



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Renewable Energy Route Map for Wales

consultation on way forward to a leaner,
greener and cleaner Wales





Contents

Minister's foreword

Introduction

1 Purpose of consultation

2 Setting the scene

Part one: Wales renewable energy resources

3 Biomass

4 Marine: tides and waves

5 Hydro-electricity

6 Waste

7 Wind: on-shore and off-shore

Part two: energy conservation and distributed renewable generation objectives

8 Energy efficiency /micro-generation

9 Large-scale distributed generation('off-grid')

Part three: context

10 Consenting regimes

11 Grid Infrastructure developments

12 Research and development

Part four: invitation to respond

13 Opportunities and contact details

Part five: Summary of route map commitments

Annex A: Summary of possible electricity and heat generation from renewable energy in Wales by 2025

Annex B: Existing Welsh Assembly Government targets and commitments

Annex C: Indicative data on Wales' energy demand, supply and greenhouse emissions

Annex D: Future costs of renewable energy/banding of the Renewables Obligation

Annex E: Data base of potential large on-shore wind power schemes in Wales

Annex F: Availability of potential waste derived fuels

Annex G: UK/Wales energy consumption breakdowns

Annex H: Major energy developments since July 2007

Ministerial Foreword

“The time for equivocation is over. The science is clear. Climate change is happening. The impact is real. The time to act is now.

Climate change is as much an opportunity as it is a threat. It is our chance to usher in a new age of green economics and truly sustainable development. New economies can and must grow with reduced carbon intensity even as they create new jobs and alleviate poverty.

Those who have done the least to cause the problem bear the gravest consequences. We have an ethical obligation to right this injustice. We have a duty to protect the most vulnerable.

United Nations Secretary-General Ban Ki-moon. Bali Dec.2007

As the Minister for Environment, Sustainability and Housing within the Welsh Assembly Government, my top priority is the fight against the threat posed by climate change. This threat is clear and urgent. If it is not tackled now, the world faces catastrophic environmental, social and economic consequences.

In Wales, we have the opportunity to set a lead amongst small nations. One of our key steps to fight climate change must be to implement energy-related policies which will enable us to move as quickly as practicable possible to a low carbon energy economy in Wales. This will not be easy because energy is so fundamental to modern life. Without it, we would have no light, heat, computers, industrial processes or powered transport, and our food and water supplies would be at risk.

We have the will and natural resources to achieve this and to help others find ways forward through our example.

I call on all sectors and parts of society to engage with us on this agenda. The energy we use today will create pressure on the climate for generations – we need to act quickly and ambitiously as a society.

In December, our Wales Climate Change Commission met for the first time and committed us all to the leadership within our sectors for the step-changes needed. We will not be alone in this endeavour. The UK Government is introducing a world-first statutory framework through the Climate Change Bill and the United Nations is making genuine progress in developing an intensive approach to international actions.

Wales is exceptionally well placed to lead the transition to low carbon economies: in which energy is used efficiently, is produced as near to the consumer as possible and emits the minimum of carbon dioxide and other greenhouse gas emissions.

We are blessed with a large range of the relevant natural resources; we have a growing body of R&D expertise in the field and an excellent record over the last century of being at the forefront of previous successful energy transformations-associated with coal, oil, gas and most recently wind and biomass power.

We now need to look radically at the options and resources available to us and collaborate with the key energy and building sectors to support fundamental change within communities. This will include looking at the scope for an arms-length energy company to enable new investment and innovative competitions for exciting major renewable projects to capture the power of our tides.

Continuing into the long term with traditional fossil fuel options, at least without the introduction of carbon capture and storage systems, is not acceptable when we know that we stand a significant risk of leaving all our children and grand-children with unstoppable and catastrophic climate change, that is unless CO2 emissions have world wide limits set.

I know that there is always a temptation to say that there are other options – more energy efficiency, more imported fuels – or that we should pursue some form of renewable energy generation over others. But the fact is that we are likely to need to pursue every available option if we are to be effective, including ensuring that our learning, economic and environmental related programmes are all fully aligned with this agenda.

Further to our Wales microgeneration action plan which we published after consultation last year, the rest of this route map discusses the potential roles of different renewable technologies, our high level energy conservation strategies and some of the underlying issues such as planning and infrastructure. Our more detailed ambitions for major energy efficiency improvements will be the subject of a subsequent consultation on a new national energy efficiency and saving plan and we expect to publish an overarching Wales energy strategy in the autumn

I invite you all to take part in this vital debate and help guide the Government of Wales into a leaner, cleaner and greener Wales. Your responses will enable us to finalise this route map and associated action plans as well as informing our wider climate change and energy related work. This will in turn become a key part of the UK's national renewables action plan which will be required under the new EU Directive on the promotion and use of renewable energy sources.

Jane Davidson
Minister for Environment, Sustainability & Housing
Welsh Assembly Government
February 2008

Introduction

- 1 Purpose of consultation
 - 1.1 This document sets out proposals for moving Wales towards self-sufficiency in renewable electricity in a generation whilst at the same time driving very forcefully towards much more energy efficiency and much more of our extensive heating requirements being supplied from renewable sources.
 - 1.2 This consultation forms part of a series of proposals that will lead to the production of comprehensive climate change and energy strategies for Wales by the end of 2008 and assist in the development of the programme to deliver our commitment to achieve annual 3% reductions in greenhouse gas emissions from 2011 onwards: the delivery of all which will be undertaken through joint working across all parts of the Assembly Government.
 - 1.3 Energy efficiency and low carbon energy generation are only part of a wider picture. Resource efficiency more generally is also key to a successful and rapid transition to a low carbon economy. We will be taking this forward through a National energy efficiency savings plan and as part of our “Green Jobs” strategy.
 - 1.4 Also of major importance, will be the Assembly Government’s work to ensure that Wales develops the attitudes, values and skills which will ensure that people of all ages are able to embrace the transition to a low carbon economy. We need to embrace the philosophy across our public sector Assembly Government funded programmes, in particular to drive the debate through our education institutions from an enhanced eco schools agenda through our commitment to ‘Education for Sustainable Development and Global Citizenship (ESDGC) and to high level research in our universities.
 - 1.5 This consultation forms part of work to develop the evidence and analytical base over the next year to ensure that we work in a very joined-up way to help deliver maximum social, economic and environmental benefit from reducing climate change. The Wales Climate Change Commission will have a key role to play in overseeing and informing these activities

2. Setting the scene

- 2.1 Modern society is built around the secure and affordable supply of energy. Since the first wave of the industrial revolution started in the Heads of the Valleys in Wales two and a half centuries ago, the world has become increasingly reliant on the burning of fossil fuels to power our economies and societies.
- 2.2 Scientific evidence shows that the cumulative effect of all that fossil fuel burn is having a major impact on the world’s climate. We need to take immediate and urgent action if we are to avoid catastrophic global warming.
- 2.3 Even if measures such as carbon capture and storage can be introduced for fossil-fuel powered energy operations to reduce greenhouse gas emissions, the finite nature of these fuels (and uranium bearing ores from any nuclear power perspective) mean we must move towards a sustainable renewable energy society for our long-term energy needs. Fossil fuels already appear to be close to their global peak production levels, at least as regards to oil, and as they become scarcer and harder to access, there will be implications for energy security-of-supply, energy prices and availability of chemical feed-stocks.
- 2.4 The Stern Review clearly identifies the perils, environmentally and economically, of not acting now. The Intergovernmental Panel on Climate Change (IPCC) published its Fourth Assessment Synthesis Report in November 2007, which highlighted the risks we face from climate change and the need for urgent action.
- 2.5 Reflecting this urgency, the Assembly Government is committed from 2011 onwards to: 3% annual reductions in Wales’s greenhouse gas emissions in areas in which the Assembly has devolved competencies; specific sectoral targets and, by 2011 we want all new buildings in Wales to be built to zero carbon standards. Other relevant Assembly Government policy commitments are summarised in Annex B.
- 2.6 In Wales we have been pressing ahead rapidly and Annex H lists some of the major developments that have occurred already in Wales since July 2007.
- 2.7 The UK and Wales has signed up to the 2020 EU target of 20% of energy requirements (electricity, heat and vehicle fuels) coming from renewable sources, including those linked to the waste cycle. Wales is committed to this target as well and can contribute significantly by taking advantage of our considerable natural renewable sources of energy – wind, tide, wave, hydro and biomass – just as in the past we benefited from, and led the world, in using our coal reserves
- 2.8 However, the first, most cost-effective and immediate way we can reduce greenhouse gas emissions is to minimise our use of fossil fuel energy: for example by insulating our buildings to a high standard, purchasing the most energy efficiency appliances, using green tariff electricity and making sustainable transport choices.

- 2.9** Our ambitious plans to enable much higher levels of energy efficiency in all sectors in Wales are discussed in section 8 below (and will be subject to further own consultation later this year) along with the stimulation of much more distributed generation of energy as illuminated in detail by our 2007 Wales micro-generation action plan .
- 2.10** Renewable energy technologies – apart from bio-energy - do not release greenhouse gases into the atmosphere. In the case of bio-energy, the main gas emitted is carbon dioxide which has already been absorbed in the growth process of the crop, thereby neutralising the emissions-other than those associated with processing and transportation. During the construction of renewable energy plants, they will always have some form of carbon eco-footprint. However, the work of the Sustainable Development Commission, Parliamentary Office of Science and Technology and others have demonstrated that the carbon eco-footprints associated with renewable energy generation are much smaller than those arising from the combustion of fossil fuels.
- 2.11** As quantitative background, Annex C shows the Wales energy production and consumption statistics and related greenhouse gas related data. This shows that in 2005 total electricity generation in Wales was almost 35TWh and total consumption of electricity around 24TWh.
- 2.12** Even at this level of electricity consumption, and we are determined to see significant reductions in the long term for building and process related purposes, Wales has such potential for renewables that it should be technically be possible to generate as much electricity as we use as a country within the next 20 years or sooner. That is, the amount of electricity generated in Wales from renewables over the year would be at least equivalent to Wales' annual electricity consumption.
- 2.13** Renewables can also contribute to some of our heating needs especially through local combined heat and power, biomass and solar water heating. But the biggest impact on heating requirements will come from paying much more attention to energy efficiency in all our buildings. There is also scope to shape future action to address issues such as fuel poverty: for example through increased efficiency measures and district heating.

- 2.14** In looking at future options generally, there is considerable scope for combining economic, skills and social benefits, with the environmental ones. Across the Assembly Government basis we will:
- be developing a strong 'green jobs' strategy, building on previous skills and economic development initiatives, such as the 'green energy cluster' work and the recommendations of various high level bodies including the Webb review and the economic and skills Ministerial Advisory Groups and
 - working with our colleges, the relevant sector skills councils and the private sector to ensure Wales has the necessary skills base to enable the rapid transition to a low carbon economy.
- 2.15** Increased generation from renewables in Wales could also provide specific support to the rural economy through increasing the options for alternative energy for communities who are not connected to the gas network. There could also be opportunities for new income streams for those who either install micro-electricity units in their homes, communities or land or, those who live in communities associated with major renewables developments.
- 2.16** In exploring all these options we will:
- ensure maximum use is made of available resources, whether at the UK level as with the Low Carbon Buildings programme, the Carbon Trust , Nesta and much of the Environmental Transformation Fund and, more locally, through the application of EU Structural Funds
- 2.17** An indication is given in Annex D of possible future costs of electricity from different technologies, along with the Department of Business Enterprise and Regulatory Reform final proposals for banding the Renewables Obligations to provide the compensating subsidies. Details of these proposed new bands, along with the possible carbon savings from renewable resources, are also listed at the end of the individual renewable technology sections.

- Heat or combined heat and power(CHP) from waste biomass
- Electricity from waste biomass

For non-waste biomass:

- Replacement of oil for commercial/industrial heat, and CHP in high heat load applications
- Replacement of oil for commercial/industrial heat in seasonal heat load applications
- Replacement of gas for commercial/industrial heat in high heat load applications
- Co-firing in new coal-fired power generating stations with carbon capture
- Replacement of gas for commercial/industrial heat in seasonal heat load applications
- High heat load district heating replacing oil
- Co-firing at existing and new coal fired power generation plant
- Replacement of individual domestic oil boilers with biomass
- Electricity generation from power plant fired exclusively on biomass
- Replacement of individual domestic gas boilers with biomass
- First generation transport biofuels

3.8 The main current applications of biomass energy in Wales are in local biomass boilers and in the co-firing of biomass in coal-fuel stations. Two current major examples are UPM's innovative use of manufacturing wastes and biomass for power in its Shotton paper plant and the recently approved £400m 'Prenergy' 350MW development at Port Talbot- which will draw on imported biomass from sustainable sources and is expected to be the world's largest biomass electricity plant when it is completed, with construction expected to start in 2008.

