales fell from 1,404 TWh in 2006 to 1,370 TWh in 2007.

4.15 Several of our witnesses expressed concern about whether the targets that have been set by the Welsh Assembly Government are actually achievable. Dulas told us their concerns about the microgeneration targets:

> "I take a sharp intake of breath every time I hear those targets, as do the people responsible for setting them, I am sure. They are ambitious and fantastic targets, but a little sprinkling of reality might be needed. There are about 5,000 photovoltaic installations across the UK at the moment, and the Government has been stimulating that market for at least seven years. It has been a slow start, but 10,000 units by 2012 in Wales alone would require radical change, and I do not see any radical policy changes or radical grant initiatives on the horizon."

The Wales Environment Trust said:

> "We need a radical deployment; things need to start happening on the ground now. What seems to happen every time is that we get a new set of targets or a new strategy is written and, by the time that process has been undertaken, you are 50 per cent of the way down the road towards the time for meeting your target."

4.16 We too are concerned abut the lack of progress towards meeting the renewable energy targets set by the Welsh government. If the targets set thus far have not been achieved or do not look as if they are likely to be achieved, ate those even more stretching targets that are now being set also likely to suffer the same fate?

4.17 We believe that the Welsh Assembly Government should focus on the achievement of the targets that they have set and therefore recommend Headline Recommendation 5.

Community engagement

4.18 The majority of renewable energy installations will be located in or close to a community in Wales. One of the strengths of renewable energy is that it is able to generate and supply power and heat to local communities.

4.19 Whilst there is the potential for renewable energy installations to disrupt some aspects of the life of some people in a community, there are also potentially great benefits for communities to having renewable energy close by.

4.20 During the eighteen months that we have been collecting evidence for our inquiry into carbon reduction in Wales, the issue of the effect of renewable energy installations on communities has been the one which has generated the largest amount of correspondence to the committee. All of the correspondence has been about the concerns of local communities about either biomass or wind generation.

4.21 From the evidence we have received, it appears that, communities where renewable energy schemes may be sited can feel excluded from the decision making process about the scheme and that it can be perceived as something that is being imposed on them rather than something in which they can play a part.

4.22 Many large and medium scale renewable energy schemes do offer benefits to the local communities in terms of financial payments or other benefits. A report for the Welsh Assembly Government[39] estimated that, in 2007, around £650,000 per year was paid to communities in Wales by developers as a result of wind farm developments. The report's authors also estimate that if the government's target of an additional 800MW of onshore wind power is reached, the benefits could rise to around £2 million a year.

4.23 The same report also suggested that more of the monies paid to communities by developers could be targeted at carbon reduction schemes within the communities and that opportunities for using the money to gain match funding for larger projects were not always used.

4.24 We heard from several witnesses how important community engagement in a new scheme is, from its inception and throughout to its operating life, to the success of the scheme.

4.25 Whilst we applaud the local community benefit schemes that are already in existence, we would urge that they are extended beyond wind farm schemes to include biomass plants and other forms of renewable energy development.

4.26 We believe that communities can benefit greatly from a relationship with the developers of renewable energy schemes but that engagement must come at an early stage in the project and that further environmental benefits to the communities involved should come out of the benefit agreement. We therefore recommend:

Recommendation 3: The Welsh Assembly Government to issue guidance to communities and developers on the use of monies gained from community benefit agreements on carbon reduction and/or sustainable projects (e.g. community heating schemes, home insulation, development of community energy action plans) and of match funding available from the Welsh Assembly Government and EU funding streams.

Recommendation 4: The Welsh Assembly Government establish and publicise a database of existing community benefit schemes which can be used by communities wishing to enter into such schemes to identify good practice.

[39] Richard Cowell, Gillian Bristow & Max Munday of Cardiff University, with Peter Strachan of Aberdeen Business School. *Wind Farm Development in Wales: Assessing the Community Benefits, 2008* http://new.wales.gov.uk/firstminister/research/economic/capacitybuilding/windfarm/windfarms.pdf?lang=en

4.27 We also believe, for the evidence we were given, that there can be great benefits for communities in establishing their own community energy schemes.

4.28 The Hermon Community Microgeneration Project estimate that they will receive £80,000 pounds annual profit from selling electricity to be taken into the national grid from 2 wind turbines that will be built by the community. The profit will be used to fund community development schemes.

