Y Pwyllgor Amgylchedd a Chynaliadwyedd

Dyfodol Ynni Craffach i Gymru?

Ymatebion i'r Ymgynghoriad

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Environment and Sustainability Committee

A Smarter Energy Future for Wales?

Consultation Responses

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Awst 2015

Annwyl Bwyllgor Amgylchedd a Chynaliadwyedd,

Parthed: Ymgynghoriad - Dyfodol Ynni Craff i Gymru?

Mae'n galondid gwybod bod Pwyllgor Amgylchedd a Chynaliadwyedd Cynulliad Cymru yn cynnal Ymchwiliad i 'Ddyfodol Ynni Craffach i Gymru'.

Mae hwn yn gam cadarnhaol iawn ymlaen a byddai'n ein galluogi i wneud defnydd gwell o'r nifer o ffynonellau naturiol ar gyfer cynhyrchu'r digonedd o ynni sydd gennym yng Nghymru, sef gwynt, dŵr a'r haul. Mae'n rhaid i ni sicrhau bod cymunedau yng Nghymru yn gallu meddu ar a chynhyrchu eu hynni eu hunain.

Yn y blynyddoedd diweddar yn yr Almaen mae eu strategaeth 'Energiewende' (trawsnewid ynni) wedi arwain at gefnogaeth drawsbleidiol wleidyddol tuag at dargedau gan gynnwys un am ostyngiad o 50% yn y defnydd o ynni sylfaenol erbyn 2050 ac un am sicrhau cyfradd o 80% o ynni adnewyddadwy o'r holl ynni a ddefnyddir erbyn 2050.

- Ar ddechrau 2012, roedd oddeutu 25% o bŵer yr Almaen yn cael ei gynhyrchu gan ffynonellau adnewyddadwy;
- Yn 2011, roedd dros 380,000 o bobl wedi'u cyflogi yn y diwydiant ffynonellau ynni adnewyddadwy;
- 13% yn unig o GW 60 yr Almaen o ynni adnewyddadwy sydd ym meddiant y cyfleustodau, gyda'r gweddill yn eiddo i gartrefi, cymunedau, a ffermwyr ymysg eraill.

Mae manteision Energiewende yn glir – mwy o berchnogaeth leol, mwy o swyddi, mwy o ddiogelwch o ran cyflenwad a chamau pendant i fynd i'r afael ag allyriadau hinsawdd newidiol gan ynni.

Yn awr rydym angen gweledigaeth glir ac uchelgeisiol i Gymru, ac ymrwymiad i gymeradwyo datblygiadau ynni dan arweiniad y gymuned ar raddfa nas gwelir o'r blaen.

Mae angen i ni newid y modd mae'r grid a'r systemau cyflenwi yn gweithredu yng Nghymru er mwyn rhoi blaenoriaeth i chwyldro ynni adnewyddadwy wedi'i arwain yn lleol, dan berchnogaeth leol ac wedi'i gyflenwi yn lleol.

Mae gweddnewid ynni yng Nghymru â'r gallu i greu nifer o swyddi newydd yng Nghymru, ac yn hanfodol mewn ardaloedd y mae angen gwirioneddol amdanynt. Mae cyflogaeth gynyddol yn yr Almaen ar draws pob lefel sgiliau – o dechnegwyr arbenigol iawn i weision fferm – wedi'u lledaenu'n ddaearyddol, yn eithriadol o ddefnyddiol i roi terfyn ar y dirywiad economaidd mewn mannau gwledig a'r ymfudiad i drefi a dinasoedd.

Mantais arall yn yr Almaen oedd ôl-ffitio cynlluniau tai cymdeithasol mawr gyda mesurau effeithlonrwydd ynni a systemau ynni adnewyddadwy a thrwy hynny lleihau costau biliau ynni neu eu dileu'n gyfan gwbl mewn adeiladau 'tŷ ynni goddefol' newydd.

Hoffwn ofyn i ymchwiliad Pwyllgor yr Amgylchedd a Chynaliadwyedd ynglŷn â 'Dyfodol Ynni Craffach i Gymru' ystyried y pwyntiau canlynol:

- Bod Llywodraeth Cymru'n gosod targed i leihau'r defnydd o ynni yng Nghymru.
- Bod Llywodraeth Cymru'n gosod targed ar gyfer ynni adnewyddadwy cymunedol yng Nghymru.
- Bod mynediad blaenoriaethol at y Grid Cenedlaethol yng Nghymru ar gyfer cynlluniau ynni adnewyddadwy cymunedol.
- Bod rheolau'r farchnad ynni yng Nghymru'n cael eu newid er mwy caniatáu a blaenoriaethu cyflenwad ynni lleol er mwyn i bobl allu prynu trydan wedi'i gynhyrchu gan grwpiau ynni adnewyddadwy cymunedol yn rhatach o'i gymharu â'r cyfleustodau mawr. Mae hyn o bwysigrwydd arbennig i'r cymunedau hynny sy'n dioddef nifer uchel o dlodi tanwydd oherwydd bydd ganddynt y dewis o gyflenwadau lleol rhatach.

Diolch am y cyfle i fynegi fy marn i'r ymchwiliad hwn.

Yn gywir

[redacted]

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August 2015

Dear Environment and Sustainability Committee,

Re: Consultation - A Smart Energy Future for Wales?

I am encouraged to hear that the Welsh Assembly's Environment and Sustainability Committee is conducting an Inquiry into 'A Smarter Energy Future for Wales'.

This is a very positive step forwards and would allow us to make better use of the many natural resources for producing energy we have in abundance in Wales, namely wind, water and the sun. We must ensure that communities in Wales are able to own and produce their own energy.

In Germany in recent years their 'Energiewende' (energy transition) strategy has led to cross party political support for targets including one for a 50% reduction in primary energy use by 2050 and one for achieving an 80% renewable electricity share of total consumption by 2050.

- In early 2012, around 25% of Germany's power was generated from renewable sources;
- In 2011, over 380,000 people were employed in the renewable energy sources industry;
- Only 13% of Germany's 60 GW of renewable energy is owned by utilities, with the rest being owned by households, communities, and farmers among others.

The benefits of the Energiewende are clear - more local ownership, more jobs, more security of supply and concrete action to tackle climate changing emissions from energy.

We now need a clear and ambitious vision for Wales, and a commitment to approving community-led energy developments on a scale not seen before. We need to change the way the grid and supply systems operate in Wales to prioritise a locally-led, locally-owned, and locally-supplied renewables revolution.

An energy transformation in Wales has the capacity to create many new jobs in Wales, and crucially in areas that desperately need them. Increased employment in Germany is across all skill levels — from highly specialised technicians to farm hands — and geographically spread, particularly useful to stop the economic decline of rural areas and the migration to towns and cities.

A further benefit in Germany has been the retrofitting of large social housing schemes with energy efficiency measures and renewable energy systems thereby reducing energy bill costs or eliminating them entirely in new 'passive house' buildings.

I would like to ask that the Environment and Sustainability Committee's inquiry on 'A Smarter Energy Future for Wales' to consider the following points:

- That the Welsh Government sets a target for energy consumption reduction in Wales.
- That the Welsh Government sets a target for community renewable energy in Wales.
- That there is priority access in Wales to the National Grid for community renewable energy schemes.
- That energy market rules in Wales are changed to permit and prioritise local energy supply so that people can buy electricity generated by community renewable energy groups more cheaply than they can buy it from big utilities. This is of particular importance to those communities suffering from high fuel poverty numbers as they will have the option of cheaper local supplies.

Thank you for the chance to input into this inquiry.

Yours sincerely

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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

A smarter energy future for Wales

A response to the consultation by the Environment and Sustainability Committee, prepared by David Clubb

About RenewableUK Cymru

1. RenewableUK Cymru is the trade body for all forms of energy in Wales except fossil fuel and nuclear. Our remit includes all renewables, energy storage, smart grids and green buildings
2. Our vision is of a sustainable Wales which makes full use of its renewable energy resource, and our mission is to maximise the benefits to Wales of that resource
3. We are involved in the 'smart energy' sector through our management of the Smart Energy Wales event[1] as well as the management of various social media platforms to share information about the topic and participation in collaboration to support 'real life' projects

The energy mix

How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions (to contribute to the prevention of global average temperature rise)?