Supporting the environment

3.9 Domestically-grown biomass will be in competition for agricultural land. An increase in crops and particular types of crop in Wales will impact on ecosystem quality issues, including biodiversity, water quality, and flood risk. As with all large scale changes in land use, biomass energy crops carry the risk of adverse landscape impacts and wider negative carbon impacts, for example through loss of soil carbon due to ploughing or due to energy intensive cultivation.

3.10 These considerations suggest that a large-scale increase in land cultivated especially for biomass in Wales might be problematic. We therefore propose to:

- test the viability of additional local biomass energy in developing axis 2 agricultural proposals and
- Support larger scale biomass projects where the fuel source is demonstrably sustainable.

Community engagement

3.11 The greatest carbon emission savings arise from the use of locally grown biomass for the local generation of heat or electricity or in a combination. There is considerable potential for reproducing the community scale plants already common in central Europe with positive benefits for community development.

3.12 We propose to:

- support the development of community heat and power units under a new wood energy business scheme- which could be funded through EU Structural Fund programmes;
- ask designers and contractors to use biomass-energy plants where possible in the development of residential and commercial properties on Assembly Government-owned land;
- provide advice through the newly formed Sustainable Energy Network on opportunities for community heat and power schemes across Wales;
- encourage all other public sector bodies to support biomass energy developments, where possible through long term feedstock purchase contracts which give growers the confidence to make the necessary investments;
- consider the scope for requiring biomass combined heat and power for larger-scale developments.

Overcoming barriers/timescales and targets

3.13 The multiple nature of biomass sources, conversion processes and uses (energy and non-energy related) means that biomass energy considerations can be highly complex and vary with location. Issues range from public acceptability, uncertain economics - local and international - and complex potential serious environmental and food chain impacts.

3.14 Therefore, and in parallel with the UK Government's biomass strategy published in 2007, the Assembly Government intends to:

- publish for consultation a biomass energy strategy/action plan which fully explores these complexities in the Welsh context. This will also cover the important issue of how to ensure that biomass energy fuel stocks used in Wales, including imports, come from certified sustainable sources.

3.15 There is undoubtedly an opportunity to increase the contribution to the biomass feedstock arising from better harvesting of private woodlands. We propose to:

- explore how the new Better Woodlands for Wales grant scheme could be more closely targeted or arrangements made to encourage cooperative action on the part of groups of farmers to identify and source biomass material for specific initiatives

3.16 It is not clear that biomass will be the best commercial option for future arable crops in Wales. Other parts of the world are well established in energy crops for reasons of climate and availability. With increasing energy demand pushing out traditional crops elsewhere in the world, it may well be that Wales should focus more on growing food crops. We will:

- consider the opportunity costs of increased biomass in our Axis 2 review.

3.17 Many potential projects at the moment appear to be constrained by the availability of quality biomass fuel in the market place. We would therefore welcome

- interest from intermediaries who might be able to establish secure and reliable supply chains.

3.18 Our interim analysis indicates that biomass (both indigenous and imported) might annually generate some 4 to 7TWhr pa of electricity and about 1.5TWh pa of heat and that a policy which gives highest priority 'to local biomass for local energy production' is likely to meet most sustainable development objectives. This might be achieved by 2015, especially if public sector projects can be used as exemplars as soon as possible. Some of these projects are discussed in the distributed generation sections below.

	ROCs yr MWh	Peak electrical power MW(e)	Peak useful thermal power MW(th)	Electrical energy generation TWh(el)/yr	Usable heat energy TWh(th)/yr	Potential Carbon savings t/yr
Heat	0		267		0.4	24,000
CHP	2	81	168	0.5	1.1	107,000
Electricity (regular biomass)	1.5 to 2	54		0.4		40,000
Electricity co-firing	0.5 to 1	75		0.7		145,000
Electricity (waste wood requiring WID compliance)	1.5	40		0.3		63,000
Electricity (imported woodfuel)	1.5	350 -700		2.5 -5		270,000 to 540,00
Total		600 -850	435	4.5 -7	1.5	600 - 860k

4. Marine: tides and waves

4.1 The Sustainable Development Commission's (SDC) 2007 report on tidal power in the UK, made clear that there is considerable potential for marine based energy capture. In particular, the tidal power resource (tidal stream and tidal range) around Wales is very significant.

4.2 Overall the SDC study concluded that the UK could in theory meet 5% of its electricity needs from tidal stream projects: a further 5% of electricity could come from tidal-range projects, mainly from the Severn estuary. There is a considerable potentially exploitable wave-power resource off south west Wales which could also be exploited. This gives Wales an exceptional opportunity to be at the leading edge of marine renewable energy developments globally

4.3 Depending on decisions about a Severn barrage, the potential in Wales from tidal and wave projects by 2025 could be more than half of our current electricity consumption. And, while much tidal-stream technology is still currently at a research and demonstration stage, and is unlikely to be in full gigawatt scale operation until after 2020, there are a range of interesting projects which are already at or near the major commercial feasibility stage. These include the EoN/Lunar tidal stream and Wave Dragon wave-power projects which are looking at sites off Pembrokeshire; the RWE/MCT Anglesey tidal stream proposal and the University of Swansea/Swan Turbines tidal stream developments.

Supporting the Environment

4.4 Following a range of initial studies undertaken on behalf of Countryside Council for Wales, the Assembly Government has commissioned a comprehensive study to collate all the relevant environmental data for the seas of Wales, with a report expected later in 2008. This will help to inform how tidal stream and wave technologies could be developed with minimal impact on marine eco-systems.

4.5 There are gaps in our understanding of the individual and cumulative impacts of renewable energy developments on the marine environment including negative impacts on specific habitats and species, and associated changes in sedimentation or current patterns (e.g. from tidal energy schemes or the positioning of constructions on the sea bed). Environmental impact assessments will be needed for all phases of construction, maintenance, grid connection and decommissioning.

4.6 The future UK Marine Bill will introduce a system of marine planning that will take account of all activities and sectors and set out a strategic framework for managing the marine area as a whole.

Community engagement

4.7 Public consultation and stakeholder participation will play an important role in the drawing up and agreeing of marine plans and projects. Considerable community opposition to major off-shore renewables may be expected on the grounds of visibility, concern about impacts on seals, dolphins and other marine life, interference with navigation and safety. Under marine spatial planning process, stakeholders will be able to get involved in the development of plans and the principles that will guide the use of the marine area at an early stage, so that potential conflicts can be resolved before a specific proposal is made. Marine renewable energy projects may also be able to provide considerable local community benefits, such as the proposed tidal lagoon at Rhyl. We will:

- ensure that the future framework for marine planning enables consideration of the role of marine renewables.

Overcoming barriers/ timescales and targets

4.8 The Sustainable Development Commission study indicated that marine projects raise a wide range of potentially difficult sustainable development issues- social, environmental and economic. Some technical issues such as grid- transmission network connections are solvable but may require undersea cable connections.

4.9 Local environmental impacts and associated legal issues (such as those raised by the EU Habitats, Birds and Water Framework Directives) will require a great deal of further work before large scale deployment can be contemplated. We will:

- ensure that the environmental impacts of a Severn Barrage and other proposals are fully tested.

4.10 Tidal stream and wave technology development demands stronger private and public sector support. We will:

- support opportunities for and encourage various marine feasibility studies and research into specific technologies.

For tidal lagoons, we will: :

- examine whether EU Convergence Funds could be used to run a competition to identify the best tidal lagoon site in Wales and support the preparatory phases of constructing perhaps the world's first tidal-energy lagoon.

4.11 The UK Government has also recently announced that tidal lagoons and small tidal barrages should be eligible for enhanced support through the banding system within the Renewables Obligation.

4.12 For tidal power in the Severn Estuary with its immense potential, a special UK Ministerial committee with Assembly Government participation has been established to examine in depth the many issues surrounding this project.

4.13 In the light of these exceptional marine energy opportunities, we propose to:

- develop a Wales marine energy action plan to consider all these marine proposals. The action plan will also look at the economic and international opportunities for Wales from being at the forefront of marine energy developments over the next 30 years including the important civil engineering construction skills aspects.

4.14 It is estimated that up to 14TWhr per annum of renewable energy could be produced from our marine resources by 2025 - allocating a notional half the output of any major Severn barrage to Wales and half to the south west of England.

Technology	Proposed ROCs per MWh	Peak electrical power MW(e)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Potential Carbon savings t/yr
Severn barrage	n/a	8,500	25	9*	1,050,000
Other marine, inc wave, tidal stream, lagoons	2	1,000 to 2,000	30	2.5 to 5	300,000 – 600,000
Total		Up to 10,500MW		Up to 14TWh	Up to 1,600,000 t/yr

* Half of expected total output from this joint England and Wales project

Hydro-electricity

- 5.1** In many parts of the world including Scotland, hydro-power plays a very significant role in energy generation. Traditionally many areas of Wales used local hydro for industrial process for wool production etc. through water wheels but this has largely fallen into disuse in the second half of the 20th Century.
- 5.2** Currently Wales has some 150MW of operational hydroelectric plants (with the largest of these being the 60 MW Dolgarrog operation) as well as the large world-class hydro-related Dinorwig and Blaenau Ffestiniog pumped-storage power stations (which use off-peak grid power)
- 5.3** Hydroelectric plants in Wales generated 0.28TWh of electricity in 2005, and the pumped storage schemes generated 2.3TWh. However, the two pump storage stations can only be considered “renewable” if the energy used for pumping the water to the top reservoirs comes from renewable sources. Most of our significant hydro stations are in north and mid Wales.

Supporting the environment

- 5.3** The main concern for new hydro schemes in rivers is their impact on water abstraction and on fish movements. This is regulated by the Environment Agency. Any larger-scale schemes would also have wider intrusion into the environment which would require very careful consideration. In particular several rivers are designated as Special Areas of Conservation under the Habitats Directive, conferring high standards of protection and any major changes to the hydrology would need considerable study. We will:
- explore with the Environment Agency Wales the scope for enabling more in-river local schemes.

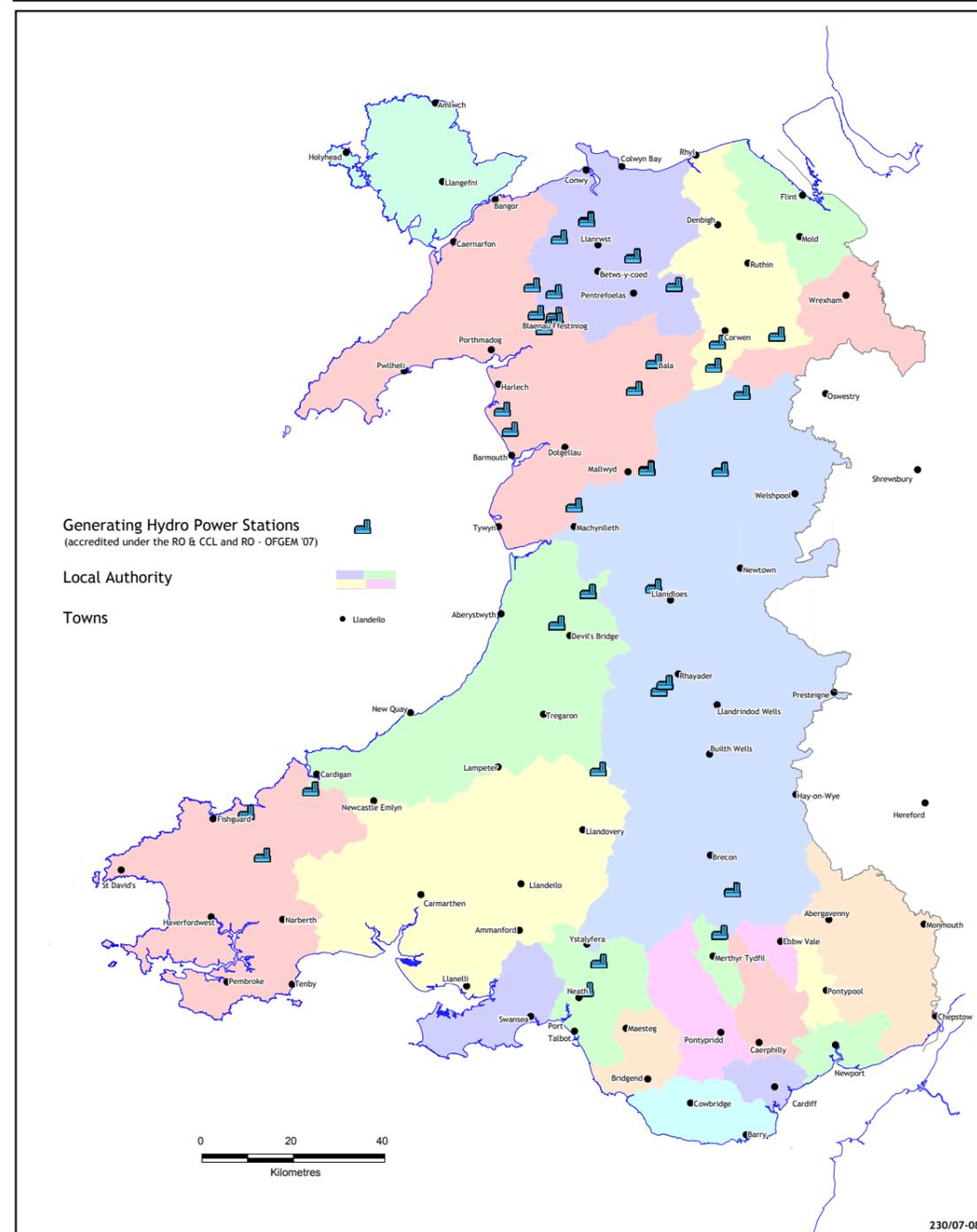
Community engagement

- 5.5** Smaller scale hydro schemes can be very good community projects, with low maintenance costs and regular income. Such developments have been supported previously using EU Objective 1 Funds. We will:
- assist the development of community hydro power proposals using new Convergence funds.