4.29 Several witnesses advocated the community approach taken by Hermon and suggested that communities should be encouraged to produce their own community energy strategies which would enable them not only to identify energy savings within the community but also opportunities for energy generation and distribution. We therefore recommend:

Recommendation 5: The Welsh Assembly Government to issue guidance on and provide funding for the development of community energy action plans.

Planning

4.30 A theme which has run throughout our inquiry into carbon reduction in Wales is that of the ability of the planning system to enable carbon reduction measures to be implemented.

4.31 Many of those giving evidence to this section of the inquiry echoed the views of the majority of witnesses in other parts of the inquiry that the planning system can act as a barrier to the development and installation of renewable energy technologies.

4.32 We heard that large, medium and small scale installations can all encounter problems with the planning system ranging from delays because of the length of time taken to make decisions on planning applications, through the restrictions that can be placed on schemes to the expense and complication of the system for individual and small companies.

4.33 We welcome the intention of the Welsh Assembly Government to give permitted development rights to domestic scale solar and photovoltaic technologies and urge them to extend the same rights to wind and ground source heat pumps.

4.34 We will be dealing further with all aspects of the planning system and carbon reduction in our final report but wish to make the following recommendations about renewable energy and the planning system:

Recommendation 6: The current TAN8 should be urgently revised to include all forms of renewable energy including marine renewables.

Recommendation 7: The Welsh Assembly Government should issue guidance to local authorities on the use of policies for carbon reduction in Local Development Plans.

Grid connection

4.35 The issue of grid connection and the extent of the energy distribution gird in Wales is one which we have explored on a number of occasions. The lack of a north/south link and the scarcity of the gas grid on mid Wales have been discussed during the course of our fuel poverty inquiry but issues over the grid have also been brought to our attention during this inquiry.

4.36 Much of the evidence we received about grid connection pointed to the length of time taken to connect to the grid. Welsh Power told us:

> National Grid are unwilling to make any speculative investment in the system, which means that new build takes significant time. We note that wind generation in mid-Wales is probably going to find connection difficult for this reason as well. The transmission connection queue now makes connections of new plants in Wales difficult before 2017.

4.37 The Hermon Community Microgeneration Project highlighted the advantages of connecting to existing grid connections available locally. They considered that establishing the existence of local connections was key to the success of schemes such as theirs.

4.38 We heard examples of good practice in mid Wales where a Welsh Assembly Government initiative has encouraged grid and distribution companies to work co-operatively with all potential developers of renewable energy schemes in the area to establish the distribution network needs of the area in the medium to long term. We therefore recommend:

Recommendation 8: The Welsh Assembly Government to continue to encourage grid and distribution companies to work co-operatively with developers to develop an integrated approach to connection for large scale renewables.

4.39 Another barrier to grid connection, especially for small energy producers, is the cost of connection. Fre-energy told us that they had an estimate of £26,000 to connect a small anaerobic digester to the grid.

4.40 We were also concerned that several witnesses told us that they were having to pay a fee to be put on the waiting list for gird connection.

4.41 We were very pleased to hear from Scottish Power that charges for being added to the waiting list for grid connection have been dropped and recognise that grid connection charges are a commercial matter. We would, however, urge the UK Government and OFGEM who regulates the market, to consider the level of charges for grid connection, especially for small generators.

Large scale renewables

4.42 The abundance of natural sources for generating renewable energy in Wales that the Centre for Alternative technology referred to means that Wales should be an ideal place for investment in the development and installation of large scale renewable energy projects.

4.43 From the evidence we were given, it is clear that, although schemes such as the proposed Severn Tidal Power Project and the Gwynt Y Mor wind farm in North Wales represent large scale schemes, other technologies such as tidal schemes and large scale anaerobic digestion are not being developed to their full potential in Wales.

4.44 There appear to be several reasons for this, some within the remit of the Welsh Assembly Government and others which will need policy changes at the UK level.

4.45 The Sustainable Development Commission warned that:

"The position in which we find ourselves is that we have too many people looking for too many alternatives, and they all believe that their idea is always the right idea while someone else's idea is always the wrong idea. We get to the point at which different technologies are actively competing against each other and rubbishing each other's version of their capacity to deliver on that target. We simply need to get back to the starting point of recognising that we may not know all the answers at this stage, but we have to take on all those options."

