



Welsh Liberal Democrats
Democratiaid Rhyddfrydol Cymru

Powering Wales' Future

Policy Paper on Energy Policy in Wales

Spring Conference 2014

Welsh Liberal Democrats

Ref: 2014/C-02

Printed by Welsh Liberal Democrats, 38 The Parade, Cardiff, CF24 3AD, published and promoted by Richard Thomas on behalf of the Welsh Liberal Democrats all at 38 The Parade, Cardiff, CF24 3AD

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Purpose of Policy Document

This paper has been approved for publication by the Welsh Liberal Democrat's Policy Committee as a Policy Paper, for debate at Welsh Liberal Democrat Spring Conference in Newport, April 2014.

Within the policy-making procedure of the Liberal Democrats, the Federal Party determines the policy of the Party in those areas which might reasonably be expected to fall within the remit of the federal institutions in the context of a federal United Kingdom. The Party in England, the Scottish Liberal Democrats, the Welsh Liberal Democrats and the Northern Ireland Local Party determine the policy of the Party on all other issues, except that any or all of them may confer this power upon the Federal Party in any specified area or areas. The Party in England has chosen to pass up policy-making to the Federal level. If approved by Conference, this paper will therefore form the policy of the Federal Party on federal issues and the Party in England on English issues. In appropriate policy areas, Scottish, Welsh and Northern Ireland party policy would take precedence.

Many of the policy papers published by the Welsh Liberal Democrats imply modifications to existing government public expenditure priorities. We recognise that it may not be possible to implement all these proposals immediately. We intend to publish a costings programme, setting out our priorities across all policy areas, closer to the Assembly election.

Comments on the paper are welcome and should be addressed to:

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Foreword

I am pleased to present to Conference this policy paper on energy generation and energy efficiency in Wales. The Welsh Liberal Democrats have recognised the need for us to bring forward a new and comprehensive set of policies which reduce Wales' reliance on damaging fossil fuels, secure the future of low-carbon alternatives for decades to come, and make us more energy efficient as individuals and as a country. This paper is designed as a first step in building a roadmap for Wales' energy future.

The Liberal Democrats have always been the greenest of Britain's major parties. This is no less true here in Wales, with Welsh Liberal Democrat Assembly Members working to protect the environment for future generations. We believe that we should aim to be the most ambitious and greenest of the major Welsh parties.

Our core target is for Wales to aim, by 2050, to end our reliance on carbon-intensive energy generation, to lower our overall energy demand through improved energy efficiency, and to produce enough renewable and low-carbon to cover our own needs and provide export potential. This is crucial for Wales to play its part in the global fight against climate change. I hope you will agree that this is an ambitious and earnest goal. We will do this by incentivising and nurturing renewable and low-carbon technologies, supporting microgeneration and community-owned generation, and improving our energy efficiency. We will need to generate energy from a wide variety of sources and have a diverse energy mix to provide for Wales' energy needs in the future.

We have aimed to produce a proposal which is realistic and credible, but it is important to remember that it is set out against an uncertain background, one of shifting technological, economic and environmental contexts. This paper is not intended to predict what technologies might become available during the intervening years, and much depends on technological progress.

I hope that you will enjoy reading this policy paper, and I look forward to hearing your thoughts.

William Powell AM

Welsh Liberal Democrat Spokesperson
for Energy, Environment and Sustainable Development.



Introduction

Our electrical energy supply is essential to the Welsh way of life. It powers our homes, our workplaces, our lives. However, we are all too aware that how we presently generate that supply is unsustainable. Our reliance on increasingly expensive fossil fuels is constraining our economy, compromising our future security, and is polluting our environment.

We understand that a major change is necessary if we are going to break with tradition. In the years ahead we need to be more effective at making these changes and at building a more sustainable future for Wales. Over the past decade Wales has begun to make some progress towards a more sustainable future, but the Welsh Government has continually failed to make do enough and has made many mistakes along the way.

As such, the Welsh Liberal Democrats recognise the need for us to bring forward a new set of policies which reduce Wales' reliance on damaging fossil fuels, secure the future of low-carbon alternatives for decades to come, and make us more energy efficient as individuals and as a country.

Wales is already a net exporter of electrical energy. **We believe that Wales should aim to become a net exporter of renewable energy and reduce our use of high-carbon fossil fuels. The fight against climate change is a global one, and we must play our part in producing clean, green energy. We believe that the Welsh Liberal Democrats must aim to be the most ambitious and greenest of the major Welsh parties.**

We will, by 2050, aim to produce enough renewable and low-carbon energy to cover our own needs and provide export potential.

We believe that Wales should set itself the targets of:

- Producing zero net greenhouse gas emissions from generation by 2050;
- Ensuring new post-2030 gas/coal generation is dependent on CCS technology;
- Achieving a 50% reduction in generation emissions on 1990 levels by 2030;
- Decarbonising the power sector by 2030, in the range of 50-100 CO₂/KwH;
- Halve total energy demand by 2030 by improving energy efficiency in domestic, commercial, services and public sector buildings.

To achieve these targets we intend to look at the medium term – from the beginning of the next National Assembly term in 2016 until 2050. In doing so we will not predict what technologies might become available during the intervening years. Instead we will look at what technologies are available to us now, how they operate, can be reasonably be expected to improve, and how long they are designed to last.

It must be remembered that this paper is set out against an uncertain background, one of shifting technological, economic and environmental contexts.

This paper is designed as the first step in building a roadmap for Wales' energy future and outline how the Welsh Liberal Democrats would deliver this future in Government. Among our first actions in Government would be to commission feasibility studies on how best to reach our energy targets.

Key Policies

In government the Welsh Liberal Democrats would ensure that while fossil fuels will remain part of our electrical generation grid for several decades, the level of their contribution will steadily decrease as they are replaced with low-carbon alternatives. This will be done to achieve our goal of zero net greenhouse gas emissions from electrical generation by 2050. We will, by 2050, aim to produce enough renewable and low-carbon energy to cover our own needs and provide export potential.

- In order to deliver this it will be necessary to make substantial reforms to the planning system. Our initial steps will be to commission a full review of TAN8 so it can be updated to meet current technological requirements, and so that new SSA options can be explored to encourage new projects and reduce the concentration on Mid-Wales.
- Further planning reforms are necessary to enable a greater number of small scale community renewables projects to be completed. We would ensure that such projects are considered with a presumption in favour of development and that the existing Ynni'r Fro programme is expanded so it is more able to deliver necessary advice and support.
- To maximise the economic benefits of renewables we will work with developers and educational institutions to expand supply chains and centres of excellence for the next generation of engineers and apprentices.
- We would also establish a suitable number of Marine Energy Hubs to provide a safe environment to manufacturing and test emergent marine renewable technologies before deployment. This will enable us to establish Wales as a world leader in marine renewables.
- In government we would also ensure that communities across Wales gain greater benefits from the investments which are made in their areas. While bespoke community benefit schemes are already in place for large scale onshore wind projects we would ensure they are expanded to a regional basis. This will be done so that residents along the transportation and grid corridors are also able to benefit from the economic benefits which come with renewables. How the money is divided between local and regional pots will be depend on individual area needs.
- We would also support research into battery storage technology. This is essential for making a low-carbon grid more flexible to demand and ensuring that all generation technologies are able to be fully used to lower consumer bills.
- These moves will also be supported by reducing consumer electricity demand, improving home efficiency and stabilising the daily demand curve.
- While these measures will make significant steps towards reducing daily demand variability we will still need to take steps in government which will enable us to deal with demand spikes without resorting to high-carbon options. This can be accomplished through the development of new pumped storage sites in suitable locations across Wales.
- Taken together these key policies will enable us make the best sustainable use of our natural resources and ensure that the benefits are spread across Wales rather than concentrated in specific areas.

The remainder of this policy paper will go through each of these key points in greater details and outline how they can be delivered along with the result we expect them to achieve.

Current Welsh Government Policy

Energy policy is partially devolved to Cardiff Bay, and partially reserved to Westminster.¹ Welsh devolved energy policy covers around 70% of total Welsh greenhouse gas emissions.

Greenhouse gases refer to carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

The Welsh Government's Climate Change Strategy for Wales² calls for a reduction of greenhouse gas emissions of 40% by 2020 (against a 1990 baseline) and a 3% annual reduction from 2011 onwards, against a baseline of the average emissions between 2006 and 2010.

In 2010, total net greenhouse gas emissions were 15% lower than the base year of 1990 - however they had increased by 3.5 mega tonnes (Mt) between 2009 and 2010. To compare to other UK countries, Wales has reduced its emissions 8.9 percentage points less than the UK average.³ This is arguably because of Wales' high proportion of energy-intensive industries, homes off the mains gas grid and therefore reliant on more carbon-intensive fuels for heating, and agriculture. To achieve the "2020 target of reducing greenhouse gas emissions by 40 per cent below the 1990 base year, emissions in Wales will need to be reduced by a further 25 percentage points from base year emissions in ten years."⁴

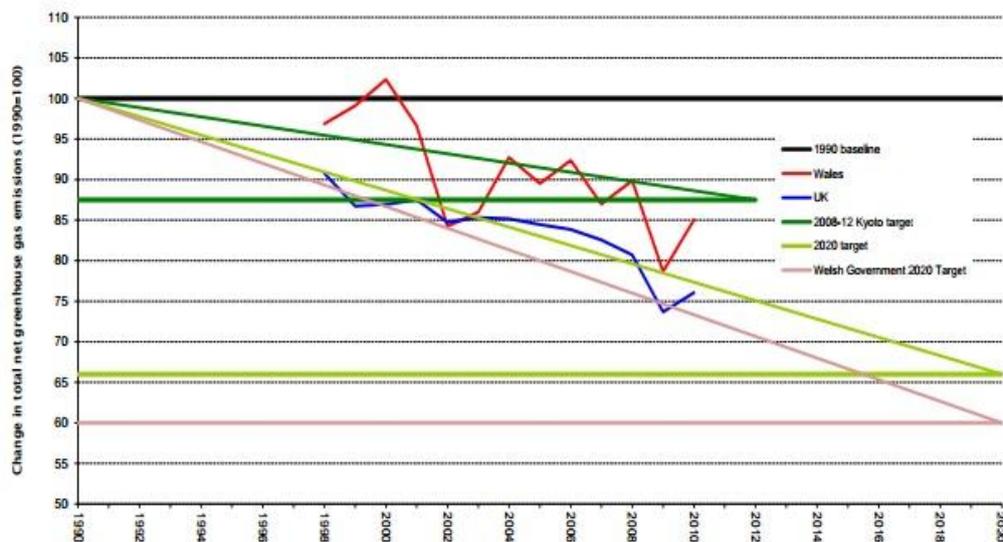


Figure 1: Trends in total net greenhouse gas emissions - National Assembly for Wales (2013) *Greenhouse Gas Emissions in Wales*, p.13

¹ This paper has been drafted, though not discussed at Conference, before the report back of the Silk Commission on the devolution of energy policy.

² Welsh Government (2010) *Climate Change Strategy for Wales*,

³ National Assembly for Wales (2013) *Greenhouse Gas Emissions in Wales*, p.10

⁴ Ibid, p.13.

Current Energy Generation

The Welsh Government has committed to reducing energy consumption; improving energy efficiency; and to maximising renewable and low carbon energy generation in Wales⁵. It set defined targets such as ‘to renewably generate up to twice as much electricity annually by 2025 as we generate today and by 2050, at the latest be in a position where almost all of our local energy needs can be met by low carbon electricity production’⁶. The policy statement A Low Carbon Transition repeats the commitment to renewable energy but notes that fossil fuels and nuclear will continue to be used in the short to medium.

Today, most of Wales' energy is generated from gas and coal. Wales has significant scope for wind (onshore and offshore), wave, tidal, solar, and hydropower generation, alongside existing non-renewable coal, gas, and nuclear power. Previously, the amount of electricity generated in Wales was relatively stable at 35,000GWh. Since 2008, the amount has been falling, with 27,300 GWhs generated in 2011⁷. However, renewables still lag far behind gas, coal and nuclear, at 2,159 GWhs. Between 2010 and 2011, renewable energy generation increased by 33%. This is primarily due to wind power, “as currently Wales does not generate any electricity from waves, and solar generation contributes to less than 1 per cent of the total figures”⁸.