4. Wales' contribution to global carbon emissions is evidently modest; however, the per-capita contribution is very high – some 40% higher than the global average which is itself unsustainable for long-term environmental sustainability

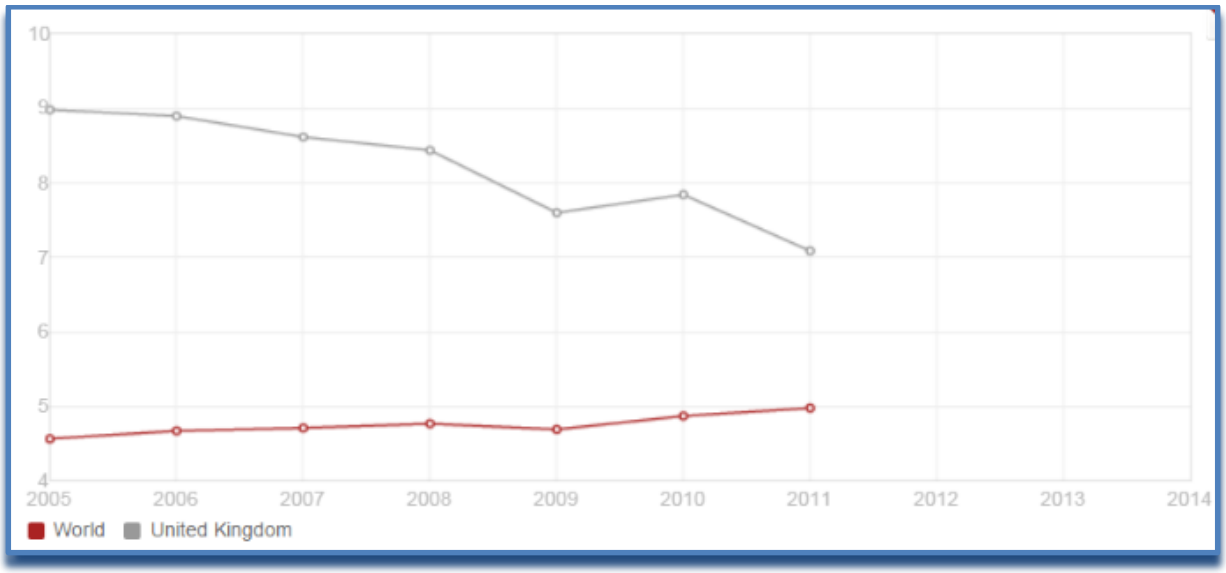

Figure 1: Per capita emissions of Carbon Dioxide (metric tonnes). Source: World Bank[2]

5. Wales' emissions have fallen in Wales by only 12% since 1990, compared with 30% across the UK[3]

[1] To be held on 16th September 2015 www.smartenergy.wales
[2] http://data.worldbank.org/indicator/EN.ATM.CO2E.PC/countries/1W-GB?display=default
[3] The Climate Change Commission

6. The pace of decarbonisation needs to be considerably greater than historic trends in order to meet our moral obligation to contribute globally, as well as our legal obligation in forthcoming legislation via the Environment Bill[4] and our contribution to the UK's carbon budget[5] (particularly the 4th carbon budget)

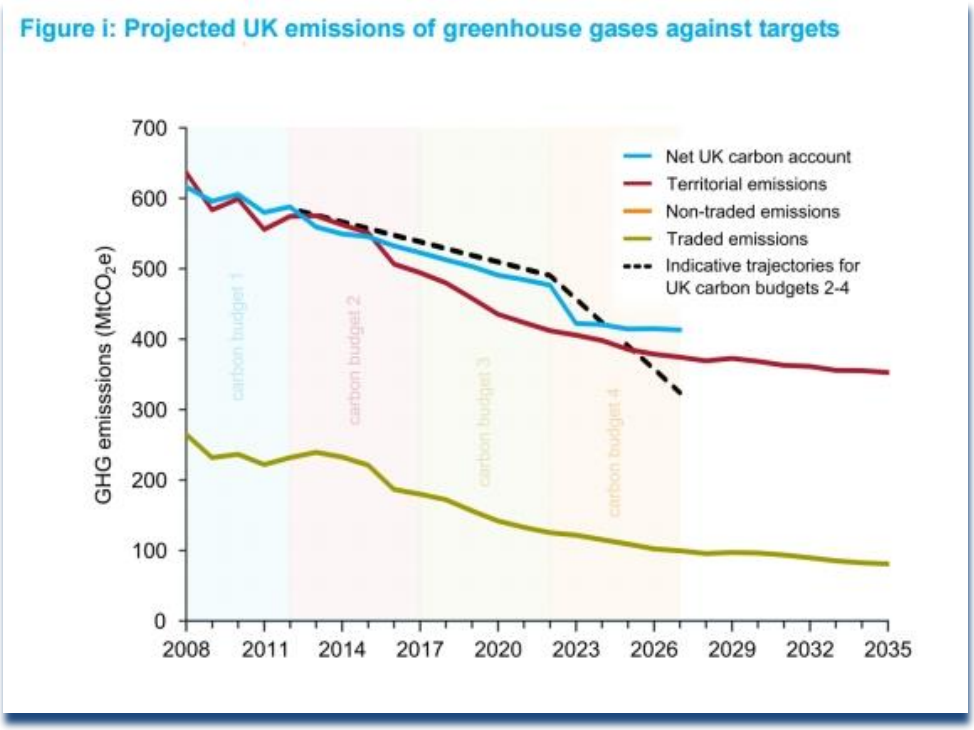

Figure 2: The UK is projected to miss the 4th GHG budget by a huge margin (DECC)

7. The supply of electricity makes up 36% of the UK's CO_2 emissions, and is the single largest component of the GHG emission mix[6]. Transport and the residential sector make up the next two largest components. Energy use therefore utterly dominates the GHG emission mix (64% of the total)

8. Of these components, the simplest and cheapest methods of decarbonisation are

    a. Reduction of energy use at the point of use through behaviour change, energy efficiency, modal shift and change of infrastructure

    b. Reduction of carbon emissions for provision of electricity and heat by shifting to renewable generation

What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

9. My research in 2014 demonstrated that the likely dominant renewable electricity generation by 2050 would come from onshore wind, offshore wind and solar photovoltaics[7]. This research has been rapidly dated due to the difficulties of the three major renewable electricity sectors in dealing with current UK Government policy,

[4] A target of an 80% reduction in GHG emissions by 2050 is proposed
[5] Projected UK emissions of greenhouse gases against targets
[6] Provisional 2014 figures from DECC
[7] Unpublished but available from http://tiny.cc/walesenergyroutemap

although it is likely that onshore wind and solar electricity will be the biggest growth areas of a greatly depleted sector over the next five years

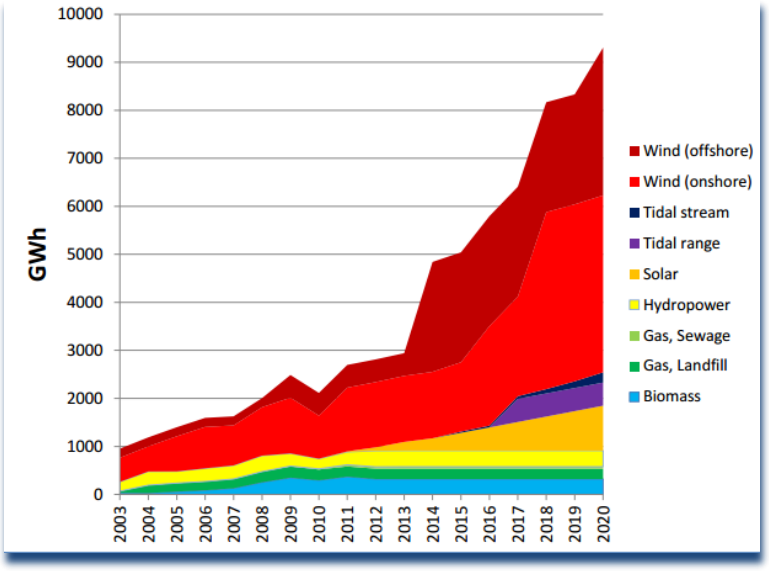

Figure 3: Potential for renewable energy in Wales (2014 research)

10. The same research indicated that the strongest growth in renewable heat to 2020 would come from 'commercial' (larger scale) biomass, but with heat pumps and domestic biomass also making significant contributions. I believe that this underestimates the potential for solar thermal to make an impact, because this technology could be incorporated easily into each new-build (domestic and commercial) via building regulations for a low cost. A good example of this policy is the solar ordinance in Spain, although other good examples include Portugal, Ireland and Israel[8]

The Grid

How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

11. The grid and distribution network in Wales severely curtails the ability of projects, particularly small and medium sized, to connect to the grid. This issue is very well described by Chris Blake in his open letter about the problems connecting a small hydro project in mid Wales[9]

12. The huge problems in grid capacity across large areas of mid and west Wales could be considered as an opportunity to incentivise innovation in the smart grid and storage sectors, particularly if structural funds are used to financially support projects which demonstrate a diminishing need for upgraded or new infrastructure

13. These ideas are currently being worked on by Jane Forshaw of Local Partnerships, and there are strong synergies with the Energy Park concept which is being developed jointly by RenewableUK Cymru and Natural Resources Wales[10]

[8] See European Solar Thermal Industry Federation information
[9] "The grid that wasn't there – a dispatch from the front line of renewable energy"
[10] An early draft of the concept video can be seen at tiny.cc/EnergyParkVideo

What changes might be needed in terms of ownership, regulation, operation and investment?