4.46 We believe that this competition and the reliance on 'proven technology' for investment have hampered the progress of renewable energy technology in Wales. We welcome the Minister's statement that funding is being given to assess the potential of alternative schemes for the Severn Tidal Power project and urge that the Welsh Assembly Government provides more incentives to attract the research and development of large scale renewable technologies that will have direct applications in Wales.

4.47 It was suggested by several witnesses that the system of Renewable Obligations Certificates (ROCs) does not provide enough incentive for energy companies to invest in large scale renewable generation, especially tidal schemes, and that the absence of any similar scheme for heat does not encourage the development and installation of large scale combined heat and power schemes (CHPs).

4.48 We were also concerned to hear that, under the proposed new Scottish scheme, Renewables Obligation Scotland (ROS), wave energy schemes would qualify for five ROCS and tidal energy schemes would qualify for three ROCs (in England and Wales both types of scheme qualify for two ROCs).

4.49 We welcome the inclusion of provisions for a Renewable Heat Incentives scheme in the Energy Act 2008. We believe that, for large scale renewable energy to become a viable alternative to fossil fuel generation in Wales, there should be as much incentivisation as possible for renewable energy. We therefore recommend:

Recommendation 9: The Welsh Assembly Government to lobby the UK Government to:

- **Implement the Renewable Heat Incentives Scheme as soon as possible;**
- **Ensure that any renewable obligations scheme in Scotland does not operate at the expense of investment in schemes in England and Wales.**

4.50 We strongly believe that large scale wind power, in conjunction with other renewable energy technologies has the potential to provide a good source of renewable energy for Wales. We have made recommendations for wind power throughout this report so will concentrate, in this section of the chapter, on other large scale renewables.

4.51 We were interested to receive evidence from Prenergy about the large biomass plant which is being built in Port Talbot and on the potential domestic market for biomass from the Forestry Commission.

4.52 We consider that energy from biomass has a great potential in Wales, but were concerned about some aspect of the evidence we received.

4.53 Whilst Prenergy's evidence claimed that the plant would contribute 70% of the 2010 renewable generation target for the whole of Wales, it is also expected to emit an estimated 743,000 tonnes of carbon per year. Whilst the energy source is from renewable forestry, the forests are in the northern USA and so will create carbon emissions in transportation and the carbon emitted from the plant will be included in Wales' overall carbon emissions.

4.54 We were also concerned that the heat from the plant would not be used as there are no plans to include infrastructure to pipe heat from the plant for use in the local area.

4.55 The Biomass Energy Centre told us that:

> "Biomass is a low energy density, ubiquitous fuel. It is therefore not well suited to long distance transport and it is appropriate to make use of it whenever possible, close to the point of production. This tends to militate against large scale operations."

Whilst the Forestry Commission emphasised the fact that currently, the domestic production of wood biomasss was limited and mostly accounted for by current demand. They advocated that the market for biomass should be stimulated by encouraging land owners to manage their woodlands and therefore produce a greater crop.

4.56 We are concerned about the development of inappropriate large scale biomass plants in Wales, especially where there is no facility for the plant to become a combined heat and power plant (CHP). We support, however, the development of small and medium scale biomass for CHP in Wales and the stimulation of the supply of biomass from woodland and form other sources for the domestic market. We therefore recommend:

Recommendation 10: The Welsh Assembly Government lobby the UK Government to ensure that any large scale biomass schemes approved in Wales are appropriate in terms of being CHP schemes and in terms of not contributing to carbon emissions through transport and other emissions.

Recommendation 11: That it is made a prerequisite for any small and medium scale biomass schemes be CHP schemes.

Recommendation 12: That the revised Wood Energy Business Scheme (WEBS) supports CHP.

4.57 We believe that there is a great potential for the development of tidal stream and wave energy generation technology around the coast of Wales.