Generation of electricity by fuel in Wales

	Gigawatt hours							
	2004	2005	2006	2007	2008	2009	2010	2011
Gas	17,363	15,926	14,940	17,182	16,546	14,580	16,033	10,670
Coal	7,234	6,772	8,859	5,121	9,364	6,547	5,929	6,170
Nuclear	7,388	7,842	7,010	5,684	7,080	6,122	5,532	5,364
Renewables	1,029	1,196	1,404	1,371	1,627	1,609	1,621	2,159
Oil & other	2,408	2,917	3,424	3,330	3,589	3,130	3,056	2,921
Total	35,422	34,653	35,636	32,688	38,205	31,988	32,170	27,284

Source: Department of Energy & Climate Change (DECC)

Renewable generation by source

	Gigawatt hours							
	2004	2005	2006	2007	2008	2009	2010	2011
Hydro	287	246	275	284	334	266	213	268
Wind & wave (a)(b)	551	715	867	864	989	905	999	1,439
Solar	1	9
Other (c)	192	235	262	223	303	438	408	443
Total	1,029	1,196	1,404	1,371	1,627	1,609	1,621	2,159

Source: Department of Energy & Climate Change (DECC)

(a) Wind Offshore is allocated to regions/countries according to where the cabling comes ashore.

(b) Wales generates no electricity from waves at present.

(c) Other consists of landfill gas, sewage gas and other bio-energy renewable sources.

⁵ Welsh Government (2010), *Climate Change Strategy for Wales*, p.42

⁶ Welsh Government (2010) *A Low Carbon Revolution*, p.6.

⁷ Statistics for Wales (2013) Statistical Bulletin, *Energy Generation and Consumption for Wales, 2011*, p.3

⁸ Ibid, p.6

Key points and targets

The Welsh Liberal Democrats believe that we should aim to be the most ambitious and greenest of the major Welsh political parties. Our core goal is that Wales should, by 2050, aim to **produce enough renewable and low-carbon energy to cover our own needs and to provide potential export**. Stopping climate change takes a global effort, and Wales must play our part in order to produce enough green energy for us all. By ridding Welsh energy generation of carbon-intensive sources and alongside decreasing energy demand through improved energy efficiency, the differential will mean Wales will be able to export even more energy, all of it green and low-carbon.

Welsh Liberal Democrats in government would commission an immediate exploration into the feasibility of achieving our targets of becoming a renewable energy exporting country. A Welsh Liberal Democrat government would develop a strategy plan to implement our targets as a matter of urgency. We intend for this standard to be a minimum baseline, one which we would seek to build on in government.

We believe that Wales should set itself the targets of:

- Producing zero net greenhouse gas emissions from generation by 2050;
- Ensuring new post-2030 gas/coal generation is dependent on CCS technology;
- Achieving a 50% reduction in generation emissions on 1990 levels by 2030;
- Decarbonising the power sector by 2030, in the range of 50-100 CO₂/KwH;
- Halve total energy demand by 2030 by improving energy efficiency in domestic, commercial, services and public sector buildings.

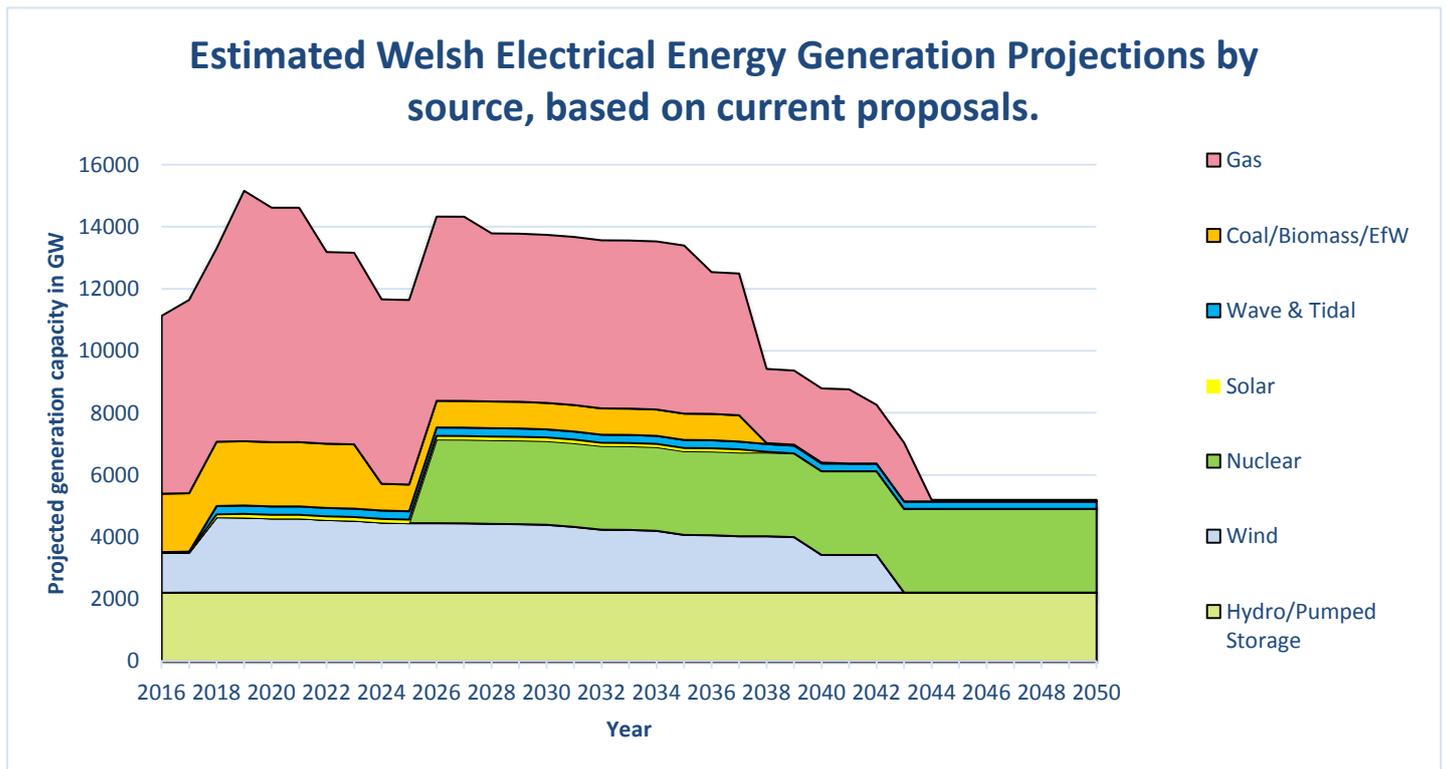
This paper is designed as the first step in building a roadmap for Wales' energy future and outline how the Welsh Liberal Democrats would deliver this future in Government. It must be remembered that this paper is set out against an uncertain background, one of shifting technological, economic and environmental contexts. This paper is not intended to predict what technologies might become available during the intervening years, and much depends on technological progress. It is also dependent on external factors such as private sector financing, which government would have to leverage. Additionally, under the current devolution settlement, much of offshore and tidal power which would be key to eradicating our dependency on carbon-intensive energy sources is not under the purview of the Welsh Assembly, but is reserved to Westminster. However, that does not prevent a Welsh government working to promote and incentivise renewable energy in Wales.

We have examined what technologies are available to us now, how they operate, can be reasonably be expected to improve, and how long they are designed to last.⁹ Our calculations demonstrate that we currently have an energy production capacity of around 11GWs, peaking at around 15GW in 2020 as more facilities come online, before slowly decreasing as facilities go offline. This is based on capacity that is currently awaiting planning permission or is likely to develop. There are certain schemes like Dinorwig and Wylfa B which will persist beyond 2050

⁹ The energy capacity in this graph is based on what is currently part of Wales' installed electrical generation capacity, and the additional capacity which has been proposed. It does not represent what we expect the grid's capacity to be in 2050, but we must decide how we will make up the shortfall.

as part of our electricity supply. Conversely, all current gas and wind generation in Wales is scheduled to end its operating life before 2050.

The Welsh Liberal Democrats in government will aim to bridge the shortfall coming in the mid-2030s using new renewable and low-carbon technologies, providing enough energy for our needs, and for renewable energy export. Along with increasing energy efficiency, meaning lower energy demand in Wales, we will seek to provide an increasing proportion of our (renewable) energy for export purposes.



Our calculations project that there will be a shortfall in energy production capacity in Wales of nearly 10 MWs from 2044 that will need to be filled by new developments if Wales's energy production capacity is to be maintained at 2020 levels. We propose that this should be done entirely through renewable and low-carbon energy projects, involving a combination of sources including marine and tidal, onshore and offshore wind, hydro-power and solar power.

Our initial headline goals would include the following:

- The majority of marine energy schemes discussed in this paper are trailblazers. Should all planning applications be accepted and be proven efficient and effective, we believe that a reasonable goal is to increase marine energy installed capacity to 350 MW by 2025, and to 4GW by 2050.
- Wind is a huge potential energy source for Wales, and we would aim to have an installed capacity of over 3GW by 2025, and 6.5GWs by 2050. We would aim for there to be a far greater focus on offshore wind, as greater use floating wind turbines will make construction of large offshore windfarms more cost effective.

- Large-scale solar facilities will also play their part, but are unlikely to produce more than a 2GW total energy given the current capacity vs. land coverage ratio. We would instead focus on community and micro-scale solar generation.
- On microgeneration and community-scale ownership and generation, we would seek to enable people and communities to develop as much energy as possible from such sources, especially solar and run-of-river hydropower. We believe that a reasonable target is for 20% of domestic energy demand to be covered by microgeneration and community-scale ownership and generation.

To maximise the efficient and effective use of these renewable energy sources, support actions will be required, including:

- The development of new pumped storage facilities to enable the security of electricity supply around fluctuations in generation by renewable power facilities. Current pumped storage facilities will last beyond 2050. We will work with energy developers to explore the possibility of constructing two or more Dinorwig-size pumped storage facilities. This has the potential to increase the capacity of pumped storage by ~3.4GW to 5.6GW by 2050.
- The planned Wylfa B facility, will be a part of the Welsh energy generation capacity and is intended to provide a “minimum of 2,600MW”¹⁰ or 2.6GW to 2050.
- Policies designed to reduce consumption and increase energy efficiency, overall increasing the level of renewable and low carbon energy generated which Wales can export.

Additionally, to maximise the economic benefits of renewables we will work with developers and educational institutions to expand supply chains and centres of excellence for the next generation of engineers and apprentices.

Public R&D should focus on technological innovation to reduce the environmental impacts of tidal and wave power, and a collaborative industry-stakeholder-government partnership should be established to monitor the impact of marine renewables on the environment. This will serve to expand the Welsh national supply chain for renewable technologies and energy and increase investment in the Welsh green economy.

We would also support research into battery storage technology. This is essential for making a low-carbon grid more flexible to demand and ensuring that all generation technologies are able to be fully used to lower consumer bills.

¹⁰ <http://www.horizonnuclearpower.com/wylfa>

Expanding Renewables and Low Carbon Solutions

The UK has enormous potential for developing renewable sources of energy. This is particularly true of wind and marine energy: Wales is both one of the windiest areas of Europe, and bordered on three sides by strong tidal currents. The Welsh Liberal Democrats seek to expand the usage of renewable energy sources and low carbon energy solutions in order to reduce our dependency on fossil fuels.

In Government, the Welsh Liberal Democrats would ensure that while fossil fuels will remain part of our electrical generation grid for several decades, the level of their contribution will steadily decrease as they are replaced with low-carbon alternatives. This will be done to achieve our goal of zero net greenhouse gas emissions from electrical generation by 2050.

Steady reduction in fossil fuel dependency

Fossil fuels make up around three quarters of energy production in Wales. This is mostly produced through coal and gas.