PLANNING FOR RENEWABLE ENERGY

NOVEMBER 2007

WALES - Hydro Electricity Stations



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Overcoming Barriers/timescales and targets

- 5.6** The development of large amounts of new hydro-power in Wales is not thought possible given our topography - the creation of new large volumes of water which would be required is most unlikely to constitute sustainable development . There may be one or two exceptional opportunities to develop plants at the 5/10 MW level in an environmentally acceptable way, but most new developments are expected to be small 'in river' hydro-schemes in the 50 to100KW range.
- 5.7** We propose to:
- undertake a study, jointly with Whitehall, to identify the potential for new hydropower schemes in Wales and England. The results should provide clear information on the most appropriate locations for developing new hydro-electric power plants.
- 5.8** Current estimates indicate that in Wales a further 10MW or so of renewable electricity capacity might be a reasonable target for in-river hydro schemes.

Technology	Proposed ROCs per MWh	Peak electrical power MW(e)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Potential Carbon savings t/yr
Hydro-electricity	1	200	40	0.7	80,000

6. Waste

- 6.1** Residual wastes, following the removal of useful material for recycling, can be a significant source of renewable energy. Energy from waste (EfW) processes contribute to greenhouse gas reduction both through generation of energy from the organic matter in the waste stream, and from the avoidance of release of methane from landfill sites.
- 6.2** Obtaining energy from waste provides a sustainable and cost effective alternative to landfill-which is the only other option for wastes that cannot be eliminated, reduced or recycled. The potential for energy from waste is being driven commercially by the stringent EC Directive targets to reduce substantially the landfill of biodegradable municipal waste and associated landfill tax measures. Businesses producing combustible and biodegradable wastes are facing increasing costs for disposal.
- 6.3** Heat and power can also be generated from agricultural wastes with beneficial reduction of methane release.
- 6.4** The potential sources of wastes that could be used as fuel are summarised in Annex F.

Supporting the environment

- 6.5** The selective use of energy from waste facilities for residual waste disposal can offer a number of environmental benefits whilst complementing existing recycling initiatives. One of the top performing EU regions, Flanders, has a household waste recycling rate of 71%, with 28% going to energy from waste plants and less than 1% to landfill.
- 6.6** Levels of energy from waste above 30-35% begin to have a negative carbon balance as they involve combustion of energy-intensive materials that are better recycled.
- 6.7** Traditional incineration plants have underperformed in the UK. These have been almost exclusively conventional mass-burn incinerators, a number of which had inadequate abatement plant and poor control over emissions.
- 6.8** Modern EfW plant has to meet stringent operating standards set by the Pollution Prevention and Control (England and Wales) Regulations 2000, which implement the provisions of the EU Waste Incineration Directive (WID). This has enabled some EU Member States to establish CHP plant fuelled by local waste in urban areas. EfW plants operating under the terms of the Waste Incineration Directive (WID) have lower emissions than comparable industrial processes or traditional energy plants.
- 6.9** Flanders, the Netherlands and Denmark are particular examples of this, with 70,000 houses in the Greater Copenhagen area currently receiving power from EfW plants via a large-scale district heating and power infrastructure.
- 6.10** If plants are operated in accordance with the stringent standards set to ensure compliance with the Waste Incineration Directive, then the risks of health impacts are not significant. The Health Protection Agency has said that: "Incinerators emit pollutants into the environment but provided they comply with modern regulatory requirements, such as the Waste Incineration Directive, they should contribute little to the concentrations of monitored pollutants in ambient air. Epidemiological studies, and risk estimates based on estimated exposures, indicate that the emissions from such incinerators have little effect on health."

Community engagement

- 6.11** Plants can be operated to link in with local circumstances, for example:
- The Shetland Islands facility supplies heat to around 840 domestic and commercial customers in the town of Lerwick. It takes around 22000 tonnes per annum of household waste from the Shetland and Orkney Islands and assorted off-shore arisings from the oil exploration industry, producing around 7MW of thermal energy, which is converted to hot water. The facility is run by the local authority, who sells the heat produced to a third party [Shetland Heat And Power], who in turn distribute it to customers via a 26km district heating ring. Average cost savings to customers compared to the traditional forms of heating on Shetland [predominantly oil-based] is between £500-£700 per annum. The efficiency of this plant is over 80%.
 - The Cyclerval facility supplies heat and electricity to an adjacent industrial estate. The facility takes around 56000 tonnes per annum of household waste from north east Lincolnshire, and produces around 3MW of thermal heat and 3MW of electricity. The operation is run by Newlincs Development Ltd on a 25 year gate-fee contract with North East Lincolnshire Council.
- 6.12** There has been a good level of community engagement in the Shetland scheme and a direct financial benefit to participants within the scheme.
- 6.13** We will:
- support community engagement through an energy from waste toolkit for use by local authorities when considering applications for developments.
 - consider the energy potential for utilising food and other non-hazardous waste from relevant public sector operations such as hospitals.

Overcoming barriers/targets and timescales

- 6.15** The Assembly Government is currently setting out a review of the Wales waste strategy *Wise about Waste*, and intends to consult widely upon the content of this review in 2008. The review will give new targets for recycling for the years 2012-13 and beyond, and will also cap the use of residual household wastes in energy from waste facilities at 30% from 2010. The development of energy from waste infrastructure within Wales will need to be developed to support these Assembly Government waste policy targets.
- 6.16** We will:
- produce a 'best-practice' design guide for new waste management facilities with exemplar facilities illustrating for developers and local authorities what can be achieved.

Examples of the potential for 'energy from waste' are set out below :

Technology	ROCs per MWh	Peak electrical power MW(e)	Peak useful thermal power MW(th)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Usable heat energy TWh(th)/yr	Potential Carbon savings t/yr
EFW (inc sewage gas) No CHP	0-0.5	30		80	0.2		24,000
EFW* with CHP	1	30	68	80	0.2	0.5	63,000
AD food waste	2	20	50	80	0.1	0.2	16,000
AD sewage sludge and agricultural slurry	2	23	84	80	0.2	0.2	24,000
Total		103	202		0.7	0.9	128,000

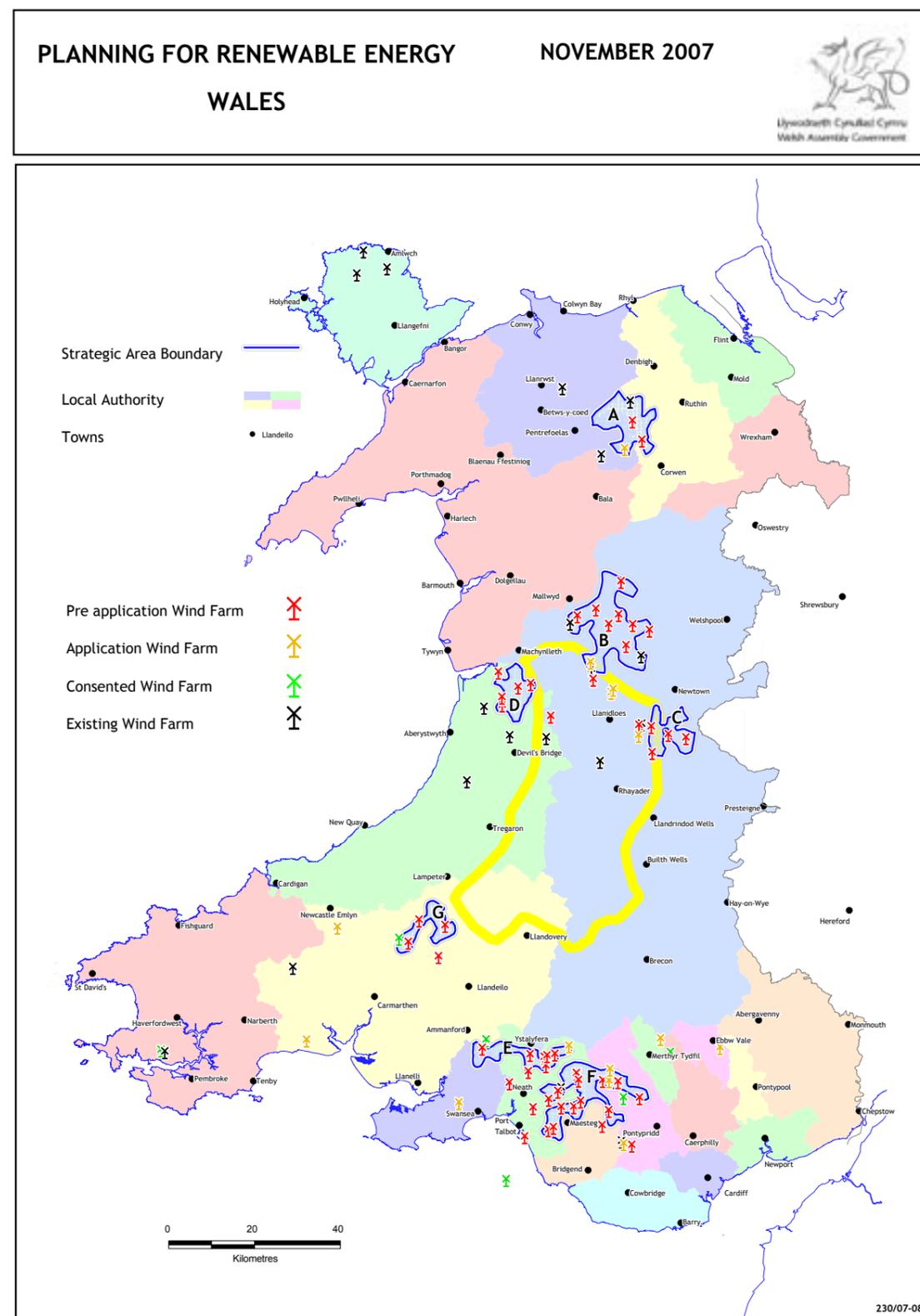
7. Wind: on-shore and off-shore

- 7.1** Wind energy is the most readily available commercial renewable technology and Wales' weather and geography means we are well placed to use it.
- 7.2** Wind power is variable. The load factor of a wind turbine on land is about 30% and off shore about 40%. As with all large scale energy plants they must be supplemented with other flexible energy sources, including storage capacity. Wales' major pumped-storage stations' role in responding to sudden variations in UK power demands could be extended to store power from intermittent renewable sources.
- 7.3** Over the past 10-15 years some 300MW of wind turbines have been constructed onshore in Wales. There is also one offshore wind farm (60MW at North Hoyle) and outline consents have also been given to 2 moderate size (100MW) off-shore wind-farms in the relatively shallow seas at Rhyl Flats in the north, and Scarweather Sands in the south.

7.4 Much of Wales' existing wind farms consist of sub 1MW turbines but technological developments now allow construction of significantly larger 2 to 3 MW (or even higher) turbines of very high efficiency. Annex E outlines the scale of the potential plans for commercial wind-farms in the seven strategic search areas identified through the 2005 TAN 8 'Planning for renewable energy' guidance as being the most appropriate locations for larger scale wind-farms in Wales- outside of brown field sites. These strategic search areas constitute a few percent of the land mass of Wales

7.5 The Forestry Commission is now undertaking the process of leasing the land which it manages within the TAN 8 strategic search areas for major wind farm developments on a competitive basis. The successful wind farm developers in the bidding process have now been offered options for this land (which constitutes a very small fraction of the forested area of Wales) requiring the minimum of tree felling. These development proposals will be subject to normal planning consent processes and will need electricity grid connections.

7.6 Offshore, there are already proposals for two very large wind-farms, 750MW off Abergele and 1500MW in the outer Bristol Channel straddling the Wales/England median line near Lundy: with the potential for more following the completion of the recently announced England and Wales off shore wind strategic environmental assessment exercise.



