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Fao Mr David Rowlands AM
Chair National Assembly for Wales Petitions Committee

Dear Mr Rowlands

Petition P-05-837 “Green Energy for the Wellbeing of Future Generations in Wales ”

Thank you for your letter dated October 16th outlining your Committee’s views on the above Petition and inviting us to submit further comments on the primary points raised in the Petition. These comments relate to how the support and investment in renewable technologies provided by Welsh Government could be improved or increased. As a result I attach a 7 page summary for consideration by your Committee on November 27th on the subject outlined above. There is much more we could present but the attached gives a flavor of what could be achieved with renewables.

We are at an important crossroads in terms of climate change and Wales could lead the way in showing how we can provide a reliable energy supply with 100% renewable energy sources and flexible carbon neutral back up - without fossil fuels, nuclear power, or gambling on the promise of future technology.

There are so many good examples in Wales about how we can provide green energy for the wellbeing of future generations. We would be very happy to facilitate a presentation to your Committee and /or a wider audience, showing how renewable energy is the way forward for energy in Wales.

Thank you for your support on this matter and we look forward to hearing from you in due course

Yours sincerely

Mag Richards – Secretariat to the Welsh Anti Nuclear Alliance

Petition P-05-837 Green Energy for the Wellbeing of Future Generations”
Further comments in response to Letter dated Oct 16th 2018
“ Support and investment in renewable technologies - how the
Welsh Government could improve or increase”

ABSTRACT

According to the latest news we have 12 years to act on climate change before it becomes seriously problematic. Two of the biggest solutions are being far more efficient in how we use energy, and moving from coal, oil and gas to 100% renewable energy asap.

Nuclear power is not a solution to climate change as it is not low carbon, cannot deliver within the timescales needed, is an extremely expensive way of guaranteeing baseload and distracts from real low carbon alternatives. We need to push ahead with renewable technology now and we look to the Welsh Government for leadership.

The Zero Carbon Britain Project <http://www.zerocarbonbritain.org/en/> offers hard data and the confidence required for visualising a future where we have risen to the demands of climate science. It shows we can provide a reliable energy supply for the UK with 100% renewable energy sources and flexible carbon neutral back up - without fossil fuels, nuclear power, or gambling on the promise of future technology.

There are a number of ways whereby the Welsh Government could improve and increase investment in renewable and energy saving technologies to ensure we are at the ‘leading edge’ in addressing climate change. We have outlined these initiatives under 5 headings.

1. Aimed at Individuals and families
2. Aimed at local communities
3. Aimed at public services
4. At Welsh Government level
5. By working with UK Government

1. RENEWABLE BASELOAD ALTERNATIVES

In “ Energy Wales: A low carbon transition “ the Welsh Government sets out its view on the role of nuclear power in Wales’ energy mix:

“ In the short term, gas, nuclear and bio-energy will provide the energy to compensate for the intermittency in supply from renewable resources” .

Currently Wales generates no energy from nuclear and the most optimistic scenario for new nuclear generation at Wylfa Newydd is 2027. However, a recent study has shown that delays can run into years or even decades and can lead to costs of nearly 20 % higher than expected . <https://www.sciencedaily.com/releases/2018/05/180529132032.htm>

Nuclear power is not a solution to global warming and is a major distraction when there are existing technologies that need investment NOW to ensure energy continuity. When combined with smart inverters, wind and solar can ramp up much faster than conventional plants, help stabilize the grid even after the sun sets and the wind stops, and, for solar PV, show much higher response accuracy than any other source.

Renewables combined with storage are also reaching price parity as lithium-ion battery costs have fallen nearly 80 percent since 2010 and solar penetration has increased. All the top solar markets world-wide have utility-scale projects that include storage. Wind broke generation records when the United Kingdom faced a natural gas shortage during a winter storm in 2018 <https://www2.deloitte.com/insights/us/en/industry/power-and-utilities/global-renewable-energy-trends.html>

Zero Carbon Britain contend that constant power output is actually not very useful as it leads to overproduction at times when output from variable renewables is enough to meet demand. Their research indicates there is a requirement for dispatchable power – power from generators which can flexibly increase or decrease output, or even switch off, as and when needed. The following methods for storing excess renewable energy deserve increased investment in Wales.