Wales' coal supply has greatly affected our past, and is still affecting our present. Despite declining gradually "as particular generating plans come off-line"¹¹, energy generation from coal in Wales is still high, at around 6,000GWh per year, more prominent than nuclear. In Wales, opencast coal production slowly declined from 3 million tonnes (Mt) in 1995, to just over 1Mt in 2007/8. Between 2005 and 2006, permitted opencast reserves were increased from 3.9Mt to 17Mt. 70% of this production is dedicated to electricity generation.¹² The Loose Anti-Opencast Network has identified seven possible new opencast sites in Wales.¹³

While relatively large reserves mean it is a comparatively cheap source of energy, it is fast depleting and dangerous, with the most deaths per TWhs of energy produced.¹⁴ It is also highly polluting. Aberthaw coal power station in Barry is the single largest emitter of CO₂ in Wales¹⁵, emitting over seven million tonnes of CO₂ in 2006. It has 'opted-in' to the Large Combustion Plant Directive (LCPD) which sets limits on the amount of sulphur dioxide, nitrogen oxides and dust particulates that it can permit. A 3MW carbon capture pilot plant is under construction.¹⁶

Gas remains the dominant source of energy in Wales, "responsible for almost 50% of all electricity generated in Wales".¹⁷ Gas is the main fuel used to generate electricity in Wales.¹⁸ Domestic consumption of gas is "significantly higher than that of electricity" and is used for many purposes, such as heating and cooking appliances.¹⁹ Gas usage for domestic purposes has been continually falling, and in 2011 had reached a low of 13,600 kilowatt hours per

¹¹ Welsh Government (2012) *Energy Wales: A Low Carbon*

Transition, <http://wales.gov.uk/docs/desh/publications/120314energywalesen.pdf> p.8

¹² Welsh Government (2009), *Minerals Technical Advice Note 2: Coal*, p.4

¹³ <http://londonminingnetwork.org/2013/01/2013-a-crunch-year-for-coal-and-the-uk-coal-industry/>

¹⁴ <http://www.ecogeek.org/monitoring-pollution/3554-evaluating-energy-sources-by-human-deaths>

¹⁵ <http://www.foe.co.uk/cymru/english/news/17740.html>

¹⁶

http://www.npower.com/rwenpowercr/4_low_carbon_and_the_future_of_energy/4_2_the_transformation_of_our_generation_portfolio/

¹⁷ Welsh Government (2012) *Energy Wales: A Low Carbon*

Transition, <http://wales.gov.uk/docs/desh/publications/120314energywalesen.pdf> p.8

¹⁸ Statistics for Wales (2013) *Statistical Bulletin, Energy Generation and Consumption for Wales, 2011*, p.4

¹⁹ *Ibid*, p.13

consumer. This may be due to the economic downturn, or improved energy efficiency. During 2010/11, domestic consumption of gas per consumer fell in all Welsh local authorities - the largest percentage increase was in Newport (9.2%), followed by Ceredigion and Denbighshire (at 8.9% each).²⁰

Two new gas fired stations are due to come online in Wales; Pembroke Power Station (2MW) and Abernedd Power Station (450MW). The Coalition government has set aside £1bn for carbon capture schemes in these locations.

Carbon capture and storage (CCS) refers to the process of capturing waste CO₂ from fossil fuel power plants, transporting it to a storage site and piping it underground to a depth of at least 800 metres, deep enough to be prevented from leaking into the atmosphere. Such CCS technologies are important to hitting international targets on greenhouse-gas mitigation and can turn high carbon fuels into low carbon electricity. It provides a unique opportunity to keep fossil fuels (coal and gas) in the UK's electricity supply mix while reducing carbon dioxide emissions. CCS could, therefore, contribute to decarbonising power generation and energy intensive industries.

For viable technologies to be developed, an average of USD 3.5-4 billion must be invested globally every year between 2010 and 2020. According to the Columbia Climate Center²¹, "each stage of CCS [...] is technically feasible and in use today". It is however highly energy-intensive – 10-40% more energy is required by utilising CCS technology – and costly, with projected abatement costs up to 2050 ranging between \$35-50 per tonne of CO₂ avoided. Its application is also currently highly limited, as there are "only nine integrated, operational commercial CCS projects worldwide [...] but none are large-scale".

Research is already ongoing at the Aberthaw power plant, which is host to a 3MWe post-combustion carbon capture pilot plant, using carbon capture technology provided by Cansolv Technologies. It will capture 50t of CO₂ per day, equivalent to the emissions from 3MW of Aberthaw's 1.5GW capacity. Its key parameters are capture rates, energy use, effectiveness, reliability, and understanding the practical implications of operating a full-scale carbon capture facility in conjunction with normal power plant operations. It is expected to conclude research in 2014.²²

The Welsh Liberal Democrats want to see the timely deployment of commercially viable CCS. We would encourage the development of CCS technology centres or hubs and continue the programme of commercialisation of CCS by providing funding for CCS demonstration projects, after which time it is to be expected that CCS can rely on normal mechanisms of support for low carbon power generation. The use of gas (and coal) on a large scale after 2030 should be conditional upon it being fitted with effective CCS technology.

We also support the spread of heat networks. These supply heat from a central source directly to homes and business through a network of pipes carrying hot water – this means that

²⁰ Ibid, <http://wales.gov.uk/docs/statistics/2013/130227-energy-generation-consumption-2011-en.pdf> p.14

²¹ IEA (2013), *Technology Roadmap Carbon Capture and Storage*

²² <https://www.rwe.com/web/cms/en/2756/rwe/innovation/projects-technologies/power-generation/fossil-fired-power-plants/co2-removal-uk/>

individual homes and businesses do not need to generate their own heat on site. Only 2% of the UK's heat demand comes from heat networks, but in the right conditions, they could supply up to 14% of the UK's heat demand.²³

The Welsh Liberal Democrats would not support new development of new fossil fuel power plants without appropriate CCS technology or in the absence of a clear plan to recover heat for supply to industrial or commercial consumers or via a heat network.

Unconventional Gas

Unconventional gas covers a variety of energy sources – the most prominent types are shale gas (gas trapped in shale rock) and coal-bed methane (CBM - which is methane produced between coal seams). The term *unconventional* refers to the source, rather than the nature of the gas. The most contentious debate within the field of unconventional gas is the use of hydraulic fracturing or *fracking* to extract gas from shale deposits. Fracking is a method of extracting unconventional gas, by fracturing rocks using pressurized liquids. Typically, a fluid of mixed water, sand and chemicals, is injected into a well at high pressure to create small fractures in the rock which are held open by materials such as sand. This allows hydrocarbons to flow into the reservoir rock. 15-80% of injected fluid is recovered and usually captured, treated and disposed of.

Significant public concern exists regarding the safety of fracking and related industrial processes in Wales. These include the risk of earth tremors; the contamination of ground/drinking water supply; return of potentially toxic and radioactive materials to the surface; and disposal of fracking fluids after use. Fracking does induce microseismic events/microearthquakes which are usually too small to be detected at the surface. However, tremors in Lancashire were linked to fracking operations, later suspended.^{24,25} Contamination of groundwaters has been alleged in several areas in North America, and the Tyndall centre's 2011 report on shale gas states that it "brings a significant risk of ground and surface water contamination and until the evidence base is developed a precautionary approach to development [...] is the only responsible action".²⁶

Fracking remains at an exploratory stage in Wales, but has the potential to be applied to several locations, such as the former South Wales coal fields, in tandem with existing methods of exploiting unconventional gas reserves. It must be noted that the licencing of unconventional gas exploration is presently non-devolved and is administered by the Department of Energy and Climate Change (DECC). DECC has established the Office of Unconventional Gas and Oil (OUGO) to promote the safe, responsible, and environmentally sound recovery of UK reserves.

However, planning and water *are* devolved and subject to Welsh Government 'call-in' procedures. The Welsh Liberal Democrats are not opposed to the use of fracking to exploit shale *in principle*, but we believe that fracking operations should not be permitted in Wales until and unless safety and environmental protection can be guaranteed to the highest

²³ <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/heat-networks>

²⁴ <http://www.bbc.co.uk/news/uk-england-lancashire-13700575>

²⁵ <http://www.bbc.co.uk/news/uk-england-lancashire-15550458>

²⁶ Tyndall Centre for Climate Change Research (2011), *Shale Gas: a provisional assessment of climate change and environmental impacts*, p.5.

standards. These should include demonstrable reassurance about the impact of fracking operations on seismic activity, water supply and water quality, and measures to ensure the safe treatment and disposal of fracking fluids. Current proposals in the UK do not yet meet this benchmark.

The Welsh Liberal Democrats will introduce a new Technical Advice Note (TAN) to set out the environmental and health standards expected of fracking operations and to direct planning authorities to reject applications for fracking operations unless these standards are met.

In the medium term it is conceivable that shale gas could contribute as a transitional fuel as part of our commitment to cut carbon emissions from electricity generation and increase energy security. However, any development of shale gas must not infringe on or distract from the expansion of renewable energy generation as our first priority.

Biomass, Anaerobic digestion and Waste incineration

'One man's rubbish is another man's treasure' has never been more true – especially as we can generate energy from waste products. The UK recovers energy from waste that cannot be reused or recycled with less greenhouse gasses emitted.²⁷

Waste and biomass (organic materials like wood or high energy crops such as rapeseed), can be used to generate energy in several ways. Biomass or waste can be used to heat homes and buildings directly through incineration or combustion. Waste can also be used in anaerobic digestion (AD), which "is a natural process in which micro-organisms break down the organic matter found in wet biomass waste [...] to produce biogas (mainly a mixture of around 60% methane and 40% carbon dioxide)"²⁸ which is burned in a combined heat and power (CHP) unit to produce heat and electricity.

Biomass heating is virtually carbon neutral. Although CO₂ is produced through burning biomass, it is largely balanced by the CO₂ that is absorbed during the fuel's production.²⁹ However, biomass can contribute to air pollution levels, particularly in cities.³⁰

Globally, biomass has been criticised for reducing the available arable land for food production, and driving up food prices³¹, although this is a matter of debate.³² Waste incineration itself has also been criticised for pollution, and reducing incentives for recycling.

Renewable energy generation from biomass sources has increased generally in Wales, from 192 gigawatt hours (GWhs) in 2004, to 443GWh in 2011. Consumption of bioenergy has increased, the only source of fuel to increase in consumption since 2005,³³ going from 604 GWhs to 2,066 GWhs in 2010 – however, this high only represents 2.1% of total energy consumption in Wales by fuel. Up to March 2012, there were no microgeneration AD installations in Wales registered for FiTs. Energy from waste (both burned directly and processed to a gas) could provide 15-20% of UK electricity needs. Several councils in South Wales are currently planning waste incineration at the Prosiect Gwyrdd facility in Cardiff.³⁴ Federal Liberal Democrat Policy passed at Autumn Conference 2013 in Glasgow sets party policy to "phase out organic waste to landfill" through AD, and regulate to achieve this. It claims that producing energy from waste is preferable to generating it from crops or woodland products, as such organic materials have a role to play in carbon sequestration, or removing CO₂ from the atmosphere.

The Welsh Government aims "to deliver by 2020 up to 6 kWh/d/p in Wales of electricity from biomass - 50% indigenous/50% imported". It is developing the Agricultural Waste Sector Plan

²⁷ <https://www.gov.uk/generating-energy-from-waste-including-anaerobic-digestion>

²⁸ <https://www.gov.uk/generating-energy-from-waste-including-anaerobic-digestion>

²⁹ Welsh Government (2007) *The power is in your hands: renewable small-scale energy*, p.5.

³⁰ Forestry Commission and Biomass Energy Centre (2010) *Biomass and air quality: Reports and studies*.[http://www.biomassenergycentre.org.uk/pls/portal/docs/PAGE/BEC_TECHNICAL/RESEARCH AND STUDIES/EMISSIONS_STUDIES/AIR_QUALITY_GUIDANCE.PDF](http://www.biomassenergycentre.org.uk/pls/portal/docs/PAGE/BEC_TECHNICAL/RESEARCH_AND_STUDIES/EMISSIONS_STUDIES/AIR_QUALITY_GUIDANCE.PDF)

³¹ Tenenbaum, David J. (2008) 'Food vs Fuel: Diversion of Crops Could Cause More Hunger', *Environmental Health Perspectives*, 116(6).

³² Ajanovic, Amela (2010) Biofuels versus food production: Does biofuels production increase food prices?, *Energy*.