14. We do not have sufficient expertise to be able to comment on this issue in depth; however the current regulatory system is overly biased in favour of limiting cost rises, and against pro-actively allowing speculative development of grid in order to allow likely connection for future (renewable) energy development

Storage

How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

15. Energy storage is the other side of the renewable energy 'coin'. There are no implications for overall system stability, security or operation for low levels of renewable energy penetration. For variable generation of up to 34% of electricity generation – compatible with the UK's targets for 2020 – additional interconnectors of 9GW and storage of 4GW is sufficient[11]

16. Energy storage can also be used to obviate the need to upgrade or install new grid capacity. Locally installed energy storage could – in principle – be able to connect islands of generators and users without the need for 'wider' grid connection. However these projects entail significant commercial risk, and would almost certainly need to be underpinned by public sector support

17. Heat storage would remove barriers to adoption of some renewable heat generation, particularly solar thermal, but seasonal heat storage has huge technical challenges of which some are currently being addressed by research programmes such as SPECIFIC[12]

Ownership

To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change

18. We have insufficient knowledge of this area to make a response

Energy efficiency and demand reduction

How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?

19. Building regulations are the primary tool for determining the energy efficiency of new and existing building stock. RenewableUK Cymru laments the huge missed opportunity presented by the decision to improve the energy efficiency of new homes by only 8% in 2013

20. We call for a huge increase in energy efficiency requirements for new-build (domestic and commercial properties) in order to support the skill base of our construction sector, and to prepare our construction companies for the forthcoming requirement for all new buildings to be 'close to zero carbon' by 2020[13]

[11] "Technical benefits of energy storage and electricity interconnections in future GB power systems"
[12] www.specific.eu.com
[13] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

21. Zero carbon buildings would also be more affordable, as they are cost the same, or very nearly the same, as 'business as usual' properties,[14] and pay back far more than the additional construction cost through reduced energy bills over their lifetime

What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

22. If new build housing had much higher energy efficiency standards, the lifetime energy use would be drastically reduced. This would reduce greenhouse gas emissions, fuel bills, fuel poverty and would increase the skill requirement for the construction sector in Wales

23. Social impacts would include reduced mortality and morbidity due to improved temperatures and reduced exposure to indoor pollutants[15]

24. Economic impacts would include:

    a. Cost savings to the NHS through reduced mortality and morbidity; economic value of this is estimated at £2.46bn over the next 50 years, or £49m per year[16]

    b. Whole-life savings to residents of £19,500 per household over 25 years of occupancy[17]

    c. Improved business opportunities to Wales-based companies involved in the engineering or construction sector improving their skill base and the export potential for goods and services

How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy? Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

25. Enabling communities to have a say in the generation of their own energy is undoubtedly a step in the right direction. However, current UK government policy acts strongly against the preferred direction of the public. It is strongly pro-fracking and pro-nuclear – neither of which can be implemented or strongly engaged with by the local communities - and anti-renewable energy, in direct contravention of the preference of the general public[18]. This dissonance is unhelpful in maintaining a collaborative, engaged dialogue with citizens, communities and businesses, and Welsh Government has the opportunity to counter this with strong policy and political statements supporting renewable energy and new 'smart' ways of engaging with all forms of energy.

[14] See "Designers create the 'impossible' zero-carbon house"
[15] See "Health effects of home energy efficiency interventions in England: a modelling study"
[16] Assumes value of QALY of £25,000; number of increased households by 2036 as 190,000; population increase of 438,900; 2241 QALYs per 10,000 persons over a 50-year follow-up
[17] Assuming average energy use for a three-bedroom semi-detached house using 2013 building regulations
[18] "Plummeting support for fracking and nuclear", RenewableUK Cymru website, 4th August 2015

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SEFW 04	SEFW 04

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Support for a Smarter Energy Future for Wales

Evidence provided by Professor Ian Knight, Cardiff University. Writing in an individual capacity

The evidence provided in this submission relates to the questions on 'Storage', 'Energy efficiency and demand reduction' as well as 'Communities – making the case for change' but to include Non-Domestic Buildings as well as Domestic.

The correspondent has been involved in research and practice into energy management and energy efficiency in buildings since 1981, and his more recent European Union funded research has been examining the practice of achieving **operationally** low energy buildings through data collection, collation and reporting. The findings and publications from this research can be found at www.harmonac.info and www.iservcmb.info.

The findings from the HARMONAC project led to the European Commission's recast Energy Performance in Buildings Directive (2010/31/EU) being amended to 'encourage the introduction of intelligent metering systems' and 'encourage, where appropriate, the installation of active control systems such as automation, control and monitoring systems that aim to save energy'. The reasons for these amendments were the significant operational energy savings being shown in HARMONAC that arose from providing detailed operational data reports back to the system operators and end users.

The iSERVcmb project built on this finding to design and implement a procedure and system for collecting, collating, analysing and reporting on the operational energy use of Estates, Buildings, Systems and Components across EU Member States. The project achieved average total electrical energy savings of 9% in the participating Buildings and Systems from across the EU.

The project recruited 330 buildings, comprising 2,831 HVAC systems, 7,685 HVAC components, 2,230 Meters, 11,173 Spaces, 72 Activity types and 1,551,638 m2 of floor area, from 20 EU Member States during the 2011 to 2014 project period. This can be seen to be a suitably large sample to provide confidence that the findings could be scaled up to National level.

A further project proposal to Horizon 2020 which will do exactly this is awaiting a decision. If successful the iSERVcmb procedure will be refined and implemented in 5 EU MS in conjunction with National Legislators, to enable them to take advantage of the exceptional returns on investment being generated by this approach.

Assuming that an annual building electricity use within Wales of around 8TWh (about £800M) can be addressed by the use of such an approach, then total annual electrical energy savings for Wales of around 0.7TWh (£70M) appear achievable for a total investment cost which is unlikely to exceed around £14M (based on the minimum 500% RoI found in iSERVcmb)

The reduction of unnecessary energy consumption is a pre-requisite for maximising the % of total energy use that can be met by renewable energy sources, and is a key component of the European Union's ambitions for increasing the % of all energy use that can be met from renewable energy.

A key element to implementing an iSERVcmb-type approach within Wales is the use of a common means of describing buildings and their physical assets which does not require the use of BIM or other software which are daunting to the average user.

The iSERVcmb project has already produced this common template which is freely available to download and use from the project website. A later version is also available.

Common adoption of this approach within Wales would assist Wales in meeting the aims for a Smarter Energy Future for Wales, as well as position it at the forefront of the use of operational data to inform and implement energy efficiency and energy investment at a National level.

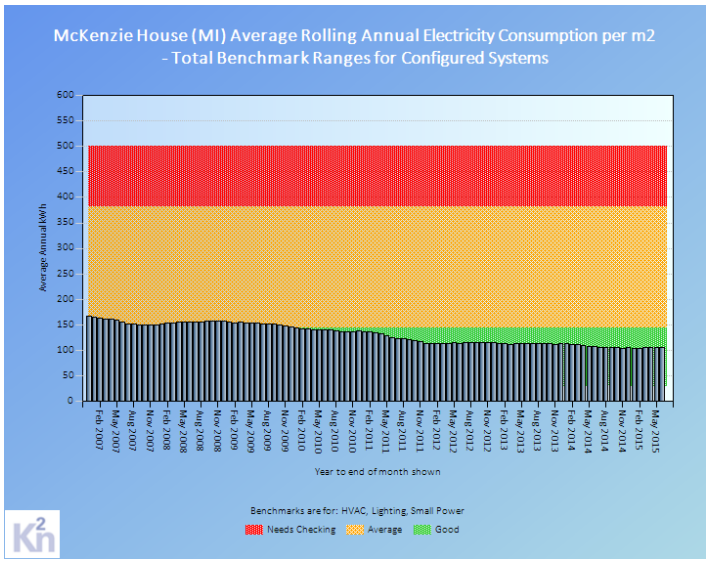
The data obtainable from a full-scale implementation of the approach in Wales would enable Wales to meet many of its obligations under the EU's Energy Efficiency Directive and would provide a continuous audit and feedback on the energy use in Wales as a whole.

This, in turn, would help the WG clarify locations and capacities of new energy sources needed across Wales, as well as provide confidence in the Return on Investment that would be obtained from WG investment in new Technologies, by being able to monitor the operational impact achieved from pilot studies against existing methods and techniques.

The approach would also help inform Communities about the size and form of investments they may need to make into Renewable Energy projects by providing unique insights into energy profiles and demands from their existing communities and any proposed expansions.

The data will also provide quantified evidence about which Technologies work best in practice, not just in testing, enabling Wales to put its efforts behind those Technologies most likely to succeed in both the home and global markets. This would make Wales a very attractive place for entrepreneurial SME's and larger companies looking to quickly prove their products in practice.