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Atgynhychwyd y map hwn o fap Arolwg Ordans Cynulliad Cenedlaethol Cymru gyda chaniatâd yr Arolwg Ordans ar ran Rheolwr Llyfrfa Ei Mawrhydi, © Hawlfraint y Goron. Cedwir pob hawl Byddai ei atgynhyrchu heb ganiatâd yn torri hawlfraint a galai arwain at eich erbyn neu ddwyn achos sifil yn eich erbyn. Rhif trwydded : 100017916

Supporting the environment

- 7.7** Wind farms mean changes to landscape or seascape and can have localised impact on habitat and soils in the construction phase. For on-shore developments, TAN 8 considered the issue of landscape impact and designated areas in order to ensure that National Parks and Areas of Outstanding Natural Beauty, amongst other areas, would not be included as strategic search areas. Details of the extensive assessment used to derive these areas, together with the various constraints are contained in Arup's final report of 2004 as a basis for the TAN8 guidance- which is available on the Assembly Government's web site. It should be noted that on shore wind farms are only consented for a 25 year period and decommissioning is a relatively simple procedure-in considerable contrast to nuclear power stations.
- 7.8** We will:
- continue to pursue the proposals in Tan 8 and monitor the uptake of wind farm sites before undertaking a further review in the light of this and related consultations.

Community engagement

- 7.9** Large schemes should always include community benefit as part of the proposal: for example the Wales Forestry Commission wind farm leasing proposals include a premium for community benefit as part of the lease terms.
- 7.10** Community benefit is not a basis for awarding permission to be given to a proposal that otherwise would be unacceptable in planning terms but there is a high priority on the active engagement of local communities in these proposals. We would want to see developers discussing with communities as wide a range of community dividends as possible, including where appropriate energy voucher schemes.
- 7.11** As yet there have been few community-owned wind energy developments in Wales. Local planning authorities may define in more detail what is meant by "smaller community based" developments- for which there is no geographic prescription in TAN 8 and include appropriately worded policies within their development plans. One exemplar is the project at Moel Moelogan (Cwmni Gwynt Teg) which now comprises three turbines which have an installed capacity of 1.3MW. Since production started in January 2003, the turbines at Moel Moelogan have been producing electricity at an average of 43% of their nameplate capacity. A recent survey of 22 larger hospital sites identified wind generating potential was available in 8 locations. The majority of these locations, however, may be potentially compromised by environmental considerations.

- 7.12** While the landscape changing nature of large windfarms has required the very careful selection of strategic search areas, single or double large turbines (or a cluster of smaller turbines) can normally be sited sensitively in a way which either enhances the landscape or has minimal impact. Hence the lack of prescription in TAN 8 for windfarms of up to 5MW capacity

- 7.13** We will:
- develop, with partners, a strategic bid for a Convergence Fund project aimed at delivering a series of community scale wind energy generation projects across the eligible area.

Overcoming barriers/timescales and targets

- 7.14** The 2005 Sustainable Development Commission's wind energy report set out the arguments for and against wind energy and came down firmly in support of the overall benefits of carefully located developments.
- 7.15** Some TAN 8 strategic search areas need higher capacity electrical connections to the National Grid. This issue is now being considered in depth by National Grid Transco in conjunction with the relevant electricity distribution companies, the Welsh Assembly Government and OFGEM. This provision of new grid infrastructure is always time consuming and means that many of the proposed large wind farms, even if planning permission is obtained, are unlikely to be in place before 2010. Grid connection issues are discussed in Section 11.
- 7.16** We will:
- review TAN 8, revising upwards the old targets for renewables- drawn from a range of sources- following the publication of the Assembly Government's energy strategy later in 2008.
 - support UK work on a strategic environmental assessment (SEA) for offshore wind generation in English and Welsh territorial waters.
- 7.17** If all potential projects were to go ahead in full, wind-farms within the TAN 8 strategic search areas could produce up to 2500MW of capacity: three times the existing TAN 8 indicative target for 2010. This could create almost 7TWhr per annum from onshore wind by 2015 – almost a third of Wales' current electricity demand. Major new offshore wind projects could add at least another 3 TWhr annually.

Technology	Proposed Renewable Obligation Certificates per MWh	Installed generation capacity (MWe)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Potential Carbon savings t/yr x 1000
On-shore wind	1	Up to 2500	30	Up to 6.5	750,000
Off-shore wind	1.5	500-1000	40	1.7 to 3.5	200,000 – 400,000
Community wind	1	100	25	0.2	20,000
Total		Up to 3,500MW(e)		Up to 10TWh	Up to 1,150,000t

Part Two: Energy Conservation and Distributed Generation

8. Energy efficiency

- 8.1** While the purchase of green electricity when offered by suppliers under green tariffs is very beneficial, the localised production of energy has the great additional benefit of making people much more aware of their energy consumption and 'reconnects' people with energy supply
- 8.2** The previous Assembly Government produced Energy Saving Wales three years ago to drive progress on energy efficiency. It contained a wide range of actions and reflected the key role that the Carbon Trust and Energy Saving Trust play in promoting energy efficiency and innovative building design, including maximising passive solar aspects. Wales consumes slightly less than the UK average of energy per head. The breakdown of energy consumption in Wales at Annex G outlines the trends in energy consumption, both in relation to the UK, and also by sector where relevant.
- 8.3** Under the auspices of a new National energy efficiency and saving plan (on which there will be a separate more detailed consultation later this year) we will take forward:
- The Sustainable Energy Network (SEN) - The Energy Saving Trust has just launched its initial Sustainable Energy Network service for Wales, which the Assembly Government has helped fund. The SEN in Wales will expand the current service to offer advice to a wider audience of householders, communities and micro-businesses on energy efficiency. The Sustainable Energy Network of Wales' wide advice centres will also offer a greater scope of guidance, including green homes programmes, micro-generation and transport issues.

- The Carbon Emissions Reduction Target (CERT) - The UK Government will be increasing the overall saving targets on energy suppliers, and extending the range of incentives suppliers can offer to their domestic customers through the Carbon Emissions Reduction Target (CERT) from April 2008, which will replace the Energy Efficiency Commitment (EEC). Carbon savings from micro-generation measures (both electricity and heat) can then be counted towards the reduction targets, as can behavioural measures which reduce consumption of energy.
- Smart Meter Installations - Energy suppliers are now starting trials of smart meters with households in England, Wales & Scotland. We are working with the Department for Business, Enterprise and Regulatory Reform and the energy regulator, Ofgem who are setting up and monitoring these trials. A number of households and one community in Wales, St Athan, will be part of the trials by Scottish and Southern Energy. Smart meters are sophisticated devices, capable of giving householders and energy suppliers detailed information on the pattern of energy consumption and enabling suppliers to offer more bespoke tariffs and tariff packages. They can be invaluable tools in helping consumers reduce the cost of energy consumption.
- In our National Energy Efficiency and Saving Plan in consultation with a wide range of partners, including the private sector, we will look at overcoming barriers in more detail, including better use of existing powers.
- The grading of green energy tariffs - We very much support the work of Ofgem in promoting the proper grading of 'green energy electricity tariffs' so that consumers know precisely what green energy measures are supported by each tariff
- The devolution of the Building Regulations: Assembly Government control of the Building Regulations, in addition to our existing Town and Country Planning powers, should enable us to ensure all new buildings in Wales are built to the highest possible low carbon standards, both in respect of energy efficiency and the use of renewable energy. Higher standards through devolved Building Regulations would be aimed at delivering the aspiration for all new buildings to be zero carbon by 2011. Over the next 3 years the Assembly Government will be looking to demonstrate a path to zero carbon buildings through construction work it funds.

Micro-generation

8.4 The Wales Micro-generation Action Plan was published in March 2007 and since then we have issued a Planning consultation on related permitted development rights in relation to domestic properties. Research has recently been commissioned (jointly with the UK Department for Communities, and Local Government) on the potential for micro-generation equipment on commercial buildings and the planning implications of this. The final report will inform future changes to the planning consent regime in due course.

The variable nature of most microgeneration technologies makes it unlikely that all the electricity produced will be used at the time of generation. Until storage technologies improve, in the vast majority of cases, the excess electricity will be fed back/exported into the distribution network gaining the benefit of utilities' renewable energy feed in tariffs (REFIT)

8.5 We will:

- issue planning guidance to make micro generation easier to install; in particular for:
 - Roof mounted solar heat and solar (photo-voltaic) electric panels .
 - Ground, water and air source powered heat pumps
 - Building mounted micro-wind electricity turbines or stand alone small wind turbines
 - Biomass electricity or heat generating units, especially for larger properties or community projects.
- encourage utilities to pay a fair price for the 'export' of locally produced electricity on to the grid.
- examine skills needs with the Sector Skills Councils, to ensure an effective micro-generation equipment supply and fitting sector.
- increasingly build micro-generation into our locally funded programmes, as part of our commitment to zero carbon buildings.
- under our green jobs strategy, building on Wales already substantial solar photovoltaic industry to be an effective champion for this highly promising technology.

8.6 We will also:

- provide information through the new Farming Connect service which will include guidance and advice for farming families on energy efficiency and micro-generation
- increase the role of renewable/alternative energy solutions under our Home Energy Efficiency Service.
- work with stakeholders to ensure the public has clear information on the benefits of micro-generation.

8.7 The total annual energy produced from the strategy targets for micro-generation would be circa 0.45 TWhr each for heat and electricity.

Technology	Proposed Renewable Obligation Certificates per MWh	Installed generation capacity (MWe)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Annual heat power output	Potential Carbon savings t/yr
Micro-generation	2	500	10	0.45	0.45	90,000

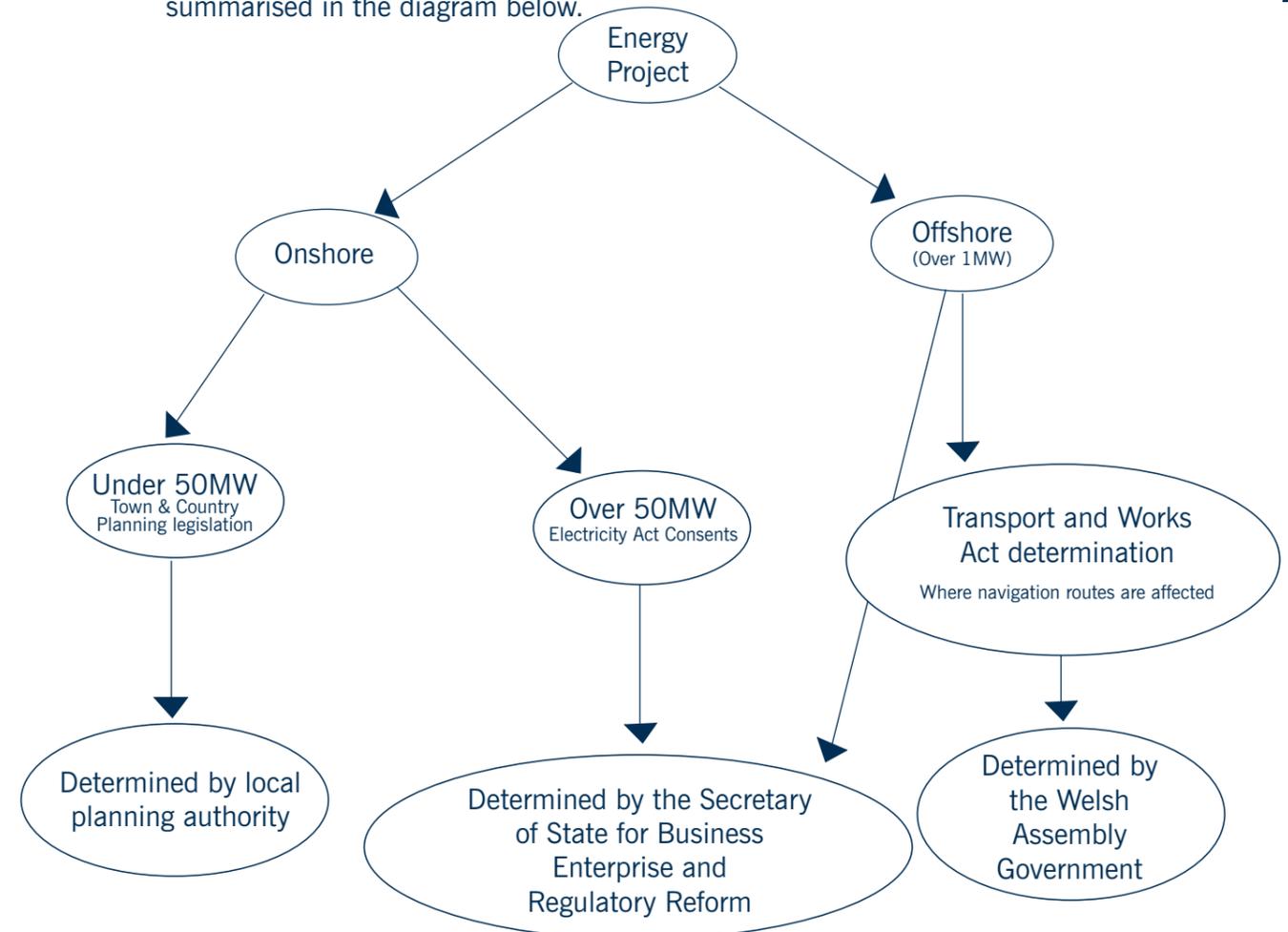
9. Large scale distributed generation (off-grid')

- 9.1** Keeping the generation and use of electricity within a local community removes a large part of transmission losses associated with centralised power stations (though there still needs to be connection to the national grid to ensure power is available should the local generation fail). This kind of local generation is particularly attractive when it is based on renewable energy sources, giving rise to community benefits and employment as well as electricity, and innovative financing of such developments, especially by special purpose energy supply companies (ESCOs), can enable rapid progress.
- 9.2** A number of forward looking companies in Wales are taking the initiative of developing renewable sources for their own large heat and power requirements. For example, Dwr Cymru has three combined heat and power (CHP) plants running on biogas and producing about 600kW of electrical power as well as over a megawatt of heat for use on the company's site. This organisation is looking at a significant increase in the amount of CHP use in the near future and also at the development of wind turbines for the generation of more electrical power for on site use.
- 9.3** G24i, the Cardiff based manufacturer of flexible photo-voltaic films and Toyota at its Deeside engine plant in north Wales are other companies currently seeking planning approval for wind power on their sites. The Welsh NHS is investing in a number of leading edge projects in its hospital estate. ABP is actively investigating the potential for its ports estate in Wales.
- 9.4** We will:
- support community-sized wind, biomass and hydroelectric schemes through the provision of grants through the climate change framework of the EU Convergence Funds programme
 - guide businesses interested in generating their own renewable energy.
- 9.5** We will:
- explore the scope for a CHP scheme for the Cathays Park area of Cardiff where the main Assembly Government office is located.
 - explore the scope for developing energy supply companies (ESCO) in Wales that could support off-grid developments and innovative energy efficiency packages.