Short-term storage of excess renewable energy

- **Pumped hydro power** - Offers the largest energy storage capacities among the implemented storage technologies. We need more schemes like Dinorwic (North Wales). However the storage units only offer short-medium term storage so pumped hydro is not an option for long-term storage, but remains a cost- and energy-efficient backbone of the grid for short- and mid-term storage.
- **Battery arrays** - Becoming more and more relevant to help stabilizing the electrical grid and have potential for widespread use as short-medium term storage options in a wide range of settings ie in the home, for transport and utility/network scale.
- **Heat storage** Heat can be stored over a few days without significant losses in well insulated hot water tanks or large external heat stores connected to district heating systems. This allows heat pumps to play an important role as they can be run when electricity supply exceeds demand
- **Hydrogen** can be made by the electrolysis of water – splitting H₂O into hydrogen (H) and oxygen (O) using electricity. Electrolysers can use electricity at times when there is abundant surplus of electricity, to create hydrogen gas for storage.

Long-term storage of excess renewable energy

- **Power to gas (PtG)** – Biogas and synthetic gas are both produced from renewable sources. Biogas can be produced by anaerobic digestion (AD) – the decomposition of biomass eg grass, animal manure or food waste. PtG allows for the storing of surplus renewable energies on sunny or windy days by creating synthetic natural gas (SNG). As an energy carrier in gaseous form, SNG offers the highest energy density of available storage technologies and can be stored in the existing gas grid thus diminishing the need for power grid expansion. Generating gas from renewables using PtG processes is the most promising way to store large amounts of energy and to reach the targets of the Paris agreement for 2030 and beyond.

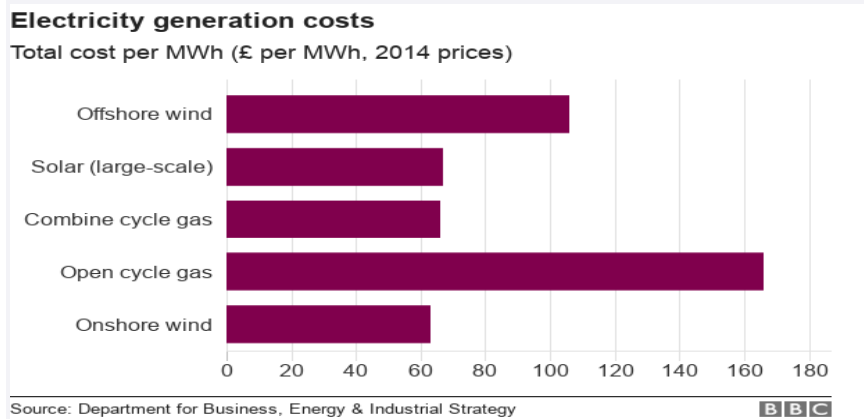
CASE – STUDY The STORE&GO Project – *This project focuses on the integration of PtG into the daily operation of European energy grids – It involves 27 partners across several European countries on 3 different demonstration sites. The partners are cooperating to capture surplus renewable energy to store as sustainable gas to fill the gaps to address baseload issues. <https://www.storeandgo.info/>. The existing gas grid allows for the transportation of the gas to wherever it is needed.*

2. ELECTRICITY COSTS

It has been shown that cancelling Hinkley C and switching to renewables would save Britain at least £30-40 billion in energy bills. Onshore windfarms would cost £31.2 billion less than Hinkley, and solar photovoltaic power £39.9 billion less over 35 years to build and run. <http://www.if.org.uk/research-posts/7925/>