³³ Statistics for Wales (2013) Statistical Bulletin, *Energy Generation and Consumption for Wales, 2011*,

³⁴ <http://wales.gov.uk/newsroom/environmentandcountryside/2013/130802pg/?lang=en>

(AWSP) to make it easier to establish AD on-site on farms³⁵ and alongside the European Regional Development Fund, has funded the establishment of the Wales Centre of Excellence for Anaerobic Digestion, based at the University of Glamorgan.³⁶³⁷

While biomass and associated technologies have their role to play in the future energy mix, it should be limited.

The Welsh Liberal Democrats would attempt to **limit biomass to be used for heat technologies, as opposed to electricity generation**. We would attempt to prevent biodegradable waste from being landfilled and support councils which wish to move to separate food waste collection.

The Welsh Liberal Democrats would seek to use only indigenous biomass energy – using imported biomass for energy carries its own additional carbon costs for transportation.

³⁵ <http://www.fwi.co.uk/articles/03/01/2013/136997/plans-to-boost-anaerobic-digestion-in-wales.htm>

³⁶ <http://www.walesonline.co.uk/news/wales-news/anaerobic-digestion-food-wastes--2494828>

³⁷ <http://wales.gov.uk/about/cabinet/decisions/dr2012/apriun/enviro/jg0646/?lang=en>

Expansion of Renewables and Low Carbon sources

As gas prices increase, many renewable technologies should become steadily more cost competitive. The issue is not potential, but delivery and diversity. The Welsh Liberal Democrats aim to construct a complete market and planning framework providing sufficient incentives to invest in clean energy compared to the risks and costs.

The next section of our paper will detail policies which we believe will lead to achieving our targets.

Marine renewables development

Wales has a rich and diverse marine environment. Welsh inshore waters cover 16,000 km², an area almost double the size of Wales, of which 5,600 km² are under designation across 125 marine protected areas. Such an expanse offers enormous potential for the development and operation of renewable energy projects. However, this can only be done with due consideration given to the vital ecosystems our seas contain, respect for conservation areas on our coasts such as Sites of Special Scientific Interest, and the sustainability of the Welsh fishing and tourism industries which are reliant upon them.

Despite this potential, marine technologies are still in an embryonic stage. Substantial work is required from industry to develop technologies to a point of commercial readiness. Favourable conditions in Welsh waters make them an ideal test-bed for these technologies, with several projects in development from wave energy converters to a tidal lagoon.

Wave energy

UK wave resources are estimated to be between 40 and 70TWhs/year³⁸. Wave energy technologies function by exploiting the movement of waves, either vertically or horizontally. There are presently two pre-commercial (demonstration) projects planned for deployment in Welsh waters, both around the Pembrokeshire coast.



Wave Dragon Wales Ltd has plans to install a 7MW wave energy converter of the Pembrokeshire coast. It functions by allowing waves to flow over it, into a central pool, and using gravity to drain the water through a turbine below which generates electricity.

Swansea University have been involved in the environmental modelling work.



Marine Energy Ltd is a project developed by the University of Uppsala in Sweden. It operates by connecting a floating ring to a sea bed via a piston. Wave movements rotate the piston which in turn generates an estimated 10MWs.

The project is going through the planning process.

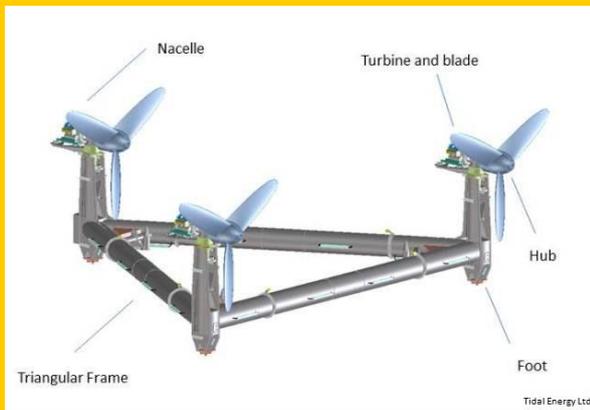
³⁸ Energy and Climate Change Committee (2012) *The Future of Marine Renewables in the UK*, Eleventh Report on the Session 2011-12.

Carbon Trust (2012) *Accelerating Marine Energy*, The Offshore Valuation Group 2010, Carbon Trust – UK wave energy resource report.

Tidal Stream energy

Tidal stream technology is considered to be more dependable in generation terms than wave technology, due to the predictability of water currents around specific coastal areas. Much like wind technology, tidal stream installations generate electricity by using turbines to capture energy contained in the flow speed of water across its cross-section. The relative density of water compared to air makes this process more demanding from an engineering perspective; however, several projects are under various stages of operations around Wales and the UK.

Concerns have been raised of the ability of such turbines to function in areas known to be populated by large marine mammals such as whales, dolphins and seals. Animal deterrents are presently being designed as part of on-going development work. There is a degree of uncertainty surrounding the amount of tidal stream resources available in Welsh and UK waters. This is due to the potential impact the location of a site can have on marine wildlife. However, it has been estimated to be between 12 and 29 TWhs/year.³⁹



Tidal Energy Ltd is based in Cardiff and is in the process of finalising designs and consents for a 1.2MW tester tri-turbine DeltaStream device to be located in Ramsey Sound off Pembrokeshire.

The project has received significant support from across the Welsh political landscape, with several UK companies involved in its construction.

Marine Current Turbines has installed several successful test devices in Northern Ireland and is planning to install five turbines with a combined 10MW capacity of the coast of Anglesey.

The proposal has been developed in partnership with RWE npower and aims to be operational by 2016 – delivering 20% of Anglesey's energy needs.

³⁹ Cardiff University and Regeneris Consulting (2013) *The Economic Impact of the Development of Marine Energy in Wales*. Welsh Government Commissioned.

Renewables Obligation Certificates (ROCs) are designed to encourage generation of electricity from eligible renewable sources in the UK. The default is that one ROC is issued for each megawatt-hour (MWh) of eligible renewable output, although this will alter between different technologies. Offshore wind installations receive 2 ROCs per MWh, onshore wind installations receive 1 ROC per MWh. The Scottish Government applies 5 ROCs per MWh for wave and tidal renewables. This is higher than currently experienced in England or Wales.

The Welsh Liberal Democrats would encourage the use of offshore tidal and wave resources by offering incentives to companies to only install the highest generating equipment.

The Welsh Liberal Democrats would establish a suitable number of Marine Energy Hubs to provide a safe environment to manufacturing and test emergent marine renewable technologies before deployment. This will enable us to establish Wales as a world leader in marine renewables.

The Welsh Liberal Democrats believe the Welsh Government should work with the UK Government to ensure that support for tidal and wave power in Wales is increased, ideally, to the same level as currently received in Scotland.

The Welsh Liberal Democrats would offer financial support to incentivise investment and development of marine renewables and enhance a Wales-based supply chain.

The Welsh Liberal Democrats believe that the identification of areas important for marine biodiversity should be carried out prior to the development of marine renewables and that the protection of marine biodiversity should be prioritised in the designation process. This can be achieved through the on-going work to develop a Welsh marine spatial plan.

Tidal Range energy

Tidal range technologies include plans for lagoons and barrages. By nature they tend to be far larger projects than those of either wave or tidal stream. As such, with few exceptions, they have the capacity to generate substantially more energy, but also have the greatest environmental impacts.

Although in Welsh waters, the devolution settlement of 1MW offshore consenting powers requires that the ultimate generation decision is taken at a UK level. However, essential construction consents are required to be given within Wales by Natural Resources Wales.

There are two significant proposals for tidal range power in Welsh waters: the Swansea Bay Tidal Lagoon and Hafren Power's Severn Barrage. Both projects operate by impounding water behind a concrete wall and using a range of concept turbine designs to generate electricity from ebb and flow tides. The two projects represent a combined generating capacity of almost 7GWs (with 240MWs coming from the Lagoon), and have a proposed lifespan of 120 years⁴⁰. Tidal range projects have been subject to a degree of criticism for the potential damage they could do to local habits, fish migration and port operations, though tidal lagoons or pools are generally considered to involve less environmental risks than shore-to-shore barrages.



Swansea Bay Tidal Lagoon



Hafren Power's Severn Barrage

The Liberal Democrat Severn Tidal Forum has examined various options for tidal range power in the Severn estuary and Bristol Channel and have produced a substantial report and positioning paper called 'A Tidal Solution – The Way Forward'⁴¹. The report endorses a mixed approach involving a range of technologies, including a barrage close to the line of the Second Severn Crossing (the 'Shoots' Barrage) mounted with slim-line wind turbines, a pilot tidal lagoon project, and research and a development work for a tidal reef from Aberthaw to Minehead. These recommendations have been adopted as policy by the Liberal Democrats federally. The forum has also examined the more recent proposal for a barrage by Hafren Power, but concluded that there was "no reason why we should alter the intention of our previous enquiry recommendations which were to provide a series of incremental and varied technology approaches to energy generation."

⁴⁰ SwanseaBayTidalLagoon.com and HafrenPower.com.

⁴¹ Liberal Democrat Tidal Forum (2009) *A Tidal Solution – The Way Forward*.

The Welsh Liberal Democrats support the development of tidal range power in the Severn estuary and Bristol Channel, using a range of technologies, as outlined by the Liberal Democrat Severn Tidal Forum.

If the current tidal range projects are judged to be environmentally safe by Natural Resources Wales and the Planning Inspectorate, and are proven not have adverse effects on the surrounding environment after construction, **the Welsh Liberal Democrats see no reason why the concept could not be extended to new projects in Welsh waters.**

Encourage investment in offshore wind

Offshore wind is the single biggest estimated potential resource for Wales, at 21TWh/year, of which 20% is shared with England. Current capacity stands at 0.9GW, either operational or consented. The Welsh Government is aiming to deliver a further 15 kWh/d/p (Kilowatt hours per day per person) by 2015/16.⁴² However, consent for offshore wind production is only devolved under 1MW of production, with production of over 1MW of offshore wind energy needing consent from the Secretary of State for Energy and Climate Change, and the Welsh Government (under the Transport & Works Act). Britain's real strengths in technologies such as offshore wind power or marine renewables leave it well placed to benefit from a rapidly expanding global market – currently growing at 3.7 per cent a year, significantly faster than the global average.

RWE npower renewables (RNE NRL), one of the UK's leading renewable energy developers and operators, has constructed large offshore wind farms off the North Wales coast. Rhyl Flats is one of its major offshore wind farms, producing 90MW annually since 2009. The neighbouring North Hoyle wind farm is also owned by RWE and produces 60MW. It is currently constructing the €2billion 576MW Gwynt y Môr offshore wind farm, off the North Wales coast⁴³. This construction has generated investment of over £80million into North Wales businesses alone. The Gwynt y Môr power station, estimated to produce 750MW, is due to become operational by 2014.

Floating platforms are now being developed. The concept of a floating wind turbine has existed since the 1970s, but the industry only started research in the mid-1990s.⁴⁴ Much of the deeper waters between 60 and 100 metres are too deep for fixed structures but benefit from consistently higher wind speeds. Floating wind technologies could therefore open up new areas off the coast of the UK. This will ultimately increase the potential of this sector, particularly post 2020 as the available shallow water sites are developed, and will help to meet our decarbonisation and energy security targets.

The UK and US are working together to develop floating wind turbines.⁴⁵ There are seven experimental floating substructures (four in Europe, two in Japan and one in the US). The world's largest is Hywind, developed by Statoil, with a 2.3MW Siemens turbine, installed in 2009.⁴⁶ Potentially, by using North Sea sites, floating platforms could meet the EU's electricity consumption four times over.⁴⁷

This should make construction of wind farms in deep waters much more effective on a large scale.

The Welsh Liberal Democrats would encourage the use of offshore wind resources by offering incentives to companies to only install the highest generating equipment.

⁴² Welsh Government (2010) *A Low Carbon Revolution*, p.13.