Part Three: Context

10. Consenting Regimes

- 10.1** There are a number of different pathways by which renewable energy projects are granted consent in Wales. The scale and location of the project will affect which route is taken and therefore which body has the ability to decide on whether consent will be given. The key pathways for determining energy projects in Wales are summarised in the diagram below.



- 10.2** Currently large onshore power station consents above 50MW (and offshore projects above 1MW) are a matter for the UK Department of Business Enterprise and Regulatory Reform (DBERR). The Assembly Government and its agencies are consulted on such projects with local stakeholders being statutory consultees. Only the objections of local authorities can now institute a public inquiry. Occasionally consent for off shore development can be obtained under the Transport and Works Act (TWA) if navigation lanes are affected. Consents under the TWA are devolved to the Assembly Government. Consents granted in these ways are outside the normal Town and Country planning system.

- 10.3** These provisions normally only apply to large wind and biomass projects with most renewables, including micro-generation projects, being a matter for local authority planning consent, with the Assembly Government holding the usual call in and appeal functions. We are currently undertaking a consultation exercise about changing householder permitted development rights. This exercise considers the merits of removing the requirement to obtain planning consent for householders to install certain types of micro-generation technologies. The results of this consultation together with research on non-domestic micro-generation, which we have jointly commissioned with the UK Department of Communities and Local Government, will be assessed and published later in 2008.
- 10.4** The Assembly Government's planning policy on all types of renewable projects is contained in the Ministerial Interim Planning Policy Statement (01/2005) Planning for Renewable Energy and in the accompanying Technical Advice Note 8(TAN8), which was published in 2005. -Both of these documents are available on the Assembly Government's web site at:
<http://new.wales.gov.uk/topics/planning/policy/?lang=en>.
- 10.5** Whilst the policy and technical advice consider all types of renewable energy, onshore wind offers the greatest potential for an increase in the generation of low cost electricity from renewable energy in the short to medium term. Following extensive detailed technical work the Assembly Government has established seven Strategic Search Areas (SSAs) where large-scale (over 25MW) onshore wind developments should be concentrated. These key areas constitute only a few percent of Wales' landmass. The characteristics used to define SSAs in TAN 8 remain unchanged since 2005 and consequently the Assembly Government continues to believe that the seven SSAs remain the most suitable locations for large onshore wind farms: although the possible relaxation of Ministry Of Defence's previous concerns regarding tactical training areas could enable a few further strategic areas in Wales to be identified in the future if that were thought appropriate.
- 10.6** The SSA boundaries are at a "broad brush" scale. It is a matter for local planning authorities to undertake local refinement, taking into account local landscape, visual and cumulative impact issues to guide and optimise initial development whilst ensuring that environmental impact is kept to the minimum. The Assembly Government expects the relevant local planning authorities to include the revised boundaries of the SSAs in their Local Development Plans.
- 10.7** Small wind farms of up to 5MW if carefully sited can have minimal environmental impact and therefore the TAN8 guidance places no geographical restriction on the location of such wind farms. Similarly, on brown field sites, wind farms of up to 25MW might be accommodated.

- 10.8** Under the current regulations governing planning fees, applications for wind turbines under 50 MW attract a sliding scale fee calculated on a per hectare basis. These funds are expected to cover the costs incurred by local planning authorities in determining such applications. In recognition of the concentration of wind energy developer interest in the strategic search areas and the implications for local planning authorities associated with that, the Welsh Assembly Government has announced its intention to provide financial support for authorities with such areas within their administrative boundary. The details are currently being worked up and are the subject of discussions with local authorities.
- 10.9** The potential for the development of wind power within urban/industrial areas in Wales is so far relatively untapped.
- We will:
- strongly encourage the exploration of opportunities for wind developments of up to 25MW in urban/brown field site areas.
- 10.10** Off-shore wind-farms are now normally consented by DBERR under Section 36 of the Electricity Act 1989 (using the provisions of the Energy Act 2004) with the Assembly Government being an informal consultee, and with leases provided by Crown Estates where they own the seabed. The associated Food and Environment Protection Act (FEPA) consents off Wales are a matter for Assembly Government approval. Future consent processes, including for associated land-based developments such as cables and sub-stations, may be affected by the UK Government's new energy, marine and planning legislation. The current proposal for consideration of offshore projects by any new Infrastructure Planning Commission (IPC) suggests that only projects above 100MW should fall into the IPC's remit.
- 10.11** Regulations introduced by the Assembly Government in respect of Local Development Plan preparation require local planning authorities to put in place a Community Involvement Scheme (CIS). This places a requirement on local planning authorities to rethink ways of engaging with a full spectrum of the local community throughout plan preparation. The Assembly Government has produced detailed guidance on the content and process of producing a CIS and this must be submitted to the Assembly Government, together with a timetable for the plan as part of a Delivery Agreement. The Delivery Agreement must be agreed by the Assembly Government whose role it is to ensure that it is robust, realistic and covers the main plan preparation requirements.
- 10.12** When a planning application for a renewable energy project is submitted, it must be subject to individual consultation by the local planning authority. This means that local planning authorities will consult residents and businesses in the immediate vicinity of any proposed development to alert them to application and indicate how objections/comments can be made. Many local planning authorities also post the details of planning applications on their web sites and place advertisements in the local press to ensure that the wider community is aware of the proposal. In coming to a decision about a specific planning application, local planning authorities must consider any representations received before reaching their decision.

10.13 From April 2009, subject to the proposals in the Planning Bill and their enactment by the UK Parliament, large scale renewable energy project consents (over 50MW) in Wales could be determined by the proposed Infrastructure Planning Commission (IPC) rather than the Secretary of State for Business, Enterprise and Regulatory Reform. The IPC would take decisions in the light of National Policy Statements, which would be prepared by the UK Government. The IPC could have the ability to grant a range of consents currently scattered throughout legislation, and would act as a “one stop shop” for the consideration of major renewable energy projects. We are in discussion with the UK Government to ensure that any forthcoming legislation which creates the IPC includes a statutory requirement for involvement with the Assembly Government on the constitution of the IPC, National Policy Statements and individual project applications with special relevance to Wales.

10.14 Under the auspices of the proposed Marine Bill, marine planning will enable a wider view to be taken on the way in which different marine operators (fisheries, offshore oil and gas, deposits on the seabed, shipping, leisure, energy generation) interact, the conflicts between them and their cumulative impacts. In this respect, the purpose of marine spatial planning will be similar to that of land use planning – to optimise the way in which the marine area is used and reduce conflicts between uses and users. Marine planning will not remove the need for the licensing of specific operations such as those needed to build an offshore wind farm, but consenting authorities will need to take marine plans into account when making their licensing decisions.

10.15 The planning approach for any Severn Barrage has still to be determined because of its sui generis one-off nature.

11. Grid infrastructure development

11.1 North and South Wales are effectively served by quite separate east-west based electricity transmission grid networks, with the mid Wales grid coverage being especially weak. With many of Wales TAN 8 strategic search areas for new wind-farms being relatively remote, large developments in some of these areas will require the construction of major new grid connections.

11.2 National Grid Transco and SP/Manweb have been working with developers, OFGEM and the Assembly Government to determine the most efficient way to proceed. In both mid and north Wales developers have been encouraged to discuss their plans collectively with the grid operators so that, rather than proceeding piecemeal as the current OFGEM mechanisms may encourage, the grid companies can determine the optimum new connections which need to be built.

11.3 This work is still underway with long term grid connection offers having already been made by NGET for very substantial mid-Wales on-shore wind farm projects on the basis that mid-Wales would significantly benefit from a new 400kV grid link into England.

11.4 In south Wales, the main potential grid problems are the constraints on the electrical current capacity of the electrical grid links between south Wales and England in the light of the strong developer interest in building substantial new gas fired and renewables (wind and biomass) projects.

11.5 The current transmission access review being undertaken by OFGEM may illuminate the best way forward to allocate the scarce grid resource while in the longer term we expect the south Wales to England, and associated, grid connections to be strengthened.

Overcoming barriers/timescales and targets

11.6 Quicker new connections in south Wales may be enabled by some of the ideas being considered under the OFGEM Transmission access review, including capacity auctioning (as already happens with gas connections) or the so called ‘connect and manage’ offers. These would enable new intermittent sources to be connected without the grid companies, and eventually the consumers, paying high costs when the lack of a full capacity connection means that the source is not allowed to supply at its maximum capacity. However we still believe that OFGEM’s primary duties and the grid connection rules should be changed to enable connection preference to be given to low carbon generation projects. We also believe that in the south, proposed grid strengthening in south Wales, together with improvements in the south of England, should increase grid capacity availability.

11.7 We will therefore:

- work with OFGEM to ensure connection of new renewables plants are given precedence over connections to new fossil fuel plants not fitted with carbon capture and storage systems.
- consider how cost effective grid connections to sparser community developments can best be enabled.

12.5 Energy developments are of course built on a global research base. The Assembly Government, in association with the Welsh Energy Research Centre, is a member of the UK Energy Research Partnership which has helped to stimulate the creation of the new UK energy technologies institute (UK ETI). Through the latter and other mechanisms, the Assembly Government is keen to ensure that our energy research base takes full advantage of the UK, European and wider international research collaboration activities as well as working closely with the UK research councils, the DBERR technology strategy board, the DBERR/DEFRA environmental transformation fund and the UK Carbon Trust.

12.6 The maximisation of the use of our social science expertise is under investigation as part of the programme to fully develop the 'enabling of sustainable economic and social renewal' strand of the Assembly Government science policy.

12.7 We will:

- consider the economic opportunities associated with the massive technological transition to a global low carbon economy
- explore the exceptional international opportunities for Wales in marine energy in conjunction with International Business Wales.

12.8 We will also:

- develop the skills agenda to ensure as much as possible of R&D and other activity is translated into company wealth generation.

Part 4: Invitation To Respond

13.1 Annex A shows how Wales could be more than self-sufficient in low carbon electricity by using its natural renewable energy resources. The real challenge, against the imperative of doing all that we can to reduce climate change, is how quickly we can move to electricity self sufficiency and preferably beyond.

13.2 The specific commitments contained in this route map are summarised below in part five

13.3 All the opportunities described in this route map, while exciting and challenging, require strong stakeholder and public support if they are to be seized rapidly. We therefore welcome comments on this proposed route map. Comments on the overall strategy, our vision and detailed plans in this Renewable Energy Route Map would be welcome.

13.4 Please send your responses, preferably by e-mail, to energy@wales.gsi.gov.uk or by post to:

Paul Harrington
Sustainable Energy and Industry Wales
Welsh Assembly Government
Cathays Park
Cardiff
CF10 3NQ

Tel. 029 2082 6852

Fax. 029 2082 5137

Please respond by 13 May 2008.