The Institute of Welsh Affairs Report “ The Economic Costs and Benefits of Renewable Energy Transition in Wales “ shows that the development of an energy system that can enable Wales to become 100% self-sufficient in renewable electricity by 2035, requires around £25bn of investment in renewable electricity generation, and £5bn in domestic energy efficiency interventions. This analysis also shows that some 40% of renewable electricity

spending could potentially be captured by Wales, along with 70% of domestic energy efficiency spending. In addition these investments could support some 20,150 jobs annually across Wales during the investment period. <https://www.iwa.wales/click/2018/11/the-time-is-now-tick-tock-its-ticking-away/>



The estimates by BEIS (above) show that it will cost £63 to generate a megawatt hour of electricity using onshore wind energy, making it the cheapest renewable power source listed, in comparison with £106 for offshore wind. However, some new onshore wind projects have been banned from competing for government subsidies and in 2015, the government pledged to "halt the spread of onshore wind farms".

3. HOW WELSH GOVERNMENT COULD IMPROVE + INCREASE INVESTMENT IN RENEWABLE / ENERGY SAVING TECHNOLOGIES ACROSS WALES

1. Aimed at individuals and families –

Key to this is the upgrade of buildings and the installation of solar / thermal and heat exchanging technologies. Personal contributions could be higher and the way may now be open (with the effective death of Feed In Tariffs) for a programme of capital grants.

Possible actions for Welsh Government

- Capital grants for renewable installations on housing, offices etc that include storage
- Grants for enhancing existing renewable installations such as heat batteries, thermal stores and plug-ins for electric cars.
- Encourage local authorities to help local people and SMEs to go solar by running bulk purchase discount schemes, as is currently happening in London.
- Urge local authorities to make full use of planning powers to stipulate higher energy performance in new developments. They could also stipulate a meaningful contribution from onsite renewables, eg. battery storage and smart energy in all new builds
- Increase engagement in the energy system ie. supporting customers to switch supplier, engage with energy efficiency and low carbon energy technologies and boost local co-ownership of energy assets.

2. Aimed at local communities –

The UK energy system is currently highly centralised and dominated by a small number of large companies who collectively were responsible for 95% of domestic supply and 80% of

commercial supply in 2014. Community energy was only 0.3% of electricity generation capacity at the same time (DECC, 2014). Even optimistic estimates suggest community energy will only meet 1.4% of electricity demand by 2020.

in Germany around half of renewable energy is owned by citizens (ILSR, 2013); in Denmark around three-quarters of wind turbines are under some form of community ownership (Dunning, 2014); and in the United States around a quarter of all electricity is generated by co-operatives or public power utilities <http://www.zerocarbonbritain.org/images/pdfs/ZeroCarbonBritain-MakingItHappen.pdf>

CASE STUDY Bethesda Energy Club

The pilot in Bethesda aims to help communities support local green energy projects by making sure the power is used locally, does not have to travel for miles, and the community gets cheaper bills. The electricity produced by the Bethesda hydro will be split evenly between club members using energy at any given time. Each home will pay 7p/KWh for their share ie about half the average electricity price but more than the hydro would normally get.

CASE STUDY The Green Valleys

The Green Valleys have undertaken an energy audit at the Lower Super Output Area of Talgarth (Powys). The figures show that about £2.5M is spent on energy by 1750 households. (This will be higher in areas off mains gas and very rural - and lower in dense urban areas) Welsh Government's own figures suggest only about 13% of energy spend is retained locally

In addition the Bethesda Club vision is being replicated in Crickhowell where club members will be able to switch their electricity supplier to buy energy from local hydro generators : topped up by other renewable sources – the price for this extra electricity depends on the time when electricity is used ie You pay more at busy times and less when demand is lower

In the UK, Anaerobic Digestion (AD) has until recently been limited to small on-farm digesters. However AD is widely used across Europe. Denmark has a number of farm co-operative AD plants which produce electricity and district heating for local villages, biogas plants have been built in Sweden to produce vehicle fuel for fleets of town buses and Germany and Austria have several thousand on-farm digesters treating mixtures of manure, energy crops and restaurant waste, with the biogas used to produce electricity.