4.58 The Countryside Council for Wales called for the Welsh Assembly Government to show leadership in encouraging the development of wave and tidal technologies. They said:

> "From a wave and tidal perspective, the tidal stream and tidal range, the sector is much more in its infancy. We recognise that there are various challenges associated with the development of these technologies. The developers of these technologies are looking for clarity and certainty, and we and the Government can play a role in helping them to understand the issues associated with their technologies to help them to bring them forward in a strategic way…….Scotland has also undertaken a marine renewable energy strategic environmental assessment, which has enabled the Crown Estate to undergo a licensing round for wave and tidal devices. That is a crucial point—there is now a framework in place for these developers, with these technologies, to go to Scotland."

4.59 Evidence from Swanturbines estimated that and investment of around £500 million was needed from government in the UK to develop and establish between five and ten types of tidal and wave energy generation technologies which would be viable not only for use around the UK but could also form a valuable export market around the world.

4.60 We also heard evidence from Cardiff University School of Engineering about the potential for wave and tidal schemes to provide important flooding controls for coastal areas, so performing a dual function.

Microgeneration

4.61 The current targets for the installation of microgeneration equipment in Wales discussed earlier in this chapter seem highly unlikely to be met. The main reasons for this, mentioned in Chapter 2 are the high installation costs of the equipment and the comparatively long pay back time. The Micropower Council also identified planning restrictions and a lack of accessible information for those wanting to install microgeneration equipment as further barriers.

4.62 The Severn Wye Energy Agency estimated that it would cost around £25,000 per house to reduce the carbon emissions from an old, hard to heat home in Wales by 60%. She considered that this level of capital outlay was beyond the ability of many householders.

4.63 Several witnesses spoke to us about the Low Carbon Buildings Programme which was designed to provide grants to home owners, community groups and public bodies to part fund the installation of microgeneration equipment.

4.64 Whilst welcoming the programme, the majority of those giving evidence criticised its administration and the way in which the funding was allocated.

4.65 The Buildings research Establishment, who administer the programme told us that they had been given no budget to advertise the scheme and that those applying for the scheme were put in touch with local advisors who did not always have expertise in all renewable technologies and so may not be recommending the most appropriate technology.

4.66 We were pleased to hear that the scheme has been extended for householders until 2010 and that, £33.6 million has been committed and £8.8 million paid of the £48 million allocated to the scheme. Of that, £1.8 Million has been committed in Wales and £0.5 million paid.

4.67 We heard form the Energy Savings Trust in Northern Ireland that top up grants of up to 15% are available for Low Carbon Buildings Scheme and that this has resulted in increased uptake of the scheme.

4.68 We believe that schemes such as the Low Carbon Buildings Scheme are a vital tool to achieving microgeneration and renewable energy targets. We therefore recommend Headline Recommendation 6 and:

Recommendation 13: The Welsh Assembly Government takes a lead in promoting the Low Carbon Buildings Programme in Wales and lobbies the UK Government to renew the Low Carbon Buildings Programme after 2010 in addition to the proposed system of feed in tariffs for renewable energy generation.

Annex A – List of Recommendations

Headline Recommendations:

Headline Recommendation 1: Whilst we acknowledge the lack of powers of the Welsh Assembly Government over fossil fuel energy production in Wales, we recommend that the Welsh Assembly Government, as part of its energy strategy, produce a strategic framework for all energy production in Wales, indicating spatially and in terms of output the preferred energy mix for Wales.

Headline recommendation 2: The Welsh Assembly Government undertake a thorough review of the adequacy of the transport infrastructure and grid connection for the construction of both fossil fuel and renewable energy plants in the areas identified in the strategic framework recommended in HL1.

Headline recommendation 3: The Welsh Assembly Government to continue to encourage grid and distribution companies to work co-operatively with developers to develop an integrated approach to connection for large scale renewables.

Headline Recommendation 4: The Welsh Assembly Government simplifies the number and nature of targets set for carbon reduction and ensures that there is consistency and explicit linkages between targets for renewable energy and carbon reduction.

Headline Recommendation 5: The Welsh Assembly Government focuses on the achievement of the targets it has set by:

- **Providing sufficient incentives for the research, development and manufacture of renewable energy technologies in Wales;**
- **Issuing guidance and advice on ways to achieve the targets; and**
- **disseminating widely examples of good practice of organisations and individuals achieving its targets.**

Headline Recommendation 6: The Welsh Assembly Government to explore the potential for local authorities in Wales to issue loans for the installation of domestic microgeneration technology e.g. the Kirklees scheme, or repayment based on feed in tariff revenue.