An example of the real energy savings achieved by this approach can be seen in the figure below taken from the main incomer electricity use in Cardiff University's McKenzie House. The current reduction of the total electricity use of this building from its peak is over 43% - saving nearly 700MWh of electricity (>£75,000) per year.



The figure also shows the iSERVcmb benchmark range of annual electrical energy use that this building is expected to use based on the activities it houses and the way it is serviced, compared to the measured ranges of energy use of other operational buildings. It can be seen to have moved from the 'average' performance range into the 'good' range over the period.

Further reports and data are available if more detail is needed.

On the 'Storage' front, I have been involved with a colleague in assessing the role that Solar Thermal technologies combined with Storage could have on reducing the annual heating for existing Welsh Domestic property types as originally built i.e. without major changes to their structure, based on the roof areas commonly available to these property types. This study indicates that Solar Thermal plus Storage could have an important role to play in giving existing 'hard-to-heat' and 'hard-to-treat' properties an extended lease of life. This is particularly important in historic buildings and areas where visual and structural changes to existing buildings are undesirable for various reasons.

For the purposes of economies of scale it is likely that solar thermal will, from a practical perspective, be better provided at a larger scale, enabling possibilities for Inter-seasonal Thermal Storage to work alongside district heating in helping address the heating demand in these and other properties.

I am happy to provide evidence orally if required.

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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Environment and Sustainability Committee's Inquiry into A Smarter Energy Future for Wales: Written evidence from NEA Cymru

In response to the Environment and Sustainability Committee's inquiry into 'A Smarter Energy Future for Wales?' National Energy Action (NEA) Cymru has the pleasure of submitting written evidence for your consideration.

NEA is a UK fuel poverty charity with more than 30 years' experience campaigning for greater investment in energy efficiency to help those who are poor, vulnerable, and living in a cold home. NEA Cymru is the dedicated Welsh arm of NEA.

NEA Cymru does not wish to provide oral evidence to the committee.

The energy mix

1. NEA Cymru has no comment on this question.

The grid

2. Household gas and electricity bills are on average higher in Wales than in England and Scotland. Due to higher fuel bills and lower household income, many households in Wales are in fuel poverty, a problem that affects all parts of Wales. One of the main factors for rural fuel poverty is the high concentration of off gas areas in Wales.

3. Approximately 20 per cent of households in Wales are off gas [1]and reliant on more expensive sources of fuel to heat their homes such as oil and electricity. The current gas distribution network does not allow the distribution of gas in many rural areas, mainly due to distance from gas network and cost of installation. The connection and distribution of electricity face similar cost and distribution issues as gas due to substation distances in rural areas. These gas and electricity distribution issues may restrict and limit the ability of a development of a rapid rollout of a smart energy system in Wales.

4. At present, funding is distributed by the gas and electricity distributors with support by the Welsh Government's Nest Scheme. However, this does not pay for the full cost of gas connection.

5. To ensure vulnerable and fuel poor consumers don't miss out on the benefits of smart energy, the Welsh Government needs to work closely with the Welsh gas and electricity distribution network operators (DNOs) to find innovative and economic solutions to developing a smarter energy system which takes into account Wales' unique geography whilst also lowering the gas and electricity bills of its householders.

6. Alongside smart energy solutions, the Welsh Government and gas network distributors must continue to provide eligible households funding towards the installation of gas supply to their existing domestic property.

7. NEA Cymru would also urge the Welsh Government to work closely with DECC to address insufficient funding available for the low income householder to fund the full connection to the grid.

Ownership, regulation, operation and investment

8. NEA Cymru has no comment on this question.

Storage

9. NEA Cymru has no comment on this question.

Ownership

10. NEA Cymru has no comment on this question.

Energy efficiency and demand reduction

11. NEA Cymru welcomed the recent Welsh Government announcement of a review of Part L of the Building Regulations in 2016. To ensure that energy efficiency in houses are improved, the Welsh Government must lower its 8% aggregate improvement for CO2 emissions for new-build housing compared to 2010 Part L of the building regulations as well as re-instate the code of sustainable homes level 3 regulation on all new builds.

12. There are numerous environmental, social and economic impacts if the planning and building regulations for new and existing stock was improved in Wales. By having a well-insulated and energy efficient house, homeowners use less energy to heat their homes, reducing their fuel bills.

13. The benefits for building and adapting more energy efficient homes will eradicate many of the causes of fuel poverty; improve health and wellbeing, reducing demand on the NHS. There are currently 475[2] needless deaths every year across Wales directly attributable to vulnerable households living in cold homes. This could figure could be less if Wales improved and adapted its building regulations.

14. In addition, improving housing energy efficiency standards will help boost economic growth and maintain a highly skilled green jobs workforce in Wales. For every £1 spent on the Welsh Government's Arbed 2 energy efficiency scheme, £2 was generated in the Welsh economy.

Communities - making the case for change

15. NEA Cymru worked with Calor on the FREE (Future of Rural Energy in Europe) Programme[3] between 2010 and 2013 to assist fuel poor households in off-grid rural communities in Wales. The project helped individual households reduce their energy consumption and encouraged local communities to work through a community led approach to promote best practice in energy efficiency and carbon reduction, with the overall aim of reducing levels of fuel poverty in off-grid areas.

16. NEA's FREE project supported local community based organisations in Ceredigion, the Llŷn Peninsula and Anglesey, areas with high levels of fuel poverty and no access to the mains gas network to set up projects that would help reduce fuel poverty among local people. The scheme was developed as a partnership project between a range of organisations working within the rural community; including various local authority departments, NHS, housing associations, credit union, community voluntary council and voluntary organisations.

17. The main aim of the project was to ensure that information about keeping warm in the winter was provided on a local basis and that all information was made accessible in one place. The project developed a pack containing this information and making it easy to signpost people for further help and support on fuel poverty, debt and health. This type of model should be replicated in other parts of

Wales and may particularly benefit people living in rural areas who were less likely to receive information through other avenues.

18. Mains gas remains one of the cheapest ways to heat a home but is not an option for rural households not connected to the mains gas network, increasing their likelihood of being in fuel poverty. Various rural communities in Wales have set up syndicates to bulk purchase oil. For one scheme operating in Ceredigion, the average annual household saving by participating in this kind of syndicate is around £150. Additional benefits of these schemes beyond reducing fuel poverty include increasing community cohesion, rural isolation, health and wellbeing as well as reducing the number of tankers on the road.

19. There is a high level of interest in rural Wales for setting up and participating in oil bulk buy schemes. There may be opportunities for farmers, as large consumers of oil, to take part in these kinds of syndicates and drive them forward. The success of these schemes often lies in their local community organisational basis but syndicates would benefit from larger organisations, such as local authorities, supporting them. For example, support could take the form of office facilities being provided free of charge, facilitation of networking between syndicates, expert advice on developing existing syndicates in new directions such as incorporating other off-grid fuels and investigating renewables, and provision of information on setting up a syndicate to communities where they do not yet exist.

NEA Cymru September 2015

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267375/off_gas_grid.pdf
[2] http://www.ons.gov.uk/ons/rel/subnational-health2/excess-winter-mortality-in-england-and-wales/2013-14--provisional--and-2012-13--final-/stb.html?format=print
[3] http://www.nea.org.uk/Resources/NEA/NEA%20Cymru-Wales/Documents%20(English)/Calor%20Policy%20Report-Year%203-Wales-final.pdf

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Inquiry: A Smarter Energy Future for Wales

British Gas response to the Environment and Sustainability Committee

September 2015

Introduction

1.1 British Gas welcomes the opportunity to contribute to the Environment and Sustainability Committee's inquiry into A Smarter Energy Future for Wales. As Britain's largest energy supplier, British Gas supplies gas and electricity to around 375,000 homes in Wales. We deliver more energy efficiency measures than any other supplier and believe that improving energy efficiency will make a significant and positive difference to households and businesses across the country. We are delivering on energy efficiency programmes run by UK and Welsh governments – and are proud to manage the Welsh Government's Nest programme.

1.2 We are also at the forefront of the smarter energy future, leading the roll out of smart meters with nearly 2 million now installed in homes and businesses across Britain, as well as an increasing range of innovative products to give customers more control over their energy bills.

1.3 We therefore believe we have a shared interest in finding answers to the "energy trilemma" which is at the heart of the committee's inquiry and want to work with governments across Britain to deliver programmes that address these issues.

1.4 This response focuses on how British Gas is acting to promote energy efficiency and the smarter energy use we all want to see.

Energy efficiency and demand reduction

2.1 British Gas notes the committee's request for views on how the planning system and building regulations could be used to improve the energy efficiency of houses. We make the following suggestions.

2.2 We believe there is potential to improve guidance for loft insulation installers. Current guidance on the installation of loft insulation is very generic. This makes it open to interpretation which can lead to poor installation quality. In particular, guidance could be improved around specific areas to ensure that there is a) adequate ventilation in a loft to prevent condensation; b) loft hatches are adequately insulated to minimise any heat loss and c) loft boards are correctly laid. The committee should encourage Welsh Government to work with the Department of Energy and Climate Change to develop robust loft insulation guidance for installers and ensure that installers operating in Wales adopt it.