Below is a selection of 100% renewable energy companies who offer a proportion of green gas from anaerobic digestion as part of their supply: all are looking to extend their supply ;

Bulb	10% of gas from anaerobic digestion of pig slurry
Ecotricity	12% of gas from anaerobic digestion of gas;
Good Energy	6% of gas comes from anaerobic digestion - manure and sewage; .
Octopus	offers 100% renewable electricity, and full carbon offsets for gas.
Tonik Energy	10% green gas

CASE STUDY South Shropshire Biowaste Digester

Greenfinch Ltd designed and installed an AD plant in South Shropshire in partnership with the South Shropshire District Council. It was constructed under Defra's New Technologies Demonstrator Programme see Further information: <http://www.greenfinch.co.uk/>

CASE STUDY – GIFTS (Get It From The Sun) Challenge and Software Project

The German Kombikraftwerk Project was the first to show that the electrical power demand on the grid can be met 24/7 with about 80% of PV plus wind power as long as the remaining 20% is provided by flexible power generators, ideally biomass. Less than 5% storage power

is necessary. In cooperation with the Centre for Alternative Technology a spreadsheet the GIFTS Software has been written to support this important result for the UK grid

*The GIFTS challenge aims to facilitate cooperation amongst local groups and between them and all -renewable energy supply companies and environmental investors. It consists of a proposed national challenge to identify the region of the UK that is first to achieve a fully all-renewable electricity supply with a range of awards. Ref Prof Keith Barnham
<http://www.sgr.org.uk/resources/get-it-sun-expanding-renewable-electricity>*

The Welsh Government has been active in trying to promote and assist with community energy schemes. The big issue for anything that exports to the distribution network (grid) is capacity and the cost of strengthening the grid. For example in Montgomeryshire there were serious issues over power lines needed to export from the potential wind farms. Grid capacity is a massive issue even for relatively small schemes.

Possible actions for Welsh Government

- Joining up energy and sustainable development around agricultural wastes such as slurry, chicken and pig litter locally. These wastes are the source of serious greenhouse gas emissions and the process should be managed to capture methane for positive utilisation. This is an area worthy of serious investment particularly in rural areas.
- Support the GIFTS software and challenge which shows that Wales could beat Scotland to an all-renewable electricity supply because they take AD of wood and farm waste more seriously than Scotland and have better sun.
- Expand permitted development rights for small scale generation
- Provide grant assistance for community renewables once Feed In Tariffs end April 2019 and support investment in community energy by local government/state pension funds
- Wales should have a much greater say over how the grid, Distribution Network Operators and energy companies operate. It should also promote storage technology systems (as outlined above) many of which are already being used successfully in local energy systems in other parts of the world.

NB .Planning Authorities in Wales have been far from helpful and getting planning permission has often been the biggest stumbling block - along with grid connection. A recent example is the Hendy Windfarm in Powys where planning permission for 7 turbines was refused but later overturned by the Minister.

3. Aimed at the Public Sector –

Welsh Government is putting a lot of pressure on the public sector to reduce their carbon emissions and they should be encouraged to give real teeth to their policies in this area - and lead by example.

Local authorities are essential stakeholders in community energy. Recent research by Community Energy England highlights the importance of local authorities making council-owned assets, particularly roof spaces, available to communities. In addition, councils can help by offering financial support, skills and time, and facilitation of financing options, like bonds. The Nuclear Free Local Authorities (NFLA) have produced a couple of briefings showing how

Local Authorities are embracing renewable technology . However, anecdotally there is less activity in Wales - NFLA Policy Briefings No 175 +179 www.nuclearpolicy.info

CASE STUDY Bristol City Council (4.2MW Avonmouth Solar Park). The project was installed on the same site as two council-owned wind farms in December 2015 with the generation sold to municipal energy supplier Bristol Energy via a power purchase agreement (PPA). Combined with the nearby wind turbines, the site generates enough energy to power 4,000 + homes and save 7,000 + tonnes of carbon dioxide from being emitted into the air.