Part 5: Summary of Specific Commitments in this Route Map

We will:

- be developing a strong 'green jobs' strategy, building on previous skills and economic development initiatives, such as the 'green energy cluster' work and the recommendations of various high level bodies including the Webb review and the economic and skills Ministerial Advisory Groups ;
- working with our colleges, the relevant sector skills councils and the private sector to ensure Wales has the necessary skills base to enable the rapid transition to a low carbon economy;
- ensure maximum use is made of available resources, whether at the UK level as with the Low Carbon Buildings programme, the Carbon Trust , Nesta and much of the Environmental Transformation Fund and, more locally, through the application of EU Structural Funds
- test the viability of additional local biomass energy in developing axis 2 agricultural proposals and
- support larger scale biomass projects where the fuel source is demonstrably sustainable;
- support the development of community heat and power units under a new wood energy business scheme- which could be funded through EU Structural Fund programmes;
- ask designers and contractors to consider biomass energy schemes in the development of residential and commercial properties on Assembly Government-owned land;
- provide advice through the newly formed Sustainable Energy Network on opportunities for community heat and power schemes across Wales;
- encourage all other public sector bodies to support biomass energy developments, where possible through long term feedstock purchase contracts which give growers the confidence to make the necessary investments;
- consider the scope for requiring biomass combined heat and power for larger-scale developments;

- publish for consultation a biomass energy strategy/action plan which fully explores these complexities in the Welsh context. This will also cover the important issue of how to ensure that biomass energy fuel stocks used in Wales, including imports, come from certified sustainable sources;
- explore how the new Better Woodlands for Wales grant scheme could be more closely targeted or arrangements made to encourage cooperative action on the part of groups of farmers to identify and source biomass material for specific initiatives;
- consider the opportunity costs of increased biomass in our Axis 2 review;
- welcome interest from intermediaries who might be able to establish secure supply chains on which customers could rely;
- examine skills needs with the Sector Skills Councils, to ensure an effective micro-generation equipment supply and fitting sector.
- ensure that the future framework for marine planning enables consideration of the role of marine renewables;
- ensure that the environmental impacts of the Severn Barrage and other proposals are fully tested;
- support opportunities for and encourage marine feasibility studies and research;
- examine whether EU Convergence Funds could be used to run a competition to identify the best tidal lagoon site in Wales and support the preparatory phases of constructing perhaps the world's first tidal-energy lagoon;
- develop a Wales marine energy action plan to take forward all the marine proposals. The action plan will also look at the economic and international opportunities for Wales from being at the forefront of marine energy developments over the next 30 years including the important construction skills aspects;
- explore with the Environment Agency Wales the scope for enabling more in-river local hydropower schemes;
- assist the development of community hydro power proposals using new Convergence funds;
- undertake a study, jointly with Whitehall, to identify the potential for new hydropower schemes in Wales and England. The results should provide clear information on the most appropriate locations for developing new hydro-electric power plants;
- support community engagement through an energy from waste toolkit for use by local authorities when considering applications for developments;
- consider the energy potential for utilising food and other non-hazardous waste from relevant public sector operations such as hospitals;
- produce a 'best-practice' design guide for new waste management facilities with exemplar facilities illustrating to developers and local authorities what can be achieved;
- continue to pursue the proposals in Tan 8 and monitor the uptake of wind farm sites before undertaking a further review in the light of this and related consultations;
- develop, with partners, a strategic bid for a Convergence Fund project aimed at delivering a series of community scale wind energy generation projects across the eligible area;
- review TAN 8, revising upwards the old targets for renewables- drawn from a range of sources- following the publication of the Assembly Government's energy strategy later in 2008;
- support UK work on a strategic environmental assessment (SEA) for offshore wind generation in English and Welsh territorial waters.

We will take forward:

- The Sustainable Energy Network (SEN) - The Energy Saving Trust has just launched its initial Sustainable Energy Network service for Wales, which the Assembly Government has helped fund. The SEN in Wales will expand the current service to offer advice to a wider audience of householders, communities and micro-businesses on energy efficiency. The Sustainable Energy Network of Wales' wide advice centres will also offer a greater scope of guidance, including on green homes programmes, micro-generation and transport issues.
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 - Building mounted micro-wind electricity turbines or stand alone small wind turbines
 - Biomass electricity or heat generating units, especially for larger properties or community projects.

- encourage a fair price from utilities for the 'export' of locally produced electricity on to the grid.
- increasingly build micro-generation into our locally funded programmes, as part of our commitment to zero carbon buildings;
- under our green jobs strategy, building on Wales already substantial solar photovoltaic industry to be an effective champion for this highly promising technology.
- provide information through the new Farming Connect service to include guidance and advice for farming families on energy efficiency and micro-generation
- increase the role of renewable/alternative energy solutions under our Home Energy Efficiency Service.
- work with stakeholders to ensure the public has clear information on the benefits of micro-generation.
- support community-sized wind, biomass and hydroelectric schemes through the provision of grants through the climate change framework of the EU Convergence Funds programme
- guide businesses interested in generating their own renewable energy.
- explore the scope for a CHP scheme for the Cathays Park area of Cardiff where the main Assembly Government office is located.
- explore the scope for developing energy supply companies (ESCo) in Wales that could support off-grid developments and innovative energy efficiency packages.
- strongly encourage the exploration of opportunities for wind developments of up to 25MW in urban/brown field site areas.
- work with OFGEM to ensure connection of new renewables plants are given precedence over connections to new fossil fuel plants not fitted with carbon capture and storage systems
- consider how cost effective grid connections to sparser developments can best be enabled.
- ensure exploitable energy innovations are eligible for new EU Structural Funds support
- consider the economic opportunities associated with the massive technological transition to a global low carbon economy
- explore the exceptional international opportunities for Wales in marine energy in conjunction with International Business Wales.
- develop the skills agenda to ensure as much as possible of R&D and other activity is translated into company wealth generation.

Annex A: Summary of Possible Electricity and Heat Generation From Renewable Energy In Wales by 2025

Technology	Proposed Renewable Obligation Certificates per MWh	Installed generation capacity (MWe)	Electricity load factor (%)	Electrical energy generated TWh(e)/yr	Annual heat power output TWhr	Potential Carbon Savings (tonnes C)
Severn barrage	0	8500	25	9 *	n/a	1,050,000
Other marine, inc wave, tidal stream, lagoons	2	1000 to 2000	30	2.5 to 5	n/a	300,000 - 600,000
On-shore wind	1	Up to 2500	30	Up to 6.5	n/a	750,000
Off-shore wind	1.5	500-1000	40	1.7 up to 3.5	n/a	200,000 - 400,000
Community wind	1	100	25	0.2	n/a	20,000
Biomass-indigenous including energy from waste	Range of 0.5 to 2	350	70	2.6	2.4	400,000
Biomass-imports	Range of 0.5 to 2	350-700	70	2.5-5	0	270,000 - 540,000
Hydro-electricity	1	200	40	0.7	n/a	80,000
Micro-generation	2	500	10	0.45	0.45	90,000
Total		Up to 15,800 MW		Up to 33 TWhr	3 TWh	Up to 4 million tonnes Carbon/yr

* (half of expected total output from this joint England and Wales project)

Annex B: Existing WAG Targets and Commitments

1. The One Wales document sets out the Welsh Assembly's commitment to tackling climate change, resolving that the Government and the people of Wales will play the fullest possible part in reducing its CO₂ emissions, with the following aims:
 - a) To achieve annual carbon reduction-equivalent emissions reductions of 3% per year by 2011 in areas of devolved competence. This will include specific sectoral targets in relation to residential, public and transport areas. It will also include working with the heavy industry/power generation industries to reduce emissions in those sectors.
 - b) To draw up an energy strategy- which will include actions on diversified renewable energy generation and biomass.
 - c) Following production of a (renewables) energy route map and a comprehensive energy strategy, to review TAN 8, revising upwards the targets for energy from renewables, drawn from a range of sources
 - d) To promote research and development into renewable technologies including their application on-shore and off-shore
 - e) To develop a support programme to promote energy efficiency and renewable energy production on-farm
 - f) To explore the introduction of a grant scheme to convert to energy crops

The current renewable electricity targets, as set out in TAN 8, are:

- g) 4TWhr by 2010
- h) 7TWhr by 2020.

2. The micro-generation action plan has targets of:
 - a) 20,000 micro heating systems installed by 2012, rising to 100,000 by 2020;
 - b) 10,000 micro electricity systems installed by 2012 rising to 200,000 by 2020;
 - c) 50 combined heat and power and/or district heating systems in place by 2020.
3. The Assembly Government has also committed itself to contributing to the UK's achievement the Kyoto target and wider UK Government goals on CO₂ emissions:
 - a) Through the Kyoto Protocol, the UK is committed to achieving a 12.5 per cent reduction in its emissions of greenhouse gases by 2008-2012
 - b) a 20 per cent reduction in CO₂ emissions below 1990 levels by 2010 and a 60 per cent reduction by 2050, with real progress by 2020

Annex C: Indicative Data On Wales' Energy Demand, Supply And Emissions

- 1.0 The figures below sets out Wales' detailed energy consumption and production figures, and emissions based on 2004 statistics. High level 2005 figures indicate an increase in both energy generation(35TWhr) and in Wales energy consumption at **24TWhr**
- 2.0 **Overall energy picture**
Annual energy consumption within Wales by sector in 2004 was split as follows:
 - 56TWhr industrial;
 - 29TWhr domestic;
 - 13TWhr services sector and
 - 28TWhr road transport.
 - = **126 TWh**
- 3.0 Electricity consumption in Wales (as a subset when heat and energy for transport are taken away) accounted for **22TWhr**⁴
- 4.0 Annual energy production and export figures were as below⁵:
 - 210TWh of crude oil imports into the major oil refineries and storage depots in Milford Haven, with the majority of these converted to vehicle fuels for UK consumption.
 - 53 TWh of indigenous coal production and imports
 - 31 TWh of net electricity production
 - 73 TWh TWh of gas imports, met in small part by the gas fields just off North Wales, but mostly from the North Sea, and mainly used for heating purposes
 - = **367 TWh**
- 5.0 Annual electricity supply within Wales is was follows⁶:
 - 23TWhr from gas and coal-fired stations;
 - 7TWhr from the Wylfa nuclear power station;
 - 1.5TWhr from a range of renewables sources(including land-fill gas operations)
 - = **31.5 TWh**
- 6.0 Wales is a net exporter of both electricity and energy more broadly. The majority of the electricity generation capacity is in North Wales. As there are no North/South electricity grid transmission links at the moment, this energy is mainly exported to England, whilst South Wales is a net importer of electricity, and has some of the highest electricity prices in the UK.

3 Not including the electricity demand by pumped storage stations

4 Figures are for 2004 but are thought to be representative of the current situation-until the Wylfa nuclear station is decommissioned and the new LNG gas import terminals come on line

5 This does not include 2TWhr from the north Wales pumped storage stations as this is generated from the consumption of electricity produced elsewhere

6 Nid yw hyn yn cynnwys 2TWhr o o orsafoedd pwmpio a storio'r gogledd oherwydd fe'i cynhyrchir trwy ddefnyddio trydan a gynhyrchir mewn llefydd eraill

- 7.0** Carbon dioxide emissions for Wales arise broadly as follows:
- production of electricity (from gas and coal) releases 4MtC of greenhouse gas a year
 - other energy uses (e.g. gas for heating, petrol and diesel for transport) release 5.5MtC/yr
 - non-energy emissions (including agriculture and waste management) contribute a further 2.5 MtC/yr
- = **12 MtC per year**

Annex D: Future Costs of Renewable Energy/Banding of the Renewables Obligation

a) The renewables cost table below is extracted from the work undertaken by Ernst and Young for the Department of Trade and Industry (now DBERR) for the 2007 UK Energy White Paper and its associated consultation on the banding of the England and Wales Renewables Obligation. This table gives the predicted costs, before subsidies, through to 2020 for energy from various renewable energy sources (excluding tidal barrages and lagoons) and, while the Assembly Government does not necessarily agree with all the details, this table provides a guide to the possible relative renewable energy production costs over the forthcoming decade.