2.3 The planning system should support the installation of Solid Wall Insulation (SWI). Where installed, SWI has a number of benefits from improved comfort and noise reduction to social benefits of regeneration, as well as improving energy efficiency. We recommend that planning applications for SWI in conservation areas should be assessed on a case by case basis rather than being rejected outright.

2.4 There is also a role for the planning system in supporting district heating installations. Planning officers should be "minded to approve" a scheme unless there is a good reason

for why the scheme cannot go ahead. When considering district heating, planning officers should take account of the positive environmental impact that a district heating scheme can have.

2.5 We would also encourage the committee to use this inquiry to explore how non-domestic buildings can benefit from a smarter energy future. As a British business, we are fully aware of the pressures faced by businesses across the country. We know that energy costs are a material component of many companies' expenditure and recognise that good energy management has the potential to achieve substantial savings to give scope for business growth and further investment. Our 950,000 non-domestic customers - around 50,000 in Wales - range from the smallest SME businesses right up to large corporate, as well as local authorities, hospitals and other public sector organisations. Our Services division offers a range of energy efficiency technologies including building controls and renewable energy systems, as well as boiler installation and maintenance, compliance and servicing.

2.6 British Gas is committed to helping our business customers to use less energy, and we're leading the way in installing smart meters, helping these customers to monitor and manage their energy costs. For large organisations we offer Energy Performance Partnerships (EPP); self-funding agreements designed to reduce energy consumption through investment in low-energy technologies.

2.7 British Gas is already working with public and private sector partners across Wales on a range of energy efficiency initiatives which will substantially reduce their manufacturing costs. There are a number of barriers to the promotion of energy efficiency in non-domestic properties.

2.8 The non-domestic building stock is incredibly varied, with a far broader range of uses and types than in the domestic sector. Many energy efficiency investment decisions in the private sector are based around expected payback times of five years or less[1], and many measures have longer payback times. As a result, larger projects are less likely to happen, and cost effective replacement technologies - such as high efficiency lighting - are the most popular measures[2].

2.9 Non-domestic property owners are business people, and will be motivated to act if there is a clear commercial case for them to do so. As such, a combination of "carrots and sticks" is required to drive improvements.

2.10 In our experience, the use of Energy Performance Contracts[3] has been successful for encouraging organisations to take a longer term view of their energy usage and

[1] Energy Efficiency Trends Vol.8 (October 2014) Figure 17. Trends in expected payback periods.
[2] Energy Efficiency Trends Vol.8 (October 2014) Figure 11. Uptake of energy efficiency technologies.
[3] Energy Performance Contracts are long-term partnership arrangements – typically 3-15 years – designed to reduce an organisation's energy bills through a detailed energy audit, the installation of energy efficiency measures and on-site renewable energy generation, and ongoing performance management

energy efficiency measures, but these have generally only been deployed in the public sector.

2.11 This longer-term approach to energy efficiency and energy management could be extended further in the non-domestic sector if businesses had greater certainty over future requirements and obligations. For example, consideration could be given to providing a longer-term forward cost curve for carbon prices in the Carbon Reduction Commitment Energy Efficiency Scheme. For large energy users, this would provide greater certainty around the cost benefit of investments in energy efficiency, and may encourage greater investment.

2.12 In our experience, small and medium sized businesses are generally less well-informed about the energy efficiency options available to help them reduce their consumption. The biggest barrier to taking action to improve the energy efficiency of their businesses is, in our view, knowing where to get the reliable advice to identify the best measures to install. Relatively small investments in energy efficiency measures can result in dramatic reductions in consumption and bills – having a significant impact on many small businesses running costs.

2.13 Our experience also informs us that it is the largest businesses which are the most likely to have dedicated energy managers. These individuals will have expertise in, and responsibility for, keeping energy bills as low as possible. Awareness of the opportunities for reducing energy costs is significantly lower among most small business owners, who are often time poor and with a less detailed understanding of how they could reduce their energy bills. We suggest that consideration is given to how SMEs could be encouraged to invest in energy efficiency, what the barriers might be to growth in this area, and how they could be overcome. Through the Energy Efficiency Fund, we are working with Welsh Government to address these challenges.

2.14 There are a number of excellent examples of energy efficiency delivery in the public sector, and a significant opportunity for further work to be done. Energy Performance Partnerships can be an excellent way for organisations in the public sector to reduce their costs, replace ageing energy related infrastructure, and guarantee cost savings. For example, British Gas is working with Hywel Dda Health Board in a partnership where we have been able to guarantee a reduction in the health board's energy bills over the life-time of the contract across its sites. Funding from the Welsh Government is paying for a new biomass boiler at Glangwili Hospital in Carmarthen, as well as other measures including energy management systems and energy efficient lighting upgrades.

2.15 While this model can be extremely successful, there are currently some restrictions in areas of the public sector that prevent organisations from entering into arrangements such as the example above. We have found examples of schools prevented from accessing finance to fund energy efficiency projects which would reduce their running costs and their carbon emissions. We believe this is an area that should be addressed in order to help cut costs in the education sector.

Communities – making the case for change

3.1 British Gas is changing the way our customers think about energy through innovation with smart meters and other products giving them greater control over their energy use.

3.2 British Gas is leading the roll-out of smart meters – with our domestic and business customers already seeing the benefits that this innovation is bringing. Across Britain, we have delivered around 2m smart meters to customers' homes and businesses (more than 100,000 of these in Wales) and have a growing team of 1,200 specially trained Smart Energy Experts installing and offering advice to customers on their smart meters. In our Cardiff contact centre, we now have customer service advisors working specifically to answer calls from customers with smart meters.

3.3 We are already seeing average actual savings of 2% per household per year from smart dual fuel customers, with smart meters and the smart energy monitor alone. We expect this to increase to 5% once new tools are provided, such as time-of-use tariffs and the interactive online tool (my energy) which provides a breakdown of energy use, personal tips on how to be more energy efficient, and a comparison to similar households, so customers have an insight into how they can make more changes if they want to.

3.4 British Gas is also leading the UK market in innovative technology to help customers control their heating and hot water remotely. Our Hive Active Heating remote heat control product is already allowing customers in Welsh homes to control their heating and hot water remotely from a mobile phone. Research shows that our highest users interact with the thermostat on average 14 times per week and 60% of our customers edit their schedules.

3.5 We recently announced a new range of Hive products, to make it easy for people to control appliances and lights remotely, as well as being alerted to movement in their home from the Hive smartphone app.

3.6 We are also trialling our Connected Boiler in homes across the country. The Worcester Bosch boilers connect to a home broadband and report faults to British Gas before they even breakdown. This will make boiler service and repair far easier for customers and will mean that problems can be pre-empted and resolved quickly.

3.7 Together, these are just the first steps towards a smarter energy future. In time, demand side response, enabled by smart meters, will also play a role and will allow us to reduce the pressure on the grid at peak times. British Gas has been involved in trials to understand the impact of demand side response, but we believe further trials would be useful and look to work with Welsh Government on this agenda.

3.8 We recognise that microgeneration and heat products will also have an important role as we transition towards a low carbon future. British Gas is already working with the public and private sector across Wales to help them make use of these technologies to

manage and reduce their energy usage. For example, in Newport we are developing a biomass district heating scheme on an estate of 900 houses while last year we worked with Toyota in Deeside to launch a solar array, which will substantially reduce manufacturing costs at the plant. In order to ensure that Wales can fully benefit from solar and to reduce the administrative burden, we would encourage the committee to look at how permitted development for roof top solar arrays is already encouraging development of solar England, with changes also being considered in Scotland. We would welcome support from the committee for an increase to 1MWp permitted development in Wales.

3.9 In its recent strategic review, our parent company Centrica indicated that we see there will be new opportunities to do more in distributed energy, including helping our industrial customers with energy efficiency supporting flexible generation and providing energy management systems. We expect these developments will create further opportunities to help transform the way communities, business and industry think about energy.

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Ymateb gan RWE npower (Saesneg yn unig)	Response from RWE npower
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BY EMAIL
Committee Clerk
Environment and Sustainability Committee
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4th September 2015

A smarter Energy Future for Wales

Dear Sir / Madam

Thank you for providing us with the opportunity to respond to the above consultation.

This response is on behalf of the all RWE companies operating in the UK and we welcome this opportunity to engage in working with the Assembly on matters of Welsh energy policy.

Within the UK, RWE Generation operates and manages a flexible portfolio of coal, oil, biomass and gas-fired power stations, producing more than 10% of electricity used in Great Britain. We also manage a portfolio of cogeneration plant. In the UK, RWE Innogy is at the forefront of producing energy through renewables sources. The gross operational renewable generation portfolio that RWE Innogy are involved in totals near 2,000MW across UK wind farms, hydro plants and biomass generation.
Specifically within Wales, we generate electricity at Aberthaw Power station (coal) and Pembroke Power Station (gas) as well as from 890MW of renewable generation plant, making RWE the largest generator of electricity in Wales.