⁴³ <http://rwe.com/web/cms/en/1202906/rwe-innogy/sites/wind-offshore/under-construction/gwynt-y-mr/>

⁴⁴ EWEA (2013) *Deep water: A next step for offshore wind energy*, p.20

⁴⁵ <https://www.gov.uk/government/news/davey-to-host-international-clean-energy-talks>

⁴⁶ EWEA (2013), p.12

⁴⁷ EWEA (2013), p.16

Onshore Wind and TAN 8

There are numerous benefits to wind power. Onshore wind farms are environmentally friendly, do not create greenhouse gases and the turbines and infrastructure leave very little long-term pollution or impact on the environment when removed. Wind farms take up less space than the average power station, and the area around the turbine can be used for many purposes, for example, agriculture. Newer technologies are making the extraction of wind energy far more efficient. Wind turbines can be useful for communities and households in remote locations.

Wales is perfectly placed to make use of wind power. As this map shows, wind speeds in Wales, and Britain more widely, are comparatively higher than most of the European continent.

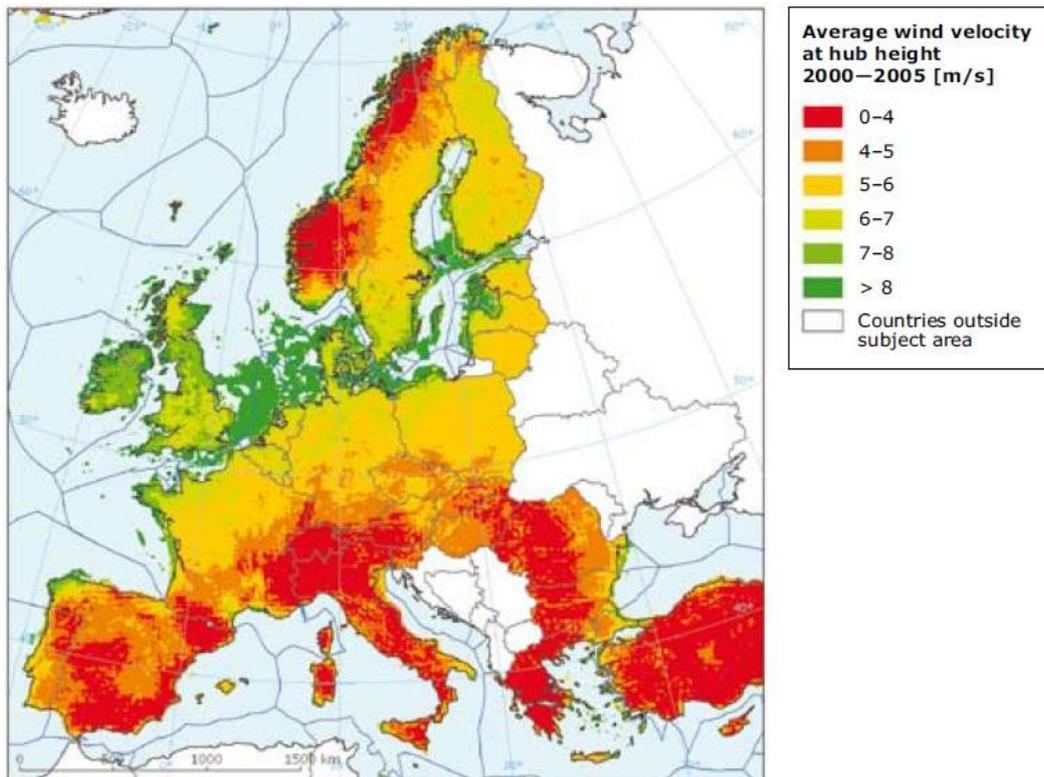


Figure 2: Average wind speed velocity, source: Europe's onshore and offshore wind energy potential: An assessment of environmental and economic constraints, EEA Technical Report, No 6/2009

However, wind power is obviously dependent on wind, causing unreliability and meaning many locations do not have strong enough wind to support a wind turbine or wind farm. It is not as productive as fossil fuel power stations, meaning multiple turbines may need to be built in order to make an impact, which can be expensive. Noise pollution can be an issue, and some believe that they negatively impact on the aesthetics of the countryside.

Technical Advice Note 8: Planning for renewable energy (2005), also known simply as TAN8, relates to the land use planning considerations for renewable energy. It provides advice on renewable energy and planning; onshore renewable energy technologies; design and energy implications for development plans; development control; and monitoring. It has come under particular scrutiny for its role in determining the location of onshore wind farms. This is through determining the location of Strategic Search Areas (SSAs), which are areas in Wales where “for efficiency and environmental reasons amongst others, large scale (over 25MW) onshore wind

developments should be concentrated⁴⁸. Land adjoining an SSA may also be developed, while National Parks, Areas of Outstanding Natural beauty and World Heritage Sites are excluded.

Table 1: Strategic Search Area

Strategic Search Area (SSA)	Capacity Target ⁴⁹	Identified Maximum Capacity ⁵⁰
A) Clocaenog Forest	140 MW	212 MW
B) Carno North	290 MW	430 MW
C) Newtown South	70 MW	98 MW
D) Nant y Moch	140 MW	212 MW
E) Pontardawe	100 MW	152 MW
F) Coed Morgannwg	290 MW	430 MW
G) Brechfa Forest	90 MW	132 MW
TOTAL	1,120 MW	1,666 MW



-* Technical Advice Note (TAN) 8: Planning for Renewable Energy, July 2005

- extensive areas with a good wind resource (typically in excess of 7 meters per second);
- upland areas (typically over 300m above ordnance datum) which contain a dominant landform that is flat (plateau) rather than a series of ridges;
- generally sparsely populated;

⁴⁸ Welsh Assembly Government (2005) *Planning Policy Wales, Technical Advice Note 8: Planning Renewable Energy*, p.5

⁴⁹ <http://www.nantymochwindfarm.com/newsletters/panels/english/Panel%204%20-%20Why%20are%20we%20Here%20V7%20Final-CW.pdf>

⁵⁰ Letter from John Griffiths AM, dated July 2011.

- dominated by conifer plantation and/or improved/impoverished moorland;
- has a general absence of nature conservation or historic landscape designations;
- of sufficient area to accommodate developments over 25MW, to achieve at least 70MW installed capacity and to meet the target capacity;
- largely unaffected by broadcast transmission, radar, MoD Mid Wales Tactical Training Area (TTA) and other constraints.

These criteria are open to criticism. Given that it was published in 2005, it has been criticised as being out of date. Many of its provisions may have been decided based on older levels of technology, while the industry has much advanced. An example could be Llandinam wind farm, which was first developed two decades ago. In 2008, they submitted an application to repower the windfarm, resulting in replacing the existing 102 turbines and replacing them with a mere 34⁵¹, while not losing overall capacity. Technology has advanced and several of TAN8's requirements could possibly be amended. Additionally, TAN8 does not consider road/transport access to the SSAs. It would be necessary to review TAN8 in order to account for these and other factors, in order to create a more equitable solution for wind power, which would lessen the burden on mid-Wales.

One of the biggest problems with wind farms are the presence of pylons. Some have voiced concerns over their aesthetic impact on the environment, especially in Wales. TAN8 does not refer to the existing National Grid network, leading to many SSAs being located far from the National Grid and additional lines of pylons needing to be constructed. This is yet another reason to review the TAN8 framework.

The existing National Grid network in Wales is being expanded as we speak with two major initiatives. The Mid Wales Connection project, connecting the existing National Grid network at Lower Frankton in Shropshire, to Cefn Coch, Powys, could comprise of more than a hundred pylons in a corridor along the Vyrnwy Valley. Where overhead lines are used, National Grid has said they "will work hard to reduce visual effects through careful routeing and the use of appropriate pylon designs, which could include the new 'T-pylon'"⁵² which offers a smaller and more compact size of pylon.⁵³ These T-Pylons were designed through a competition developed by the Department of Energy and Climate Change, National Grid, and the Royal Institute of British Architects.⁵⁴ Other entrants such as the Silhouette and the Totem designs⁵⁵ could also be used to lessen the impact of transmission on the environment.

Undergrounding cables is another option that has been proposed as a solution to aesthetic concerns over transmission cables. Given that they are underground, the visual impact is minimal. Additionally, they are less subject to damage from the elements, pose no hazards to low flying aircraft or birds, and are protected from theft or sabotage. However, there are several drawbacks, including difficulty over repair work and upgrade, damage to environmentally sensitive land such as peat bogs, and much higher costs. Overhead lines are the cheapest transmission technology, varying between £2.2m and £4.2m per kilometre. Underground cable, directly buried, is the least expensive underground technology, with lifetime costs of £10.2m to

⁵¹ http://www.scottishpowerrenewables.com/pages/llandinam_repowering.asp

⁵² <http://www.midwalesconnection.com/route-corridor.aspx>

⁵³ <http://www.nationalgrid-talk.com/?p=471>

⁵⁴ <http://www.nationalgrid-talk.com/?p=130>

⁵⁵ <http://www.bbc.co.uk/news/uk-15293918>

£24.1m per kilometre. For underground cables in a deep tunnel, the single largest cost element is the tunnel itself, with costs ranging from £12.9m to £23.9m per kilometre. Other forms exist with varying costs and attributes.⁵⁶

One of the other main criticisms of wind farms is about the noise pollution they produce. A recent Committee⁵⁷, chaired by William Powell AM, investigated the issue. They found that while some criticised the noise levels, others claimed the unremitting presence of the noise of wind turbines was problematic, especially at night.⁵⁸ This can lead to stress, depression and health and safety concerns for those who drive or operate heavy machinery at work. Noise levels are particularly disruptive in rural areas where the ambient noise level is low, particularly at night.

The committee recommended that⁵⁹

- Statutory Planning Guidance is amended “to introduce buffer zones that maintain the current 500 metres minimum distance between dwellings and turbines, and increase the separation distance as appropriate, and in specified circumstances up to 1500 metres, according to environmental factors such as the topography and the ambient noise levels of the area.”
- Guidelines are “revised to take into account the lower ambient noise levels in rural areas and the latest research and World Health Organisation evidence on the effects of noise on sleep disturbance.”
- Statutory Planning Guidance is “amended to include a requirement that faulty turbines are switched off at specified times overnight as soon as a fault affects its noise emissions and that turbines are not returned to full operation until any such faults are fully repaired.”
- Outside SSAs, microgeneration projects are possible with planning permission – local authorities may consider the cumulative impact of smaller schemes and establish separation distances. As of March 2012, 136 wind installations are registered for FiTs in Wales, with a total generation capacity of 0.9MW. The majority (87%) of installations are domestic, 17% are commercial/industrial, and 1% are community-owned.⁶⁰

⁵⁶ <http://www.theiet.org/factfiles/transmission-report.cfm>

⁵⁷ National Assembly for Wales (2012) Petitions Committee, *Control of Noise from Wind Turbines*

⁵⁸ *Ibid*, p.10

⁵⁹ *Ibid*, p.6.

⁶⁰ National Assembly for Wales (2012) *Renewable – Micro-Tariffs*. p.15

The Welsh Liberal Democrats in government would:

- **Commission an immediate review into TAN 8**, so it can be updated to meet current technological requirements; to include consideration for the National Grid network; to include consideration for road/transport access to SSAs; and to consider the impact of noise pollution.
- **Seek to minimise the impact of wind energy on the landscape** where possible.
- **Encourage where possible the use of the latest technology and maximum innovation in relation to wind turbines and pylons**, such as t-pylons and undergrounding
- **Issue local authorities with specific guidance on single turbine developments.**
- **Develop a more equitable solution for wind power, which would lessen the burden on mid-Wales.**
- **Explore new SSA options to encourage new projects and reduce the existing concentration on Mid-Wales.**

Hydro-electric

Wales is a land of rivers, lakes and mountains. Our nation has over 398 natural lakes, “not counting the 90 we built ourselves”.⁶¹ The wettest area of Wales is Snowdonia, and sees up to 6000mm of rainfall a year.⁶² This unique geography has a direct impact on our lifestyle. Part of this contribution can be to our energy generation through hydroelectric power.