Medium Levelised Cost

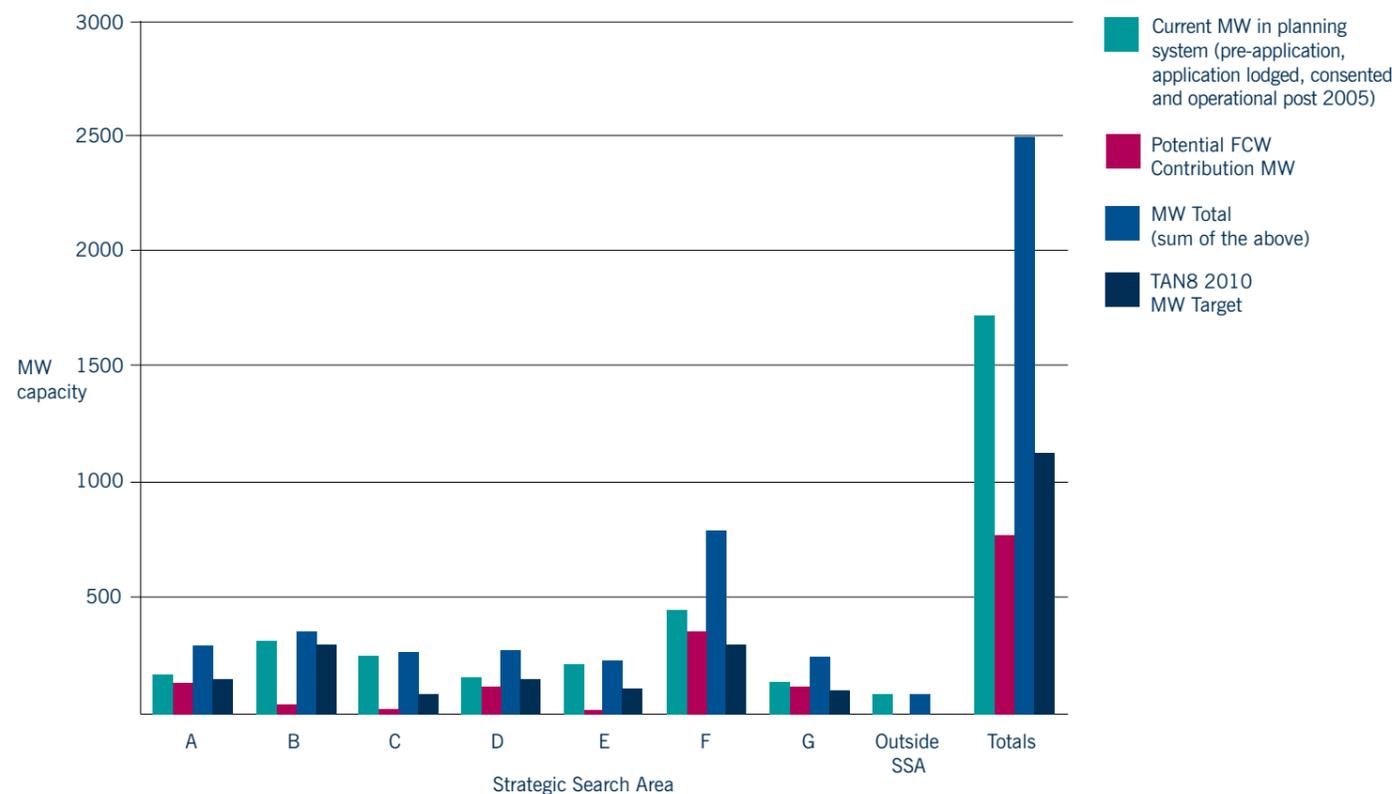
£/mwh (real)

	2006	2010	2015	2020
Onshore Wind - Large - High Wind	62	65	62	61
Onshore Wind - Small - High Wind	72	75	72	70
Onshore Wind - Large - Low Wind	74	77	74	72
Onshore Wind - Small - Low Wind	86	89	86	83
Offshore Wind	91	92	86	85
Co-Firing Regular	51	53	52	49
Co-Firing - Energy Crop	67	70	68	64
Biomass - Regular	90	101	99	95
Biomass Energy Crop	122	126	122	116
Biomass Chp	135	145	141	139
Landfill Gas	48	48	48	48
Large Scale Hydro	63	63	63	63
Small Scale Hydro	71	71	71	71
Sewage Gas	38	38	38	38
Solar PV	635	571	508	444
Wave	199	196	165	151
Tidal	181	177	149	137
Efw Chp	79	79	79	79
A Chp	107	133	143	143
Gasification/Pyrolysis	127	150	160	160

b) BERR proposals for the banding of the Renewables Obligation

Band	Technologies	Level of support ROCs/MWh
Established 1	Landfill gas;	0.25
Established 2	Sewage gas, co-firing of non-energy crop (regular) biomass	0.5
Reference	Onshore wind; hydro-electric; co-firing of energy crops; EfW with combined heat and power; geopressure; other not specified	1.0
Post-Demonstration	Offshore wind; dedicated regular biomass	1.5
Emerging	Wave; tidal stream; advanced conversion technologies (anaerobic digestion; gasification and pyrolysis); dedicated biomass burning energy crops (with or without CHP); dedicated regular biomass with CHP; solar photovoltaic; geothermal, tidal lagoons, tidal barrages (up to 1GW); micro-generation.	2.0

Annex E: Database of Potential Wind Farm Projects in Tan 8 Strategic Areas



Annex F:

a) Availability of Potential Waste Derived Fuels

Potential combustible waste feedstock sources in Wales include:

Industrial and commercial waste – the joint ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS) at Cardiff University and Environment Agency Wales 2003 Commercial and Industrial Waste Survey estimated total wastes produced by commerce and industry to be 5.28 million tonnes per annum.

Removing mineral wastes from this total, we get a total figure of 2.87 million tonnes per annum, of which 0.65 million tonnes is landfilled or used for land recovery, and 2.2 million tonnes is recycled, reused, composted or incinerated. In this latter total incineration only accounts for around 0.023 million tonnes per annum, and may be regarded as insignificant for the purpose of this paper.

The question is, therefore – how much of the residual fraction of 0.65 million tonnes to landfill is suitable for use in a thermal treatment process? Commerce and industry (C&I) in Wales already outperforms local authorities in terms of recycling rates (recycling rates for 2003 were around 65% when looking at all C&I wastes), and further scope for recycling is not easily quantifiable. If we make the assumption that a further 30% of the residual is recyclable, and the rest is combustible, then we can estimate that the combustible fraction in the residual fraction of C&I waste in Wales is around 0.45M tonnes per annum. These figures should, however, be treated with caution, and further study is needed. It is possible that the available combustible fraction would be higher than the figure suggested, and that an amount of material which is currently recycled would be reassessed as combustible material, and would find a higher value as energy feedstock. An example here is the current practice of shredding clean waste wood for animal bedding – its market value as a fuel may be higher than its value as animal bedding, and so we can expect some diversion as a result.)

Energy value – the total energy value of this material in a conventional mass-burn incinerator generating electricity only (at 22% net efficiency) would be around **38 MWe/hr**

Heat value – the total heat value of this material in a conventional mass-burn incinerator for heat only (at 80% net conversion efficiency) would be around **137MWth/hr**.

These figures are likely to be amended as the use of anaerobic digestion increases within Wales. This will have the effect of diverting source-segregated organic materials through anaerobic digestion plant in order to generate energy prior to its final utilisation. As much of this material arising from C&I sources is currently landspread or otherwise utilised instead of being landfilled, then there is an unknown potential for energy generation from this route. Current estimates put the amount of material which could be utilised at around 100,000 tonnes per annum from the food sector alone. Further study is needed to quantify this figure.

Household waste - around 69% of municipal waste (excluding construction and demolition wastes) is combustible. This figure drops to 65% if construction and demolition wastes are included –from AEA compositional analysis.

Total municipal waste arisings for 2005/6 (excluding abandoned vehicles) were around 1.9 million tonnes. Making assumptions that 70% of this material will be recycled by 2025 (the compositional analysis demonstrates that around 77% of this waste is comprised of traditional recyclables); that around 30% of this material is available for combustion processes (based on a predicted share of the municipal arisings; keeping combustible recyclables out of the equation as far as possible to ensure that the waste hierarchy is maintained and complying with the proposed 2010 EfW cap of 30%; and assuming that waste growth per annum is around 2%, we can conclude that total municipal derived waste for 2009/2010 is likely to be around 2. million tonnes, of which around 0.6M tonnes per annum could be diverted to EfW without compromising other initiatives and complying with the 30% cap. However this figure could change as a consequence of future recycling initiatives.

Energy value – the total energy value of this material in a conventional mass-burn incinerator generating electricity only (at 22% net efficiency) would be around **51MWe/hr**

Heat value – the total heat value of this material in a conventional mass-burn incinerator for heat only (at 80% net conversion efficiency) would be around **186 MWth/hr**.

Sewage sludge and screenings – The 2001 UK Sewage Sludge Survey showed that an average of 1,072,000 tonnes of dry solids per annum was produced in the years 1998 to 2000. This equates to around 1,080,300 tonnes given the rise in population since this time. Using these figures on a pro-rata basis suggests that current Welsh sewage sludge arisings are at least around 53,000 tonnes per annum. This is probably an underestimate given the greater standards imposed by the Urban Wastewater Treatment directive. Data from the Thames Water corporate responsibility report for 2003 shows that sewage work screenings are around 6.9% of sewage sludge arisings, suggesting that a Welsh equivalent would be around 3,670 tonnes. It is not known how much of this would be suitable for EfW applications, although most of the screenings will be plastic and vegetation.

Agricultural wastes - the UK Agricultural Waste estimation model (1998) gave the following Welsh farm waste arisings:

Vegetable/plant waste – 104,000 tonnes
 Plastics/polymers – 5,600 tonnes
 Paper/card – 700 tonnes
 Tyres – 1,400 tonnes
 Oils – 1,400 tonnes

Animal matter (manures) – 5,929,600 tonnes (not legally classed as waste when used as on-farm arisings for land-spreading purposes, but appropriate to factor into these calculations). However how much of this is readily collectable is not known

b) Energy From Waste Technologies

Energy from waste processes can take several different forms, and can be divided into several broad categories:

- “mass burn” combustion taking largely unprocessed residual waste;
- refuse derived fuel (RDF) fed mass burn combustors ;
- gasification and/or pyrolysis (where a gaseous fuel is produced for combustion, usually for electricity generation)
- RDF substitution of other fuels in existing power plants (e.g. cement kilns, power stations or other industrial power generating plants);
- anaerobic digestion where methane/hydrogen are generated as a fuel(see below);
- production of biofuels (e.g. biodiesel produced from used vegetable oils / abattoir wastes etc).
- combustion of biomass (i.e. wood wastes) in biomass generation plant

Transport Bio-fuels from Waste

The development of transport biofuels in Wales is in its infancy. However, there is much current interest in this area, and indications are that the market is likely to be well served in the near future. The following technologies offer possibilities for transport biofuel production:-

- Conversion of waste vegetable oils to biodiesel via hydrolysis / esterification. [can be used in diesel engines without modification.]
- Use of filtered waste vegetable oils as a diesel replacement [require engine and fuel tank modification – not suitable for some engines.]
- Production of alcohol road fuels from waste fermentation
- Production of LPG replacement fuel from anaerobic digestion plant.
- Production of ethanol from high temperature steam gasification.

Anaerobic Digestion of food wastes

Anaerobic digestion offers a treatment method whereby wet organic wastes can be turned into a compost-like material, a liquid fertiliser and a source of biogas. Digestion of dry wastes is also possible, although less common.

There are hundreds of examples of this technology in use in Europe, although it is in its infancy in Wales, with only one small digester working on waste food at the present time.

However, Wales is fortunate in housing some of the leading European researchers in this technology, including the team based at the University of Glamorgan. With the latter’s assistance, the Assembly Government has just run a capital grants competition through the Materials Action Programme to increase the provision of anaerobic digestion plants, and has identified two facilities which have gone forward to Phase 2 of the competition. In addition, there is much interest from local authorities across Wales to provide such plants for the treatment of segregated food wastes.

The potential tonnages available for Anaerobic Digestion are large. From the municipal, commercial and industrial waste streams, there is around one million tonnes per annum

of material which may be suitable feedstock for such plants. There are also several million tonnes per annum of agricultural wastes which could be utilised.

A rough value for the energy content of this municipal, commercial, public sector and industrial waste used as anaerobic digestion feed-stock is around 40-50 MWe electrical, and a further 75MWth after the biogas has been converted to electricity in a generating set, but the real environmental gain lies with the diversion of this waste from landfill and the considerable green house gas savings that would occur as a result, given that methane has around twenty times the global warming potential of CO₂.

Annex G: UK/Wales Energy Consumption Breakdowns

Wales homes consume slightly less than the UK average of energy per head. The following summary of energy consumption in Wales outlines the trends in energy consumption, both in relation to the UK, and also by sector where relevant.

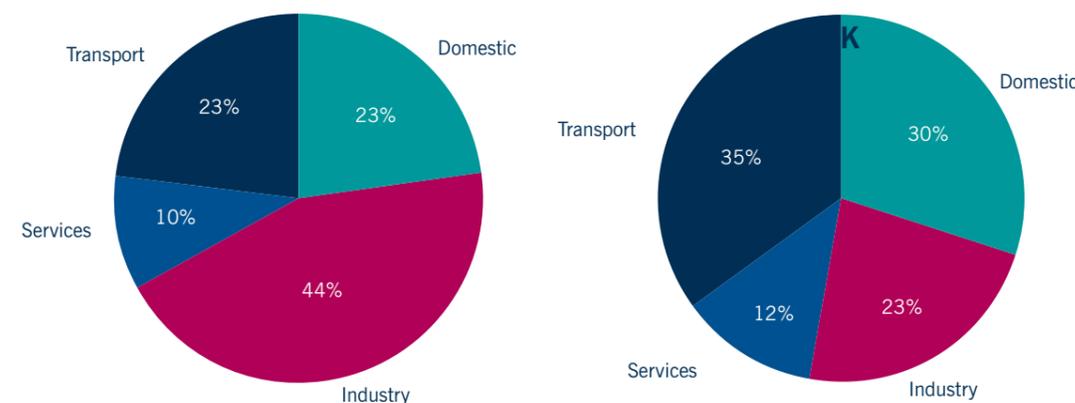


Figure 1. Percentage sector shares in total energy consumption in 2003

8.4 Figure 1 highlights the proportion of energy consumed by the four main sectors, for the UK as a whole, and separately for Wales. It can be seen that Wales has a significantly larger proportion of energy consumed by the industry sector than the UK. This is due to Wales having a large industrial base, accounting for 12.6% of the UK total, i.e. approximately 2.5 times its pro-rata population. This industrial base consists of energy intensive industries such as iron and steel, aluminium, paper and pulp, high temperature mineral processing (cement and glass), chemicals, and a number of large engineering facilities. Wales also has two oil refineries, giving it 17.5% of the UK’s refining capacity.