Our retail business, RWE npower supplies ca. 5.4m residential and non-domestic customers with energy, energy efficiency and holistic energy solutions, including Energy Performance Contracts. RWE npower is committed to providing our customers with innovative products and services which support and deliver more energy efficient outcomes. We have a long history of delivering energy efficiency measures in Wales under EEC1, EEC2, CERT, CESP and now ECO. In April, npower Business Solutions bought RUMM, the specialist Welsh energy management company as part of our broader strategy of helping our larger customers better manage and control their energy usage.

1. The Energy Mix (decarbonisation and energy mix

1.1 Efficient delivery of carbon reductions within the electricity sector

Having invested heavily in both renewable energy generation and high efficiency fossil fuel generation in Wales, we are fully supportive of efficient measures to mitigate the damaging impacts of climate change.

Whilst there is a clear role for national, regional and local measures in sectors falling outside the Traded sector of the EU ETS, we believe that climate change management at regional level is potentially inefficient and sub-optimal for consumers who will have to pay through their energy bills or taxes. Costs of decarbonising electricity should be optimised at a UK level and carbon pricing should be at EU level and ultimately at the global level to ensure emissions reductions are delivered at least cost.

We are supportive of a strengthened and properly functioning carbon market through the EU Emissions Trading Scheme and welcome the establishing of a Market Stability Reserve and the recent legislative proposals from the European Commission.

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1.2 Renewable electricity generation deployment

It is welcome that The Environment (Wales) Bill 2015 sets a 2050 emissions reduction target and five-yearly carbon budgets and complementary progress reviews. However, because to date Wales has fallen short on reducing carbon emissions at the necessary pace, there is an urgent need for significant new deployment of readily available emission reduction solutions. Figures in the latest Climate Change annual report show against the (non-statutory) target of a 40% cut in emissions by 2020, the level of reduction achieved so far falls well short of what is required with emissions from Wales rising between 2011 and 2012 (the most recent year for which statistics are available). Emissions in 2013 are forecast to show an even bigger increase due to a 20% increase in emissions from the energy sector. The Welsh energy mix should shift towards an increased share from renewables and gas. This should be in conjunction with improved energy efficiency and emission reductions from the heat and transport sectors.

1.3 Overcome existing barriers to the deployment of renewable electricity:

Whilst we are of the view that grid access should be equal for all users, there are a number of barriers in place that slow the rate of power sector emissions reduction. The consenting process for UK renewable energy projects and new grid infrastructure is slow and costly, thus moderating deployment.

Regarding the barriers in the planning process we see a chance for National Assembly to step in and determine NSIP 132kV grid connections. With DECC handing back planning to local authorities in England, there is an opportunity for National Assembly to have a say over Section 36 and NSIP projects in Wales.

A key barrier to additional deployment is central UK Government policy on renewables. Investor confidence is being harmed by the UK Government approach to renewable energy especially relating to recent measures relating to solar and onshore wind. The potential for onshore wind and solar PV to be ineligible for participation in future Contracts for Difference is a particular risk, especially given to potential for these low cost renewable technologies to operate under a subsidy free CfD.

There is a clear role for the National Assembly to work with Westminster to explore such mechanisms, particularly in promoting a subsidy free CfD for onshore wind.

1.4 What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

Whilst we have no particular view of the best balance between electricity, gas and heating sectors in Wales, we believe there is a key role for the National Assembly to:

- Further promote energy efficiency;
- Secure contributions from the heat and transport sectors;
- To support a properly functioning carbon market through a reformed EU Emissions Trading Scheme; and
- To support the ongoing deployment of renewables

2. The grid

The grid infrastructure in Wales is at capacity. Both distribution and transmission connections require large financial commitments on the part of developers and can take many years to complete. This access along with associated cost of consenting and time to construct are barriers to deployment of all energy projects.

One critical lesson to be learnt from the TAN8 process is that if any future strategic search areas for renewables are designated these should consider access to existing grid infrastructure so that the length of new lines and the cost of reinforcement works is considered alongside other factors. What is needed is strategic planning of upgrades to the grid network – outside and independent of the development process - in parallel with strategic planning of the changes to the renewable energy generation mix.

3. Storage

Whilst we have no particular comments, we welcome innovation in this area and are keen to see cost reduction in storage solutions in order to enable their wider deployment at both large and small scale.

4. Ownership (public and community ownership of generation)

Given recent UK policy announcements and barriers to investment in renewables, community investment within the renewable electricity sector appears challenged, despite considerable previous effort in encouraging shared community ownership of renewable generation.

However, the investigation in Wales of the desirability and feasibility of community investment , given these constraints would be welcome.

5. Energy efficiency and demand reduction

Whilst we have no detailed comments on the planning system or impacts of a higher energy efficiency standard in Wales for new housing, we are very supportive of the proposed Energy Efficiency strategy for Wales as proposed by the Welsh Government and look forward to working with the Welsh Government to deliver on its vision for Wales of ensuring Wales can meet its full energy efficiency potential and become a major exporter of energy efficiency technology and know-how.

Within the Welsh Government's Consultation we note that the proposed strategy will cover a ten year timeframe. We agree and support this intention to set out a longer term framework given that some of the key enablers for greater energy efficiency will be realised over the medium term (including the roll out of smart metering and the development of smart grids and a broader transition to half hourly settlement for electricity).

RWE npower agrees with the approach proposed by the Welsh Government, whereby tackling the barriers to energy efficiency will be addressed through a multi-agency and partnership approach; understanding that different customer segments and sectors all have different needs, different levels of engagement regarding the benefits of improved energy efficiency and that these require diverse approaches and differing and tailored levels of support. Furthermore RWE npower remains very supportive of the Welsh Government's approach to continue to provide additional funding for support and measures to improve energy efficiency through the Welsh Government Warm Homes Nest and Arbed.

Since the publication of the consultation, we note the announcements that no further funding will be made available to the Green Deal Finance Company, likely resulting in its closure and that there is to be an independent review undertaken by Dr Bonfield (into standards, consumer protection and enforcement of energy efficiency schemes). Until this review is completed and there is clarity as to what any future framework for financing, consumer protection and managing energy efficiency improvements may comprise, it is unclear to what extent this may impact the proposals to support the take up of energy efficiency measures amongst the able to pay. From that perspective, we are particularly supportive of research into the feasibility and potential impact of establishing a paid for service that facilitates the assessment and installation of energy efficiency improvements for middle and higher households and would welcome the opportunity to understand the research parameters and its future outputs.

6. Communities - making the case for change

We have no additional comments

Yours faithfully

Paul Mernagh
Policy Adviser

RWE npower (on behalf of RWE operating companies in the UK)

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
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National Assembly for Wales Environment and Sustainability Committee –

A Smarter Energy Future for Wales?

Response to the National Assembly for Wales' Environment and Sustainability Committee's inquiry on A Smarter Energy Future for Wales – September 2015

1) How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

1.1 Citizens Advice has statutory responsibilities to represent energy consumers[1]. Citizens Advice Cymru supports UK and Welsh Government efforts to decarbonise the economy, in line with the objectives laid out in the Climate Change Act 2008 and the timetable set down in subsequent carbon budgets. We believe the approach most likely to achieve the Act's objectives is one which minimises costs to consumers, and ensures that resources committed to decarbonisation go the furthest. The principal policy to support cost-effective UK - and European - action on climate change should be an adequate price on carbon, however the power to amend carbon taxes is not currently devolved.

1.2 We do not think it is necessary or desirable, however, for carbon targets to be supplemented by numerous sub-targets, including for decarbonisation of particular sectors, nations, or deployment of specifically chosen technologies. An approach that sets the right high-level objective and then allows for competition to identify the most cost-effective routes to achieve it is more likely to achieve best value for consumers. As a result, this first response will look at UK-wide policy with implications for Wales, before highlighting Wales-specific matters in response to later questions.

1.3 The three key elements of emissions reduction are decarbonising the supply of energy, reducing demand from all consumers, and increasing the use of energy storage.

[1] On 1st April 2013 responsibility for consumer representation was transferred from Consumer Focus to the Citizens Advice Service (including Citizens Advice Cymru) following the UK Government's review of the consumer landscape. From 1st April 2014 this includes statutory functions and responsibilities to represent post and energy consumers.