Other Recommendations:

Recommendation 1: The Welsh Assembly Government indicate the renewable energy mix that will be required in Wales to meet the 2020 targets which does not include a scheme in the Severn Estuary and lobbies the UK Government to do the same.

Recommendation 2: The Welsh Assembly Government to lobby the UK government with its views on the use of Carbon Capture and Storage technology to ensure that any new fossil fuel power stations built in Wales are CCS ready and that any new fossil fuel power stations built are close to areas where satisfactory carbon storage can take place.

Recommendation 3: The Welsh Assembly Government to issue guidance to communities and developers on the use of monies gained from community benefit agreements on carbon reduction and/or sustainable projects (e.g. community heating schemes, home insulation, development of community energy action plans) and of match funding available from the Welsh Assembly Government and EU funding streams.

Recommendation 4: The Welsh Assembly Government establish and publicise a database of existing community benefit schemes which can be used by communities wishing to enter into such schemes to identify good practice.

Recommendation 5: The Welsh Assembly Government to issue guidance on and provide funding for the development of community energy action plans.

Recommendation 6: The current TAN8 should be urgently revised to include all forms of renewable energy including marine renewables.

Recommendation 7: The Welsh Assembly Government should issue guidance to local authorities on the use of policies for carbon reduction in Local Development Plans.

Recommendation 8: The Welsh Assembly Government to continue to encourage grid and distribution companies to work co-operatively with developers to develop an integrated approach to connection for large scale renewables.

Recommendation 9: The Welsh Assembly Government to lobby the UK Government to:

- **Implement the Renewable Heat Incentives Scheme as soon as possible;**
- **Ensure that any renewable obligations scheme in Scotland does not operate at the expense of investment in schemes in England and Wales.**

Recommendation 10: The Welsh Assembly Government lobby the UK Government to ensure that any large scale biomass schemes approved in Wales are appropriate in terms of being CHP schemes and in terms of not contributing to carbon emissions through transport and other emissions.

Recommendation 11: That it is made a prerequisite for any small and medium scale biomass schemes be CHP schemes.

Recommendation 12: That the revised Wood Energy Business Scheme (WEBS) supports CHP.

Recommendation 13: The Welsh Assembly Government takes a lead in promoting the Low Carbon Buildings Programme in Wales and lobbies the UK Government to renew the Low Carbon Buildings Programme after 2010 in addition to the proposed system of feed in tariffs for renewable energy generation.

Annex B: List of Respondents to the call for written evidence

http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third1/bus-committees-third-sc-home/inquiries_sd/inquiries_-_carbon_reduction/carbon_energy.htm

British Telecom
Countryside Council for Wales
EDF Energy
Energy Saving Trust
Friends of the Earth
Gardner, Ian (PDF 130 KB)
Graveson Energy Management (GEM).
RWE n-power
Wales Environment Link
Welsh Power Group Ltd
WWF Cymru

Annex C – List of witnesses providing oral evidence.

Wednesday 25 June 2008 SC(3)-14-08 : Transcript

Welsh Energy Research Centre
SC(3)-14-08 : Paper 1 : Submission by the Welsh Energy Research Centre on Energy Production
Paper to note
SC(3)-14-08 : Paper 3 : Paper to note : Committee's Visit to Germany and Austria
Freiburg Energy Department
SC(3)-14-08 : Paper 3 Annex A Part 1 : Presentation from Freiburg Energy Department (fact-finding visit) (pdf 7.5KB)
SC(3)-14-08 : Paper 3 Annex A Part 2 : Presentation from Freiburg Energy Department (fact-finding visit) (pdf 4.8KB)
Energiesparverband
SC(3)-14-08 : Paper 3 Annex B : Presentation from Energiesparverband (fact-finding visit) (pdf 4 MB)