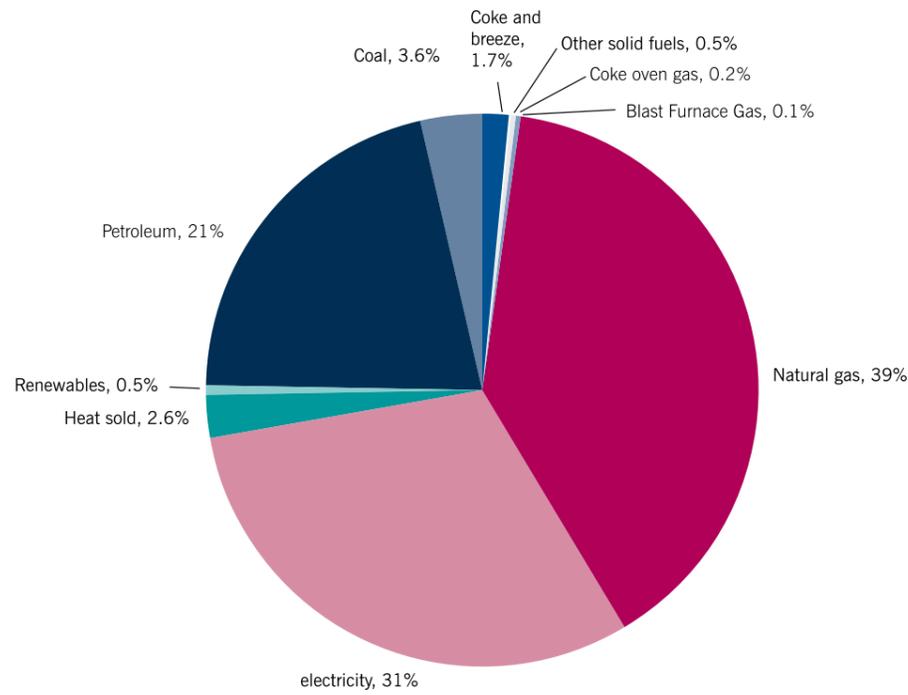


Figure 2 UK Industrial Energy Consumption by fuel, 2005

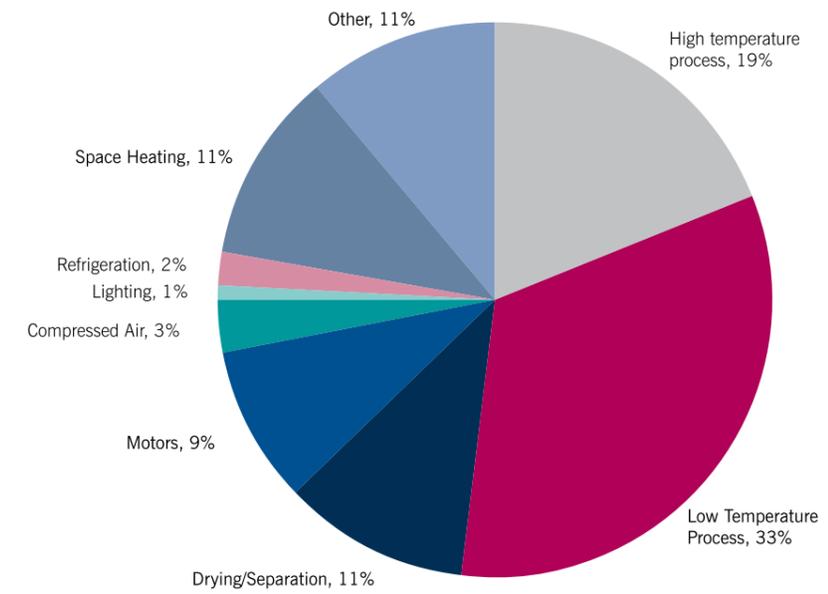


Figure 4 UK Industrial energy consumption by process 2005

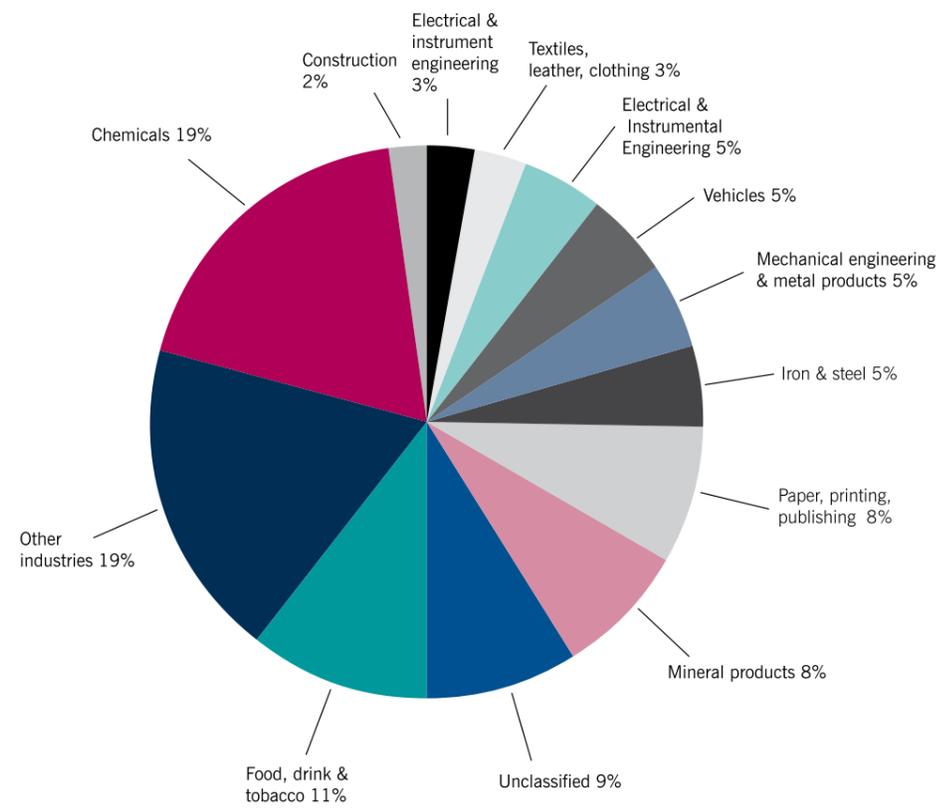
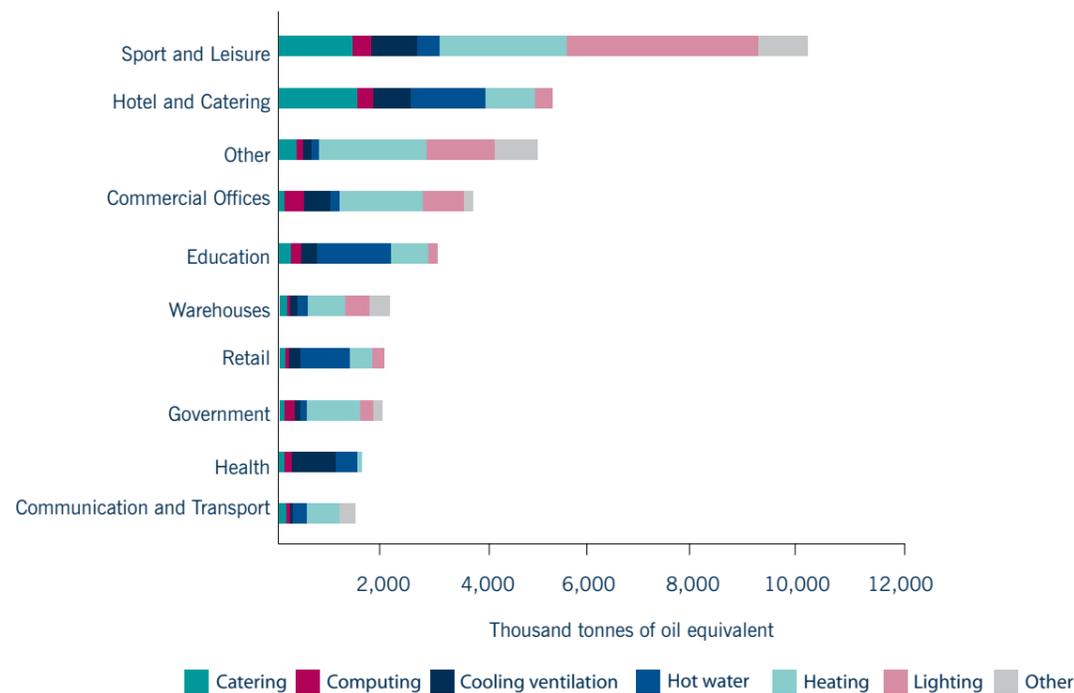


Figure 3 UK Industrial energy consumption by sub-sector, 2005

Figures 2, 3 and 4 illustrate industrial energy consumption by fuel type, by sub sector and by process. Considerable work has already been done by the Carbon Trust in Wales in helping companies to reduce the energy consumption and the recent CBI climate change report illustrates that enlightened companies recognise the need urgently to meet the challenge of dramatically reducing their carbon footprint, and encouraging their suppliers to do likewise.

Although the service sector accounts for only 10% of the energy consumed within Wales, it accounts for the largest proportion of enterprises and the largest turnover. Figure 5 below shows the largest consumer of energy in the service sector is sport and leisure, where the energy used is mainly for heating, lighting and catering.



Annex H: Major Energy Developments Since July 2007

At the project level:

- the publication of the Sustainable Development Commission's in depth and comprehensive report on tidal power which indicates the possibility that tidal stream energy could provide 5% of the UK's electricity needs, with a further 5% coming from tidal barrage/lagoon projects, especially from the Severn estuary.
- EoN, in conjunction with Lunar energy and RWE, in conjunction with MCT announced the world's first major utility led tidal stream projects-to be located off the Wales coast.
- The world's largest biomass power station (350 MW Prenergy) project received Electricity Act consent to proceed at Port Talbot.

- Forestry Commission Wales has issued offer letters to preferred bidders tendering Forestry Commission managed land in key areas for large wind farm developments subject to planning permission.
- National Grid issued long term grid connection offers for a number of very substantial potential wind farm projects in key areas in mid Wales.
- Announcement of Assembly Government support for those local planning authorities with TAN 8 strategic search wind-power areas within their boundaries and publication of the TAN 8 wind-farm monitoring database
- Launch of the Wales Sustainable Energy Network which significantly enhances the support and advice available to individuals, communities and micro-businesses on energy efficiency, renewables and sustainable transport.
- Announcement that the Assembly Government will co-fund with Cardiff University a feasibility study into the development of a district heating scheme for Cathays Park.
- £5 m Assembly Government investment agreed to create a new world class Low Carbon Energy Research Institute in Wales.
- £8M RWE Npower carbon capture scheme to be built at Aberthaw B power station.
- Announcement by Corus of a major investment at Port Talbot to capture more waste gases and use them for on-site energy purposes.

At the policy level:

- the introduction into the UK Parliament of the UK Climate Change Bill, which sets a clear framework for moving the UK to a low-carbon economy and will strengthen the Assembly Government's ability to take action on climate change.
- First meeting held of the new Climate Change Commission for Wales, which includes members from all four political parties, businesses, local government and voluntary sector groups and will work in partnership with the UK Sustainable Development Commission.
- Public consultations in Wales were completed on reducing the requirement for householders to seek planning permission for the installation of micro-generation equipment on their homes.
- Announcement by the UK Government of the rollout of a Green Homes service which will further enhance the service provided by the Sustainable Energy Network.
- New Wales Convergence and Competitiveness Programmes launched containing a focus on climate change and support for renewable and low carbon energy generation projects.
- The UK Government, following consultation with the Assembly Government, has set out a plan to conduct a strategic environmental assessment (SEA) for off-shore wind generation in English and Welsh territorial waters and the UK renewable energy zone.
- There have been wide ranging interactions with Whitehall on new Planning and Energy Bills, creation of an Infrastructure Planning Commission, devolution of large power station consents and banding of the Renewables Obligation proposals: with the latter being amended in the final proposals to include enhanced support for tidal lagoons and small barrages.