1.4 Citizens Advice's response to the Committee on Climate Change's (CCC) 5th Carbon Budget consultation[2] made the following points:

- There are huge opportunities for carbon savings through changing consumer behaviour and reducing household energy consumption.
- The complexity of achieving this has led successive UK Governments to focus the bulk of investment and policy effort on measures affecting the generation side.
- This has meant energy efficiency policy UK-wide has fallen behind schedule, jeopardising earlier carbon budgets and raising the difficulty level for the 5th carbon budget, as well as having a damaging impact on energy affordability

1.5 The focus on the supply-side also fails to prepare the energy distribution network for significant disruption from new technologies. For example, as more consumers choose to reduce their exposure to centralised generation by investing in domestic storage and renewable generation, how does this impact on those customers who lack this flexibility, due to their financial situation? Will the networks be left providing for a smaller number of, on average less well-off households, and will this mean new payment structures will be required? These issues have already come to the fore in sunnier markets where solar PV penetration is much higher. Neither Wales nor anywhere else in the UK, is yet in a position where this is a significant problem, but it will be worth keeping an eye on deployment trends to identify if it becomes a more acute risk in future.

1.6 This could be a particular problem after 2030, should renewables plus storage come close to grid parity in the UK. If affordability issues remain proportionately higher in Wales, a devolved approach may be required to ensure those customers are not left behind.

1.7 The Welsh Government has invested extensively in domestic energy efficiency property retrofit for fuel poor households, but to make the necessary contribution to UK carbon targets it will need to increase energy efficiency uptake across all households, businesses, and the public estate. We welcome the fact that it is consulting on a new energy efficiency strategy which considers these areas, and will be submitting a response to that consultation separately.

1.8 A greater focus on cost-effectiveness in generation policy decisions is also desirable. The UK Government has recently made a number of changes to subsidies for renewables. Citizens

[2] Citizens Advice CCC 5th Carbon Budget consultation response: https://www.citizensadvice.org.uk/about-us/policy/policy-research-topics/energy-policy-research-and-consultation-responses/energy-policy-research/committee-on-climate-change-5th-carbon-budget-consultation/

Advice is particularly concerned about new limits being placed on onshore wind, which is one of the cheapest forms of renewable energy.

1.9 The challenge for the Welsh Government will be to reconcile its ambitions on decarbonisation, with the reserved nature of decisions on energy infrastructure, and subsidies via the renewables obligation and the levy control framework. However there are opportunities to act at a Wales level, and we consider these below.

2) What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

2.1 Governments should not seek to pre-determine the mix of technologies, but should instead provide a level playing field for companies offering particular technologies to compete to deliver carbon reductions at the lowest cost. This means that, among other things, governments must ensure distributed generation can access the grid on fair and efficient terms.

2.2 At present the power to make these strategic decisions about major infrastructure rests with the UK Government, but we would encourage a similar approach to planning by the Welsh Government.

3) How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system? What changes might be needed in terms of ownership, regulation, operation and investment?

3.1 Networks have a vital role to play in sustainability strategy, in that their development is essential - and potentially rate-limiting - for the growth of renewable energy.

Consumer Engagement

3.2 Our research has found that a big challenge in this area is customer engagement. Citizens Advice’s report Where Next For The Smart Energy Consumer? explores consumer benefits from projects funded by the Low Carbon Network Fund (LCNF), which aims to stimulate innovation in electricity networks.

3.3 The report found that the key to success - ensuring that benefits in terms of reducing emissions or avoiding the need to make capital-intensive investments - is often a local approach. Many local energy initiatives already exist, so working with councils and community groups is a key way for smart grids to build on this potential. Trial findings suggest that emerging technology will be key to empowering consumers to engage with the smart grid, so long as it is reliable and simple to control. Intelligent and interconnected solutions where the consumer is passive have been particularly effective, suggesting scope to build on these in future.

Role of networks

3.4 Behind the scenes, there is much networks can do to manage energy before it reaches consumers' homes. Automated voltage control, self-healing grid and enhanced fault prevention are not phrases most consumers will need to learn, but they may have an important (beneficial) impact on the service they receive. In addition, smart data on energy usage can be valuable to shaping policy, but customers must give fully informed consent to the use of their data by networks.

3.5 Our report Many Happy Returns investigated the rates of return enjoyed by regulated monopolies such as Distributed Network Operators (DNOs). It found that profit margins for DNOs far exceed what is needed to ensure the continued provision of essential services. We are aware that distribution charges in Wales are amongst the highest in the UK. While network operators can often be a bottleneck to infrastructure improvements, this is not due to a punitive financial settlement. On the contrary, networks must now deliver the promises made in their last price control settlement, to improve customer environmental outcomes, which justified the generous returns granted to them.

Networks and community energy

3.8 Citizens Advice's report Beginning To See The Light has made the case for greater transparency on performance reporting by distribution network operators (DNOs), and set out in detail the steps Ofgem should take to deliver this. DECC has identified a lack of network transparency as one of the current barriers to the development of community energy, stating:

"Community groups have told us that connecting to the electricity network can be a major barrier to getting projects off the ground. The speed and cost of network connection, perceived inconsistencies between the way DNOs engage customers, the need for greater transparency of network connection costs, and the apparent lack of opportunity for regular strategic engagement with DNOs are all issues for the sector."

3.9 Citizens Advice Cymru has heard similar concerns raised informally by community energy groups in Wales. We would urge the Committee to explore whether small scale generation

projects in Wales face additional barriers to securing a grid connection, compared to England. We would welcome evidence on whether this is caused by the state of repair of the grid, unfair charges, or poor strategic engagement by DNOs leading to a failure to 'future proof' the grid for distributed generation.

4) How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

4.1 The Committee has clearly identified the key role energy storage must play in any move to greater reliance on renewables, as well as delivering demand side reduction (DSR). We do not have any comments on the technical challenges associated with this.

4.2 However there will be a need to ensure consumers are able to confidently and competently make use of domestic level storage technology as it reaches a wider market, and that appropriate time of use (TOU) tariffs are on offer from suppliers to incentivise behaviour change. Consumers' experiences of electric storage heating, the closest equivalent to this technology which is currently in common use, indicates some of the risks and challenges.

4.3 Consumer Focus' report From Devotees To The Disengaged (2012) suggested that nearly 40 per cent of consumers on Economy 7 were on the wrong tariff, and were therefore getting no benefit from it. This indicates a strong risk that many could be left worse off by new TOU tariffs, and savings envisaged by the smart meter programme.

4.4 The report concluded that:

- The introduction of DSR should be phased, starting with simple offers that build on present opportunities presented by storage and energy efficiency.
- The comparability of DSR offers will be key and more work is needed to provide consumers with the tools they need in order to choose whether to engage.
- When it comes to the risks presented by DSR, attitudes of 'wait and see' or 'buyer beware' will not be enough. Proactive protections need to be put in place around financial liability and accountability.

5) To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

Ownership of infrastructure

5.1 Whilst we do not have a view on the desirability of local or public ownership, we would urge the Committee to consider generation, transmission and distribution separately.

5.2 Transmission by its nature operates nationally, and requires the oversight of a centralised system operator (National Grid - currently run, by necessity as a monopoly) which makes decisions about balancing capacity and meeting demand. Public ownership of this infrastructure has been the model in the past so is clearly feasible, but if Wales moved in this direction, it is unlikely the rest of the UK/GB would follow suit. There would remain dependencies across the border with England, so this would require negotiated agreements with DECC and others regarding how supply and demand would be balanced.

5.3 Distribution could either be interpreted as being within a small geographic area corresponding to a particular community, or as over greater distances within a county. The feasibility of community ownership and management will vary according to what scale is being considered. Maintenance of a micro-generator which only serves local houses will be easier to manage locally than it would be for a generator which supplied energy to the wider grid over a distance.

5.4 Generation, particularly at a small or micro scale, is fundamentally easier to manage at a community level, consisting as it does of discrete pieces of infrastructure which could be locally managed and maintained. Even here, though, the difficulty and desirability of community or national public ownership will vary from, for example a small wind farm in comparison with major power station.

Ownership of supply

5.5 We note that the Committee is not considering local or public ownership of energy supply. Whilst we again do not have a view on the desirability of this, it is clear that suppliers can wield considerable influence over their individual customers' ability to take control of their energy usage - not least through their role delivering smart meters. How this interacts with any move towards local ownership of generation etc. will be an important consideration in any policy making.

5.6 An example of locally owned supply is Our Power, a new independent energy supplier in Scotland owned by a consortium of 35 housing associations, councils and other organisations. The company was set up with financial support from the Scottish Government in the form of a £2.5m loan. Our Power aims primarily to tackle fuel poverty amongst its tenants, and will be offering a 'smart from the start' approach, making use of the resulting data to identify where issues with a property are causing energy waste and therefore increasing costs to tenants. We call on the Committee to monitor the progress of Our Power and to consider the merits of the model

5.7 The company will not enter the market until later this year, so it is clearly too early to reach a verdict on the success or otherwise of this approach. However we would urge the Committee to monitor the progression of this with a view to considering the merits of the model.

6) How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?

6.1 Citizens Advice Cymru believes the Welsh Government should use building regulations to future-proof new home building projects by ensuring they meet the highest possible energy efficiency standards. It should also require developers to install new green technologies - such as small scale renewable generation, district heating, and energy storage - where it would benefit residents to do so.