Hydro-electric power “utilises the force of flowing water to turn turbines in order to generate electricity” through kinetic energy.⁶³ The amount of energy produced depends on the speed of the water flow and the vertical distance the water drops, referred to as the ‘head’. Hydro-electric power accounts for 1.65GW of energy generation in the UK, equivalent to ~2% of generating capacity. In Wales, hydropower is the second largest contributor to renewable energy generation but present generation is steady – while the number of hydropower sites “more than doubled between 2003 and 2011”⁶⁴, the installed capacity has only increased by 3% as these were often micro-generation installations.⁶⁵ If all current ‘approved’ sites become operational, the relative contribution of hydropower will decline⁶⁶ as other sources such as biomass increase. The total physical resource for hydro-power is estimated to be 13 TWhs per year of installed capacity – however, the accessible resource is *considerably* smaller, due to geographical and environmental constraints noted above. As such, large-scale resources are largely only likely to be developed in Scotland, providing up to 3TWh per year. Most other locations suitable for large-scale hydroelectric projects have already been developed. Generation capacity could be generated through refurbishing existing projects. Smaller-scale developments are now a focus of the hydro-electric industry, for example old quarries.

Run-of-the-River technologies shall be considered in the section on community-scale ownership and generation, as those technologies more readily lend themselves to microgeneration. Pumped storage is more likely to be a larger, government-led project.

Pumped storage schemes are a type of hydroelectric power generator which utilise off-peak electricity from the National Grid to elevate water from one reservoir to another higher up – during times of peak demand, the water is released, turning turbines and generating electricity. They are overall “net consumers of electricity”⁶⁷, as they require energy to operate. Their advantage is in acting as a stabilising source of electricity when demand fluctuates and when other forms of energy, notably renewable sources, alter in generation. When wind farms generate surplus energy, the excess can be used to pump water between two reservoirs, one higher up, to be released generating energy when the wind farms are not producing sufficient energy. They produce electricity at a constant rate, aren’t seasonally or weather dependent, and can be used when required. They produce no greenhouse gases. The reservoirs can be used for leisure, tourism and irrigation. But those same reservoirs need filling, which is

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http://www.wales.com/en/content/cms/English/About_Wales/Landscapes/Lakes_and_Rivers/Lakes_and_Rivers.aspx

⁶² Dŵr Cymru (n.d.) *Water in Wales*, p.5

⁶³ National Assembly for Wales (2013), *Renewable Energy in Wales: in figures*, p.1

⁶⁴ *Ibid*, p.9

⁶⁵ *Ibid*, p.8

⁶⁶ *Ibid*, p.12

⁶⁷ National Assembly for Wales (2013), *Renewable Energy in Wales: in figures*, p.7

predominately done by flooding valleys and old mines, causing massive environmental disruption.

The economics of pumped storage schemes are characterised by a long lifetime, low running costs, the absence of fuel costs on the one hand but relatively high initial capital costs on the other. This is one of its significant drawbacks. However, the largest effect of hydropower is on the ecology of the area. Building the station and diverting water flow have large-scale detrimental effects including “disturbance of the river ecology, damage to fish and organisms passing through hydro turbines, visual intrusion from engineering structures, noise, and change of groundwater levels”.⁶⁸ This is particularly problematic in North Wales, as suitable catchment areas are often located in Snowdonia National Park. There are numerous advantages - once a dam is constructed, electricity can be produced at a constant rate, and last many decades. They do not produce greenhouse gases, unlike many other forms of energy generation.

Britain currently has four pumped-storage facilities, two of which are in Wales. The Dinorwig Power Station, a 1,728MW pumped-storage hydroelectric scheme near Llanberis is the largest hydroelectric power station in the UK. Ffestiniog power station can generate around 360MW in sixty seconds⁶⁹ and is Britain’s third largest. Other sites such Bowydd and Croesor have been identified as possible locations for new pumped-storage facilities.⁷⁰ Both were considered as potential alternatives to Dinorwig in the seventies. During our consultation process, sites in Penmaenmawr^{71,72} that could hold a ~15GWh capacity pumped storage power station and Llanberis.⁷³ Most other locations suitable for large-scale hydroelectric projects have already been developed. Generation capacity could be generated through refurbishing existing projects. Smaller-scale developments are now a focus of the hydro-electric industry, for example old quarries.

We will need to take steps in government which will enable us to deal with demand spikes without resorting to high-carbon options. This can be accomplished through **the development of new pumped storage sites in suitable locations** across Wales. The Welsh Liberal Democrats believe hydropower, both ROR and pumped storage, will play a substantial role in Wales' future energy mix.

We will work with energy developers to explore the possibility of constructing two or more Dinorwig-size pumped storage facilities. This has the potential to increase the capacity of pumped storage by ~3.4GW.

⁶⁸ Tyndall Centre for Climate Change Research (2011), *Shale Gas: a provisional assessment of climate change and environmental impacts*.

⁶⁹ http://www.utilityweek.co.uk/news/news_story.asp?id=199046&title=Ffestiniog+power+station+turns+50

⁷⁰ <http://www.walesonline.co.uk/news/wales-news/government-advisor-calls-two-new-2045285>

⁷¹ <http://stephencirell.co.uk/wp-content/uploads/2012/10/Case-Study-06.pdf>

⁷² <http://c3wales.org/wp-content/uploads/2012/10/TidalEnergyWalesv4.pdf>

⁷³ <http://www.businessgreen.com/bg/news/2292150/welsh-pumped-storage-scheme-gets-green-light-for-gbp100m-investment>

Nuclear power

Nuclear power currently provides around 13.5% of global electricity production and “represents a potential source of large quantities of carbon-free electricity production for the future from plants that do not create the intermittency problems associated with wind and solar”⁷⁴.

However, there are deeply held concerns about the impacts on human health for those in the surrounding vicinities, particularly in terms of cancer ratios⁷⁵, and its long-term effects on the environment, particularly in terms of producing nuclear waste.

Nuclear power currently provides ~20% of our energy generation in Wales, less than a third of the production of coal, oil and gas, but still more than double that of renewables. There are two nuclear power stations in Wales – Wylfa on Anglesey, and Trawsfynydd in Gwynedd. Trawsfynydd was decommissioned in 1991⁷⁶ and the current Wylfa set-up could generate electricity until the end of 2015.⁷⁷ Wylfa is due to be increased with a new reactor called Wylfa B⁷⁸. The proposed site covers over 600 acres adjoining the existing plant. At least two Advanced Boiling Water Reactors (ABWRs) are planned, generating “a minimum of 2,600MW at Wylfa”⁷⁹. It aims to start being operational by the mid 2020s. The Assembly voted in favour of a Conservative motion welcoming Hitachi’s £10bn investment in Wylfa B.⁸⁰ The Hitachi investment in nuclear on Anglesey is projected to create 6,000 jobs during construction, and 1,000 permanent jobs during operation, in an area with an unemployment rate of 5.1%, higher than any other part of North Wales and above the average for Wales, England or the UK. Hitachi are also contributing £90,000 to support apprentice training schemes on the island.⁸¹

Nuclear power is a reserved matter, not devolved, and the government in Westminster is responsible for Wales’ nuclear power generation. As such, we note that the Federal Liberal Democrats have adopted the position that they:

[R]ecognise that the achievement of a zero carbon Britain would require an enormous effort. We accept that in future, nuclear power stations, as an established low carbon source of electricity, could play a limited role in decarbonising the UK’s electricity supply and reducing the country’s dependence on fossil fuel imports, provided concerns about safety, disposal of radioactive waste and cost (including decommissioning) can be adequately addressed. Liberal Democrats insist that it must be up to the industry to finance the full life span of new nuclear power plant from construction to decommissioning and disposal of waste. We will not allow any public subsidy for new nuclear build.

Although we have been opposed to the expansion of new nuclear, we also accept that the energy challenges facing the UK are considerable. Our future energy needs cannot be achieved by relying upon any single energy source alone. The Welsh Liberal Democrats

⁷⁴ Joskow (2012) ‘The Future of Nuclear Power After Fukushima’, *Economics of Energy and Environmental Policy*, Vol. 1, No. 2, pp.2-3

⁷⁵ Spix C et al. (2007) ‘Case-control study on childhood cancer in the vicinity of nuclear power plants in Germany 1980-2003’, *Eur J Cancer*.

⁷⁶ <http://www.nda.gov.uk/sites/trawsfynydd/>

⁷⁷ <http://www.dailypost.co.uk/news/north-wales-news/design-work-wylfa-b-reactors-4028014>

⁷⁸ <http://www.dailypost.co.uk/news/north-wales-news/first-minister-explains-wylfa-b-2667117>

⁷⁹ <http://www.horizonnuclearpower.com/wylfa>

⁸⁰ <http://www.walesonline.co.uk/news/wales-news/wylfa-nuclear-power-station-plan-3002628>

⁸¹ <http://www.bbc.co.uk/news/uk-wales-north-west-wales-20495200>

recognise that it would be difficult to halt or reverse the development of the replacement nuclear power plant at Wylfa that has already been commissioned, and note that the development, whilst not without risks, will contribute both to economic regeneration in Ynys Môn, and to decarbonising Wales's electricity supply. As such, we accept that nuclear power will be part of Wales's energy mix for the foreseeable future, and have included it in our projections of energy production capacity. However, we continue to be concerned about the risk of leaks from nuclear stations, the problem of disposing nuclear waste, and the cost of decommissioning, and as such we do not believe that nuclear is an appropriate alternative to renewable energy as the mainstay of energy production in Wales. Therefore, the Welsh Liberal Democrats would oppose any further expansion of nuclear power in Wales beyond the current Wylfa site.

More money in your pocket, and in your community

The Welsh Liberal Democrats believe that individuals and communities should see the benefit of the utilisation of our natural resources. Wales, its individuals, and its communities benefit inherently from the spread of clean, green, renewable energies and technologies - but we can also see economic benefit from the spread of such technologies.

Community Benefit Funds

The energy industry brings many benefits to local communities up and down Wales, “both in terms of their time and through voluntary contributions to local ‘good causes’ through a variety of schemes”⁸², known as community benefit funds (CBFs). These can provide direct funding, through fixed amounts or amounts calculated per MW installed. Community initiatives are also common and include volunteering days, appointing community liaison offices, supporting local youth and community groups, regenerating communal areas, sporting tournaments and community newspapers.⁸³ Contributions to education can be made with work placement schemes, volunteering at local school career days, and providing for additional Further or Higher Education places or apprenticeships in the area.

For example, the onshore wind industry provides structured CBFs to local communities in four out of every five wind farms operating in Wales – from 55% of respondents to a renewableUK Cymru survey, the total amounts paid to CBFs or similar in 2011 totalled £623,853.30. RenewableUK’s community benefits protocol in England proposes “a minimum payment equivalent of £1,000 per MW of installed capacity, index linked to the RPI (for schemes over 5MW)”.⁸⁴ Eight sites in England & Wales could benefit from CBFs up to £1000/MW over 40 years for hosting nuclear power stations, including the Wylfa plant.⁸⁵ However, the *total* number and form of “such schemes which operate in Wales is unknown”⁸⁶ and data for other energy sources is sparse.

In Government, the Welsh Liberal Democrats would ensure that communities across Wales gain greater benefits from the investments which are made in their areas.

The Welsh Liberal Democrats would radically overhaul CBFs in order to:

- **Develop Regional Community Benefit Funds.** At present, only communities which are affected by energy installations usually achieve CBFs, while communities which are affected by transportation corridors to the installation or the grid links to the installation are not able to benefit from the economic benefits which come with local renewables. These RCBFs would have a strategic regional governance model and look at regionally important economic and development issues.⁸⁷

⁸² <http://www.renewableuk.com/en/news/press-releases.cfm/2012-12-22-welsh-communities-receive-over-620-000-from-wind-energy-in-2011>

⁸³ Welsh Government (2010), *Community Benefits: Delivering Maximum Value for the Welsh Pound*, <http://wales.gov.uk/docs/dpsp/publications/valuewales/100426commbenefitsen.pdf> p.S2:5

⁸⁴ renewableUK Cymru (2012) *Enjoying the Benefits: The value of onshore wind farm Community Benefit Funds to Wales*, p.14

⁸⁵ <https://www.gov.uk/government/news/communities-to-benefit-from-hosting-nuclear-power-stations>

⁸⁶ <http://www.renewableuk.com/en/news/press-releases.cfm/2012-12-22-welsh-communities-receive-over-620-000-from-wind-energy-in-2011>

⁸⁷ renewableUK Cymru (2012) *Enjoying the Benefits*, p.37

- **Investigate leveraging matched funding** from the EU or Welsh Assembly into regional or local CBFs.
- **Develop a public and transparent official registry of CBFs in Wales.** It could include other energy installations that have been approved but not yet constructed, and CBFs that had been proposed but not yet put in place. This would enable communities considering CBFs to ask for best practice, ideas and experience from communities with existing schemes. It would likely need cooperation from industry and local government.
- **Provide independent support for communities** to guide them through the process of setting up a CBF.
- While we would seek to allow each CBF to be constituted on its own basis, we would provide **template models and examples of what CBFs can be used for** as part of the independent support and registry scheme. In order to tackle fuel poverty, we would encourage that **a portion of community benefits is set aside to tackle fuel poverty and high energy bills in the community.** While each community and developer would set up their CBF on their own terms, we would recommend a level.