Wednesday 9 July 2008 SC(3)-15-08 : Transcript

RWE n-power
SC(3)-15-08 : Paper 1 : Submission from RWE n-power to Inquiry into Energy Production
Association of Electricity Producers
SC(3)-15-08 : Paper 2 : Submission from the Association of Electricity Producers to Inquiry into Energy Production
Welsh Power Group Limited
SC(3)-15-08 : Paper 3 : Submission from Welsh Power Group Limited to Inquiry into Energy Production
SC(3)-15-08 : Paper 3 Annex A : Welsh Power Group Ltd Response to Energy Routemap (pdf 3.00 MB)
WWF
SC(3)-15-08 : Paper 4 : Paper and Background Material from WWF on Carbon Capture and Storage
SC(3)-15-08 : Paper 4 Annex A : WWF Report on Evading Capture (pdf 1.8MB)
SC(3)-15-08 : Paper 4 Annex B : WWF Assembly Brief on UK Energy Bill
Paper to note
SC(3)-15-08 : Paper 6 : Paper to Note - Committee's Visit to Germany and Austria
SC(3)-15-08 : Paper 6 Annexes : Presentations from Austria and Germany (fact-finding visit)

Wednesday 16 July 2008 SC(3)-17-08 : Transcript

Paper to note
SC(3)-16-08 : Paper 6 : Paper to Note - Committee's Visit to Germany and Austria
Friends of the Earth
SC(3)-16-08 : Paper 7 : Paper from Friends of the Earth on Energy Production

Thursday 25 September 2008 SC(3)-18-08 : Transcript

Micropower Council
SC(3)-18-08 : Paper 3 : Evidence on Energy Production from Micropower Council
Renewable Energy Association
SC(3)-18-08 : Paper 4 : Evidence Session on Energy Production from the Renewable Energy Association (pdf 557 KB)
WWF
SC(3)-18-08 : Paper 7 : WWF Further Evidence on Carbon Capture and Storage (follow-up to evidence session 9 July)
SC(3)-18-08 : Paper 7 : WWF Further Evidence on Carbon Capture and Storage Annex 1 : Canary in the Cage Briefing (pdf 125 KB)
SC(3)-18-08 : Paper 7 : WWF Further Evidence on Carbon Capture and Storage Annex 2 : Pöyry Energy Consulting report to WWF and Greenpeace UK, on implications of UK meeting its 2020 renewable energy target (pdf 733 KB)

Thursday 9 October 2008 SC(3)-19-08 : Transcript

Severn Wye Energy Agency
SC(3)-19-08 : Paper 1 : Evidence from Severn Wye Energy Agency (SWEA) on Energy Production
Hermon Community Micro-generation Project
SC(3)-19-08 : Paper 4 : Evidence from Hermon Community Micro-generation Project on Energy Production

Thursday 16 October 2008 SC(3)-20-08 : Transcript

Biomass Energy Centre
SC(3)-20-08 : Paper 4 : Biomass and Electrical Power Generation - Comments from the Biomass Energy Centre

Thursday 13 November 2008 SC(3)-22-08 : Transcript

Sustainable Development Commission
SC(3)-22-08 : Paper 1 : Evidence Energy Production Sustainable Development Commission submission
Countryside Council Wales
SC(3)-22-08 : Paper 2 : Evidence from CCW on Large Scale Renewables
School of Engineering Cardiff University
SC(3)-22-08 : Paper 3 : Evidence from the Hydro-Environmental Research Centre, Cardiff University
RSPB
SC(3)-22-08 : Paper 4 : Evidence from RSPB
Environment Agency
SC(3)-22-08 : Paper 5 : Evidence from Environment Agency Wales
Swansea University
SC(3)-22-08 : Paper 6 : Evidence from Swansea University

Thursday 20 November 2008 SC(3)-23-08 : Transcript

Conservation of Upland Montgomeryshire
SC(3)-23-08 : Paper 2 : Annex 1 - Conservation of Upland Montgomeryshire Energy Statement
SC(3)-23-08 : Paper 2 : Inquiry into Carbon Reduction in Wales: Evidence from the Conservation of Upland Montgomeryshire (pdf, 76.5Kb)
ARUP
SC(3)-23-08 : Paper 3 : Annex - Planning for Renewable Energy in Wales (pdf, 5Mb)

Thursday 27 November 2008 SC(3)-24-08 : Transcript

Minister for Environment, Sustainability and Housing
SC(3)-24-08 : Paper 1 : Paper on Energy Production in Wales from the Minister for Environment, Sustainability and Housing