CASE STUDY Swindon Borough Council's solar projects raise £647,000 every year which help to fund local services, their projects include:

- The establishment of the first ever tax-free solar ISA, for investment by local people, to fund a 5MW community solar farm;
- The site preparation for a huge 50MW battery storage facility, and
- The development of one of the UK's largest solar farms at 61MW on a former airfield, funded in partnership with other boroughs

Possible Actions for Welsh Government

- Encourage local authorities to make full use of Salix Finance interest-free loans to retrofit existing council buildings and always go solar when replacing roofs as part of a buildings upgrade programme <https://www.salixfinance.co.uk/>
- Ensure all new developments have solar PV and energy efficiency measures
- Set targets for all local authorities to reduce their energy use and increase renewable generation
- Support the development of a network of electric vehicle charge points eg every council car park should have some.
- Lead by example and celebrate good practice

4.Welsh Government Level -

The Scottish Government aims to establish a publicly-owned, not-for-profit energy company (POEC) to support economic development and contribute to tackling fuel poverty. They hope the POEC will also help the growth of local and community projects. Some commentators see the POEC as an opportunity to cover a number of issues. Craig Berry from the Common Weal Think Tank says the POEC should have five key objectives:

1. reducing fuel poverty and eventually eliminating it;
2. meeting 75% of energy demand through renewables;
3. decentralising the energy supply;
4. expanding research and development in green and smart technologies; and
5. maximising social value through a not-for-profit approach. <http://www.thenational.scot/resources/files/72737>

The Zero Carbon Britain Project <http://www.zerocarbonbritain.org/en/> is based at the Centre for Alternative Technology (Machynlleth) and was initiated in 2007. The project shows that :

- We can provide a reliable energy supply for the UK with 100% renewable energy sources and flexible carbon neutral back up - without fossil fuels, nuclear power, or gambling on the promise of future technology.

- We can grow the vast majority of the food we need for a healthy, low carbon diet, and manage our land to capture carbon, nurture biodiversity and increase the health and resilience of our ecosystems.
- We can deliver a modern lifestyle, create employment, improve our wellbeing, and ensure the future we leave for generations to come is safe and sustainable.
- Smart demand management, plus the intelligent use of surplus electricity in combination with biomass to create carbon neutral synthetic gas and liquid fuels, means we can meet our entire energy demand without imports.

Possible Actions for Welsh Government

- Take a more proactive role in developing our fabulous renewable energy resources rather than investing time, energy and resources on an outdated + costly nuclear programme that does not address the immediate problems of climate change
- Explore the role of long term power purchasing agreements (PPAs) for renewable energy projects now that subsidies have mostly been removed
- Promote and invest in back-up storage for renewable energy along the lines promoted by Zero Carbon Britain.
- Bring renewable energy into the mix when looking at capital investments to promote regeneration across Wales eg. grants for anaerobic digesters
- Accelerate wider energy system transformation (e.g. providing advice and guidance on programme and project management for other public bodies and social enterprises, thus helping the growth of local and community projects.

5. Working with the UK Government - There are a number of issues here -

- Marine technologies.-We know that Welsh Government supports the Swansea barrage but it needs to persuade the UK Government that it should be approved. The arguments about value for money are a joke as they make false assumptions when comparing it to nuclear
- Planning powers - It was the UK Government that scuppered several large windfarm proposals in Wales which complied with Welsh Government planning policy. Clawing back planning powers for developments above 50 MW schemes would help .
- Lobby the UK Government to ensure subsidies are more favourable than they currently are to renewable energy technology types suitable to Wales. Explore the need to devolve a range of powers over renewable energy subsidy setting to Wales, so that Welsh schemes are not susceptible to UK Government policy and subsidy changes.
- Decision makers must build in zero carbon as a policy goal at all levels including reintroducing zero carbon homes legislation and increasing our ambition re.UK Climate Change Act
- Wales should have more control over its own energy policy and how it delivers renewable energy .