Community-Scale ownership and generation

Energy generation schemes are usually divided into three categories of sizes – large-scale projects are above 5MW, small-scale are less than 5MWs, while ‘micro hydro’ projects generate some tens of KWs of energy and are usually not connected to the Grid.

This covers a wide variety of energy sources and technologies, such as run-of-the-river hydroelectricity and solar. Such techniques should also be supported on a national scale, but they also lend themselves to microgeneration.

Run-of-the-river [ROR] hydroelectricity is a type of power generation which requires little to no storage facility and is used primarily in streams and rivers. The amount of power produced at a facility depends on the volume of water available and the rate of its flow. While these are highly diverse, they are also reasonably predictable in their output. It is best suited for those with a minimum dry weather flow. Fluctuations in hydro-electric generation are highly “dependent on precipitation as the volume of rainfall determines to a large degree how close to capacity the hydro systems can work”⁸⁸.

High-head micro hydro systems are ideal for many parts of Wales; they require a stream that runs all year round and a drop from intake to turbine of at least 30m to operate. They can then generate small amounts of electricity, and users can benefit from Feed-In Tariffs. Numerous small scale schemes exist – in Wales around 30 plants generate approximately 1,700MW.⁸⁹

By March 2012, there were 45 hydropower microgeneration projects in Wales benefiting from FITs, which between them produced 0.72MW. However, it is important to note that the *average* capacity *per* installation was 16KW, far higher than the average of 3KW for solar PV installations or 6.6KW for wind installations.⁹⁰ 84% of hydro-power microgeneration installations are domestic, but have an average capacity of only 9KW, as opposed to 62KW for the few commercial installations.

William Powell AM has said that it “is essential that the Welsh Government and Natural Resources Wales fully supports this sector, and that any changes to how hydropower schemes are regulated do not suffocate development unnecessarily.”

The Welsh Liberal Democrats call for guidelines and abstraction limits to be produced for high head schemes. This will simplify the process and make it simpler for those interested in installing run-of-river microgeneration in their community, while also ensuring that river ecosystems are not jeopardised by uncontrolled development.

Solar power in Wales is an emerging source of energy. Solar Photovoltaic (Solar PV) systems use semi-conductor cells to convert sunlight into electricity. Several different varieties exist, including those with crystalline cells, thin-film or hybrid technologies. Advances are making this energy source cheaper.

There are many advantages to solar farms. Well-designed solar farms have minimal visual impact due to limiting the height of the solar array so that it does not exceed the height of surrounding hedgerows. The land around solar arrays within a farm can be used to graze

⁸⁸ Statistics for Wales (2013) Statistical Bulletin, *Energy Generation and Consumption for Wales, 2011*, p.7

⁸⁹ <http://www.fwi.co.uk/articles/11/11/2011/129940/hydro-scheme-is-good-fit-for-welsh-hill-farm.htm>

⁹⁰ National Assembly for Wales, *Micro electricity technologies and the up[take of Feed-In Tariffs in Wales*, p.7

livestock. They do not require direct sunlight and can still generate power on overcast days. Finding a proper location can be problematic however, as the orientation and shade of a scheme affect energy generation. Initial start-up costs can be high, and older PV panels are sometimes made of toxic materials such as mercury and expensive rare earth metals, though these are being phased out by technological improvements.

The first solar park in Wales was founded in 2011 in Pembrokeshire's Rhosygilwen estate⁹¹, with 10,000 panels over a six-acre field producing more than 1,200KW of electricity.⁹² There was a large increase in the number of solar installations in Wales between 2010 and 2011 from 3MW to 30MW in a year⁹³, mostly due to the introduction of feed-in tariffs and lowering production costs.

In 2011, solar installations accounted for 97% of the renewable energy projects, but contributed only 5% of capacity, as most of these installations are domestic panels with small installed capacities. As of July 2013, over 28,000 schemes with a combined capacity of ~93MW receive feed-in tariffs – around 97% of these are solar PV schemes, and are largely domestic.⁹⁴ There are currently no Welsh Assembly grants available for solar PV installations.⁹⁵ Over 23,000 Welsh homes now have domestic solar panels which can provide for their own energy needs and feed surplus generation back into the grid.⁹⁶ 177 homes per 100,000 in Wales have photovoltaic solar panels installed, above the UK average of 118. However, seven Local Authorities in South Wales do not reach the British average. Installation of a typical domestic solar PV system to generate up to 2kW of power can cost upwards of £10,000, and should be able to reduce electricity bills by around £1,300 per year.⁹⁷

The Welsh Liberal Democrats would incentivise solar panels on existing farmland and on new built housing, and attempt to develop appropriate community benefit funds.

Further planning reforms are necessary to enable a greater number of small scale community renewables projects to be completed, using technologies from run-of-river hydropower to solar, wind to anaerobic digestion. Micro-generation should be encouraged to develop resilience within the electricity network.

Welsh Liberal Democrats would encourage the involvement of local authorities, community groups and individuals in renewable energy and energy conservation projects. Engaging local communities would introduce more competition into the energy supply market and enable the spread microgeneration projects.

⁹¹ <http://www.bbc.co.uk/news/uk-wales-14073447>

⁹² <http://retreat.co.uk/about-rhosygilwen/sustainable-living>

⁹³ EPIA (2012) *Global Market Outlook for Photovoltaics until 2016*, http://www.epia.org/fileadmin/user_upload/Publications/Global-Market-Outlook-2016.pdf p.71

⁹⁴ National Assembly for Wales (2013), *Renewable Energy in Wales: in figures*, summary

⁹⁵ <http://wales.gov.uk/topics/environmentcountryside/energy/renewable/solarpv>

⁹⁶ <http://www.cynnalcyrmru.com/news/parts-wales-revealed-solar-power-hotspots>

⁹⁷ Welsh Government (2007) *The power is in your hands: renewable small-scale energy*.

The Welsh Liberal Democrats would:

- Ensure that microgeneration projects are considered with a presumption in favour of development;
- Provide a model legal and business framework for Community-Owned Renewable Energy Co-Operatives, for communities to use which would reduce the legal costs and complexity for communities wishing to establish their own;
- Enable local co-operatives to supply their own residents or local wholesalers;
- Work to ensure there are no barriers to connection to appropriate networks, nor to sale or purchase at a competitive price;
- Give local communities the right to purchase a certain minimum portion of any wind or solar project larger than 1 MW proposed within their area; and
- Give community co-operatives the right to develop renewable energy projects (including, but not limited to, solar) in or on suitable publicly owned buildings, and publicly owned land, where practicable.
- **Create a central library of resources for community groups**, to understand best practice for their own community generation projects. This should include learning from the Ynni'r Fro project, including through learning diaries and case studies, which should inform any successor programme.

Small-scale renewable co-operatives are a fast growing force in the energy market. In Germany, the number of energy co-operatives grew from 142 in 2012 to 888 by the end of 2013.⁹⁸ The Welsh Liberal Democrats see co-operatives as a way of empowering communities and individuals to take control of their situation, enabled and supported by government.

The Welsh Liberal Democrats would reform the farming advice service so that it is more individualised and ensure advice is offered on sustainability as well as profitability, to promote small energy facilities on farms such as wind, hydro and anaerobic digestion.

The Ynni'r Fro project is a "European funded Welsh Government programme to encourage the development of community renewable energy initiatives through the provision of advice, support and financial assistance".⁹⁹ Its term will end in 2015 and "is unlikely to achieve its ambitious targets for energy generation and job creation" before its demise.¹⁰⁰

The Welsh Liberal Democrats would develop a new future for Ynni'r Fro. We would:

- **Expand the provision for any successor to Ynni'r Fro**, so that it is more able to deliver necessary advice and support.
- **Develop a transition strategy for Ynni'r Fro that gives groups certainty about future sources of support**, especially for projects begun but not been completed by 2015.
- **Review the existing method of allocating support through Ynni's Fro** and consult with stakeholders on the approach to be adopted in any successor programme, including consideration for smaller-scale projects.

⁹⁸ <https://twitter.com/CarolineLJulian/status/433312126271107072>

⁹⁹ Welsh Government (2014) *Ynni'r Fro Mid-Term Evaluation - Final Report*, p.2, <http://wales.gov.uk/docs/caecd/research/2014/140117-ynnir-fro-mid-term-evaluation-en.pdf>

¹⁰⁰ Ibid, p.2.

Energy Efficiency and Fuel Poverty

One of the Welsh Liberal Democrats' core aims is to increase energy efficiency and reduce demand. The other policies discussed in this paper will be supported by reducing consumer electricity demand, improving home efficiency and stabilising the daily demand curve.

Helping individuals to make their homes more energy efficient is crucial both to tackling climate change and poverty in Wales. It is vital to help people to make their homes more energy efficient, cutting carbon emissions and fuel poverty. Going green must be an option for everyone, not just those who can afford it. We must tackle fuel poverty, funding more improvements to people's homes, ensuring warm homes and improving household disposable incomes.

Under the Warm Homes and Energy Conservation Act (2000), the UK and Welsh Governments have a legal duty to do everything reasonably practicable to eliminate *fuel poverty*. Fuel Poverty is defined as "having to spend more than 10 percent of income (including housing benefit) on all household fuel use to maintain a satisfactory heating regime", and becomes *severe* when expenditure on fuel exceeds 20 per cent of income.¹⁰¹ The World Health Organisation recommends a standard of:

- For households with older people or people with disability or chronic illness, 23°C in the living room and 18°C in other rooms, to be achieved for 16 hours in every 24.
- For other households, 21°C in the living room and 18°C in other rooms for a period of nine in every 24 hours, or 16 in every 24 over the weekends.¹⁰²

The Welsh Government has developed statutory targets to eradicate, as far as reasonably practicable, fuel poverty in vulnerable households by 2010, in all social housing by 2012, and for everyone by 2018.¹⁰³

Fuel poverty in Wales has dramatically increased since *A Fuel Poverty Commitment for Wales* in 2003. Between 2004 and 2008, there was an increase of 15 percentage points, equivalent to 198,000 households suffering from fuel poverty¹⁰⁴. A total of 332,000 or 26 per cent of all households were estimated to be fuel poor in 2008, and one in five was severely fuel poor. By 2012, 386,000 homes in Wales are estimated to be in fuel poverty, equivalent to 30 per cent of Welsh households.¹⁰⁵

Fuel poverty lies at the heart of numerous other issues. By lifting people out of fuel poverty, problems with health, housing, education and wellbeing can be improved. It is vital that we tackle this crisis.

¹⁰¹ Welsh Government (2010), *Fuel Poverty Strategy*

2010, <http://wales.gov.uk/docs/desh/publications/100723fuelpovertystrategyen.pdf> p.7

¹⁰² Ibid, <http://wales.gov.uk/docs/desh/publications/100723fuelpovertystrategyen.pdf> p.7

¹⁰³ Welsh Government (2003) *A Fuel Poverty Commitment for Wales*.

¹⁰⁴

<http://cymru.gov.uk/topics/statistics/headlines/housing2010/1011261/?jsessionid=W3HrM2GVVS1wMnWjkmSkL2BWnpTb1vXPr4xQZxzdpmsYXnkGZy7Y!-1406392113?lang=en>

¹⁰⁵ <http://wales.gov.uk/newsroom/environmentandcountryside/2013/130430fuel/?lang=en>

Institutions

In order to tackle fuel poverty in Wales, we must have the correct organisations and institutions in place to tackle it.

In December 2011, the Welsh Government abolished the Ministerial Advisory Group on Fuel Poverty. This makes it the only UK nation without a group of this kind.¹⁰⁶ The Welsh Government have claimed that it intends to co-ordinate action to tackle poverty across all ministerial portfolios through the Tackling Poverty Action Plan. However, this body only considers fuel poverty as one issue amongst many. A separate and independent advisory group for fuel poverty would help support the Welsh Assembly and Welsh Government regarding how best to tackle the critical issue of fuel poverty.

The Welsh Liberal Democrats would reinstate a Fuel Poverty Advisory Group with an appropriate remit and the ability to make policy recommendations to the Government.

Resource Efficient Scotland is the Scottish Government-funded programme that advises businesses, public sector and third sector organisations on making more efficient use of energy, water and raw materials. It provides telephone advice, online resources, training and onsite support. These services were previously provided by Zero Waste Scotland, Carbon Trust and Energy Saving Trust. Resource Efficient Scotland was launched in 2013 to simplify and streamline the energy and resource efficiency advice and support delivery landscape.¹⁰⁷

The Welsh Liberal Democrats would investigate developing a similar institution to Resource Efficient Scotland for Wales, and expand it to cover domestic audiences.

Resource Efficient Wales should:

- Provide advice on all aspects of low carbon homes online, over the phone and face to face;
- Promote energy saving behaviour through social networks, local communities, online communities and communities of interest;
- Develop innovative tools and initiatives which facilitate greater levels of 'carbon literacy' and greater understanding of and control of personal carbon footprints;
- Develop local waste messaging and advice on areas which have the greatest potential for emission reductions such as waste prevention, re-use and recycling, and home composting;
- Run field trials of new technologies to show consumers what works, and where;
- Investigate finance options that help manage upfront costs;
- Develop installer and professional networks;
- Encourage manufacturers, installers and retailers to market and recommend best in class products and advise on their most efficient use;
- Provide a comprehensive technical advice service to the building industry for retrofit and new homes;

¹⁰⁶ NEA (2013) *The UK Fuel Poverty Monitor 2013*, p.44

¹⁰⁷ <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ResourceEfficientScotland>

- Offer specialist training for planners in low/zero carbon building solutions and offer them technical advice and back up;
- Provide efficient driving training for employees across Wales;
- Develop a network of exemplar homes and communities by providing financial support for low carbon refurbishment;
- Research the barriers to community-scale microgeneration and address these.¹⁰⁸

The Welsh Liberal Democrats in government would:

- Work towards consistent messages on climate change and action, from the Welsh Government, energy suppliers, voluntary groups and word-of-mouth communications;
- Ensure Assembly Government campaigns link to proper advice;
- Set targets for local government to ensure they use their influence as community leaders to help their citizens save energy and lower their bills;
- Ensure climate change and education policies fully recognise the role of education and schools in delivering behaviour change, and bring more understanding of ecological issues into our schools;
- Increase the profile and prominence of Energy Performance Certificates in home sales and rentals.¹⁰⁹

Part of the reason people in Wales are struggling with high energy and fuel bills is the lack of competition in the energy supply sector. The Big Six energy companies are giants in the market. The Welsh Liberal Democrats in government would enable more community-generated and owned energy, and provide communities the support to set up co-operatives and similar organisations for themselves, to help with the cost of their own energy. This would not only enable local communities to support themselves and take charge of their own future, but would introduce much needed competition into the energy sector. The Welsh Liberal Democrats believe in empowering people and communities, not the government, to take control of their own lives and provide for their energy needs.

Co-operative businesses are owned and run by and for their members, whether they are customers, employees or residents. As well as giving members an equal say and share of the profits, co-operatives act together to build a better world. Co-operatives are a flexible alternative business model. They can be set up in different ways, using different legal structures, depending on what works for the members. The definition of a co-operative business is that they are owned and run by the members - the people who benefit from the co-operative's services.¹¹⁰

The Welsh Liberal Democrats would explore the possibility of a nation-wide cooperative body which could support smaller communities which do not feel able to found a cooperative body themselves.

¹⁰⁸ Energy Saving Trust (2009) *Low carbon citizens*

¹⁰⁹ Energy Saving Trust (2009) *Low carbon citizens*

¹¹⁰ Willis, Rebecca and Willis, Jenny (2012) *Co-operative renewable energy in the UK*, p.6

Existing Policies

The Welsh Liberal Democrats have already adopted policies to:

- Reform the farming advice service so that it is more individualised and ensuring that advice is offered on sustainability as well as profitability. We will use this service to promote take-up of small energy facilities on farms such as wind, hydro and anaerobic digestion.
- Continue the roll-out of smart meters, giving people the chance to effectively monitor their own energy use and reduce their energy bills.
- Use Assembly powers over building regulations to develop a Welsh 'greenmark' to certify high standards of energy efficiency; and endorse adequate monitoring of houses in fuel poverty to better direct resources.¹¹¹
- Make all new public sector buildings energy efficient by 2015, including micro-generation where appropriate.

We have previously committed to provide accurate data on fuel poverty for planning and ensure good information is available across the public sector and to consumers. The Welsh Government has done little work in terms of accurately mapping the issue of fuel poverty. We believe it is right to undertake an audit of existing data sources, identifying gaps in knowledge and seek to put in place mechanisms to address this.¹¹²

We have previously stated our intention to publish a Carbon Budget alongside the Budget every year so that people can tell what impact our plans will have on the environment. We would also add a carbon impact assessment to all new Welsh legislation, so that we can assess their environmental impact. We would require that any reorganisation of public services - including the relocation of health services and the closure of schools - is assessed for its impact of carbon use resulting from changed travel patterns and new uses of buildings. We would set targets for reducing carbon use for all Welsh Government departments and quangos, and publishing performance figures. Each year, we will push for the National Assembly's Sustainability Committee to publish an environmental audit of the Government. To enhance these policies, upon entering Government, we would order an immediate assessment of the impact of all policies, programmes and public expenditure on reduction of greenhouse gas emissions and Wales ecological/carbon footprint. When considering different policy options in government, we would include a requirement for a carbon assessment, not just a cost assessment of different options. We would ensure our budgets in government were consistent with our governmental carbon and greenhouse gases reduction targets.

In the paper *Green Growth, Green Jobs*, the Federal Liberal Democrat party implicitly endorsed the objectives of the Energy Bill Revolution campaign to use carbon revenue to be used to fund energy efficiency programmes for those in fuel poverty.¹¹³ The Welsh Liberal Democrats agree with this aim and endorse this policy objective.

¹¹¹ NEA Cymru (2011) *National Assembly Election Briefing 2011*.

¹¹² <http://www.fuelpovertycharterwales.org.uk/assets/uploads/2009/10/Welsh-Fuel-Poverty-Charter-English-V7.pdf>

¹¹³ <http://www.energybillrevolution.org/media/liberal-democrats-back-energy-bill-revolution>

Green Deal

The Liberal Democrats have pioneered the Green Deal, which provides loans and vouchers to pay for energy saving improvements on houses. Energy Company obligations on affordable warmth and carbon saving are also present, to help pay for the cost of increasing energy efficiency.

The Welsh Liberal Democrats would ensure that those eligible for the Green Deal in Wales are offered information, and guarantee that people who are either highly fuel poor, living in off-gas areas or are in the lowest 4 income deciles¹¹⁴ are the focus of Welsh Government fuel poverty programmes. This will allow people to access money for insulation, new heating equipment such as boilers, cavity-wall insulation and other energy efficiency measures.

SMEs

There has been a dearth of policies aimed at helping small and medium-sized enterprises to save energy.

Some of the key barriers to the wider take up of energy efficiency by SMEs include ability to access capital, transaction cost (management time), prioritisation of other issues, building stock and split incentives.¹¹⁵

When in Government in Scotland, the Scottish Liberal Democrats introduced a zero interest loan scheme to provide small unsecured loans of up to £50,000 with minimum bureaucracy to established SMEs for recognised energy saving installations. The loan is paid back into a revolving fund from savings on the energy bills after five years. The capital is then loaned out to other potential beneficiaries. This would help tackle the barrier of access to capital.

The Welsh Liberal Democrats would look to introduce a similar zero interest loan scheme, including on-site renewables, in Wales.

The amount of time the management and employees of an SME can spend on researching and organising energy efficiency schemes can be deeply problematic. They are far less able to spend their time on issues which may not appear directly related to their business than larger companies.

The Welsh Liberal Democrats in government would work directly with SMEs to provide opportunities and advice for SMEs to undertake energy efficiency work.

Such connections can also provide another advantage. It would mean that we can reach more individuals by trying to contact them at work, as opposed to on the street or by phone. It would grant economies and ease of scale. There is also anecdotal evidence that individuals are more likely to trust advice coming through their workplace than, for example, on the street.

The Welsh Liberal Democrats would promote energy efficiency at work and at home to individuals in their workplace.

¹¹⁴ WWF (2012) Cutting carbon emissions in Welsh homes - a twin-track approach.

¹¹⁵ Sykes, Richard - DECC (2009) *Engaging SME's to improve their Energy Efficiency: A Market Appraisal*, p.3

Letting of inefficient commercial buildings

The Liberal Democrats in the UK Coalition Government have outlawed the letting of the most inefficient commercial buildings (F and G rated). Although it is not mandatory until 2018, this measure is already increasing the value differential between energy efficient and gas guzzling buildings. The Liberal Democrats have taken the stance that they would tighten standards, to cover the letting of E and D buildings given appropriate notice. ¹¹⁶

The Welsh Liberal Democrats will outlaw the letting of the most inefficient commercial buildings (F and G rated) and move to include E and D rated buildings over time.

Other schemes

The Federal Liberal Democrats would introduce a policy to encourage investment in energy efficiency by offering differential final stamp duty rates on home transactions. Householders who, shortly after purchase, improved EPC ratings by investing in energy efficiency measures would receive a rebate. The rate of stamp duty would in effect be higher for those purchasers who after two years of occupancy had failed to make improvements. This differential, designed so as to make the scheme revenue neutral, would widen over the years. Another option is through variable council tax (either by linking rates to the energy efficiency of a property, or by offering a rebate when measures are installed).¹¹⁷

The Welsh Liberal Democrats would commission a study to explore a range of options to incentivise energy efficiency through taxation in the Welsh devolved context with similar schemes. We would need to find a suitable balance between increasing energy efficiency measure take-up and possible reduction in tax receipts.

Insulation is highly important for ensuring high energy efficiency. However, encouraging households to insulate their lofts is often difficult. This is one problem addressed by the famous Behavioural Insights unit of the Cabinet Office, the so-called 'nudge unit'. ¹¹⁸

A government scheme of loft insulation partnered with B&Q suffered from low take up before the Behavioural Insights team investigated. Their research revealed that take up wasn't prevented by financial reasons (subsidy being too low etc) but because people weren't able or willing to clear the clutter out of their lofts. The scheme then trialled subsidised loft clearance, with unwanted items being taken to local charity shops, on the condition the householders got the space insulated afterwards. Uptake rates tripled if the clearance was subsidised; if the insulation was also subsidised, take-up increased fivefold. Simple solutions are vital if we are to tackle low energy efficiency.

The Welsh Liberal Democrats would investigate offering subsidised loft clearance alongside loft insulation.

The Keep Cosy project run by Ymlaen Ceredigion¹¹⁹ provides an excellent example of communities getting involved in energy efficiency. The scheme's Home Energy Coaches make

¹¹⁶ *Green Growth, Green Jobs*, p.20.

¹¹⁷ UK Green Building Council (2013) *Retrofit Incentives*.

¹¹⁸ <http://www.theguardian.com/politics/2013/may/02/nudge-unit-has-it-worked>

¹¹⁹ <http://www.ymlaenceredigion.org.uk/en/what-we-do/energy-projects>

home visits to residents to advise on how to be more energy efficient, troubleshoot problem issues in the home, and signpost to other energy schemes. They also offer draught-proofing, energy monitors, secondary glazing and radiator insulation.

It could well be more effective at getting people to change their energy behaviour than advertising campaigns or telephone hot lines.

The Welsh Liberal Democrats would support the development of community-based energy efficiency advice and mentoring schemes, especially in areas of significant fuel poverty.