6.2 Consumer Focus' report What's In It For Me? explored how consumers weigh up what's on offer. Perceived benefits of an energy efficiency measure need to outweigh the perceived barriers, including costs, before they take action. Therefore any new approach to planning policy must put customers' needs, motivations and concerns at the centre, to ensure good response rates, reduce costs, and avoid wasted effort.

6.3 We note that the Welsh Government has recently introduced a Home Improvement Loan scheme for existing housing stock. There is much to learn from the experience of the Green Deal finance scheme, which suffered from complexity, issues with assessment and certification, issues with guarantees and warranties, and issues with audit, standards and training. All of these factors contributed to low uptake of the scheme, which was ultimately scrapped.

7) What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

7.1 Citizens Advice Cymru does not have any detailed analysis or modelling of the impacts of such a policy in Wales. We would again refer to the findings of our Taking Control report in respect of the need to adequately understand consumer motivations in policy design. The report notes:

"...policy development is often incomplete: failing to identify the trigger for action, providing an incomplete accreditation framework, providing better information without ensuring consumers can then use that information to take control; or weakening building regulations which not only has a direct impact on homebuyers but also sends a signal to the wider property market of the low value the [UK] Government places on energy efficiency."

7.2 When looking at new build in particular, it will clearly be important to scope the cost implications of adopting new standards. Welsh Government will need to understand what level of trade-off between energy efficiency and cost increase homebuyers find acceptable. Clearly there are also cost savings in the longer term from living in a highly energy efficient home, but this will need to be communicated in a way consumers can understand and be enthused by.

7.3 We note the recent construction of the 'Solcer House' built in Bridgend by the Low Carbon Research Institute, which is claimed to be zero carbon, to generate more energy than it consumes ('energy positive'), and to be built to affordable housing standards. We would urge the Committee to engage closely with those involved in this project to understand whether this model could be adopted as standard practice in the construction of affordable housing.

8) How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy? Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

8.1 No answer.

For further information or any queries please contact:

XXXXXX XXXXXX
Energy Policy Manager, Wales / Rheolwr Polisi Ynni, Cymru
Citizens Advice Cymru / Cyngor ar Bopeth Cymru
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Ynni Clyfar GB	Response from Smart Energy GB
SEFW 09	SEFW 09

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

East Side, King's Cross Station
London N1C 4AX
Tel: xxxxxxxxxxxx
smartenergyGB.org

Environment and Sustainability Committee
National Assembly for Wales
Pierhead Street
Cardiff
CF99 1NA

1 September 2015

SMART ENERGY GB RESPONSE TO THE NATIONAL ASSEMBLY FOR WALES CONSULTATION ON "A SMARTER ENERGY FUTURE FOR WALES'

Approach to our response:

Smart Energy GB is the national campaign for the smart meter rollout. The rollout is one of the biggest infrastructure projects undertaken across Great Britain in recent times. It will involve the installation of over 50 million smart meters in 26 million homes and 4 million microbusinesses in Wales, Scotland and England. It will deliver £6bn in savings to the country.

Smart meters are an essential upgrade to digitise the retail energy market, empower consumers and help to ensure our energy infrastructure is ready to meet future demand. With smart meters, consumers will be able to see what they are spending on energy in real time and in pounds and pence, information which will enable better informed decisions about energy use and give consumers greater confidence when shopping around for the best energy deal.

Smart meters will also put in place the infrastructure needed to enable faster switching, better energy demand management and the widespread uptake of low carbon technologies such as electric vehicles.

Whilst smart meters are being introduced as part of an overall UK Government Programme, they have relevance and impact for a number of Welsh Government policy areas including energy efficiency, tackling poverty, and technology and innovation. They create opportunites for significant behavioural change in energy use and spend by consumers, as well as providing energy suppliers with the potential to target management of load through tariff controls and more detailed information for networks on load and voltage. This data can enable investment and innovative decisions across Wales based on accurate information.

In considering our response, we have focused on the area of community engagement and address the two questions you raise in detail below.

Detailed Responses:

Question: How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy?

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smartenergyGB.org

1. Smart meters will transform the way consumers and small businesses think about their energy use and costs. When installed, all consumers[1] are offered a smart meter display that directly communicates with their meters showing them near real time consumption[2] of energy and its cost, based on their tariff and standing charges.

2. The UK Government's Impact Assessment for the smart meter programme assumes that, as a conservative estimate, domestic consumers using the information from their smart meters will save a minimum of 2.8% and 2% for electricity and gas respectively, with non-domestic consumers saving 2.8% and 4.5%.

3. For networks the Impact Assessment attributes significant benefits amounting to £0.99bn. In discussing the realisation of these benefits the UK Government acknowledges that smart meters and the data that they provided to suppliers and networks create the opportunities to:
    i. Identify losses for network operators and prevent them continuing
    ii. Use the alarms and alerts from smart meters to significantly improve outages and manage electricity demand
    iii. Improve and investigate voltage across networks to increase efficiency and drive down consumer complaints
    iv. Provide significant data to drive more informed investment decisions across the network in the future
4. Smart meters are acknowledged to create the environment where sophisticated types of tariffs may incentivise Demand Side Response (DSR) or load shifting to be a reality. Additionally they offer the industry the potential to deploy wide scale future technologies from heat pumps to onsite energy storage and electric car volume capacity. Benefits identified in the Impact Assessment indicate that the savings could be:
    i. Generation short run marginal costs £113m
    ii. Generation capacity management £690m
    iii. Network capacity investment savings £40m
    iv. Carbon savings £26m

    (Note that all the above costs are GB savings and the Impact Assessment does not permit individual nation savings to be readily identified.)

[1] For non-domestic consumers they may be offered an energy display but the industry is not mandated to do so.
[2] Up to 10 seconds for electricity and ½ hourly for gas.

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smartenergyGB.org

5. The rich data provided from the rollout of smart meters that drives all the benefits outlined above is dependent upon achieving the UK Government's target of changing 53m meters across GB by 2020. Engaging with Welsh Government and local authorities across the programme and maximising the benefits that can be derived from its delivery, will support the rollout and actively encourage community programmes across Wales to utilise the technology not only to achieve energy savings targets, but potentially to significantly improve them.

6. Smart Energy GB will also be working in partnership with organisations from the voluntary, public and private sectors to support our engagement with communities and individuals the length and breadth of Wales. Our partnership programme, due to launch in 2016, will help to ensure that our engagement reaches across the population, and in particular ensuring that we reach some of the most vulnerable communities.

Question: Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

7. Smart Energy GB believes that where communities at all levels are engaged in the delivery of the smart meter programme, then both individual consumers and the communities will derive the maximum benefits. Within Wales we consult with relevant stakeholders to ensure that our campaign takes account of specific issues including the challenges of those not connected to the gas grid, rural isolation and language of choice. We will continue to do this throughout the rollout.
8. The data provided from smart meters will enable future investment decisions on generation and supply to be based on factual information and can factor in growth using real data. This information has not previously been readily available across all sectors. Smart meters therefore offer the potential to communities to actively participate in the development, management and cost of future supply. They can lay the foundations for a smart platform to optimise micro and community energy generation. Building generation on the most accurate possible view of what a local community uses in energy allows generation to be planned, and supports the best community managed decisions about when to buy or sell electricity to and from the grid. With smart meters, the managers of community generation schemes can most effectively plan and deliver energy to households in the community and plan accurately for the total consumption needs of their community and how best to meet them.

We hope that this written evidence is useful to the Committee's inquiry. We are keen to provide the Committee with more information on any of areas summarized in this evidence where it would be useful.

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For further information please contact Fflur Lawton, Head of Policy and Communications, Wales for Smart Energy GB at Fflur.lawton@smartenergyGB.org

XXXXX XXXXXX

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Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Ynni Cymunedol Caerdydd (Saesneg yn unig)	Response from Cardiff Community Energy
SEFW 10	SEFW 10

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Response to the consultation on: **A Smarter Energy Future for Wales?**

from: **Cardiff Community Energy**

Cardiff Community Energy is a community benefit society set up to renewable energy systems for community benefit. (www.cardiffcommunityenergy.co.uk)

1. We note that the Wellbeing of Future Generations Act places a well-being duty on public bodies in Wales.
2. We believe that a key part of meeting well-being goals is carbon footprint reduction by carrying out energy efficiency measures and by installing on-site renewable energy systems.
3. For this to be effective there need to be measurable targets and monitoring but also assistance for public bodies with understanding options, making good decisions and accessing finance. Local Partnerships (http://localpartnerships.org.uk) is already providing this kind of assistance.
4. Energy efficiency for public bodies can be funded through Salix (http://salixfinance.co.uk)and boosted by Green Growth Wales.
5. Roof-top solar PV could (and should) be fitted on most hospitals, schools, colleges, universities and other elements of the public estate in Wales. In most cases grid connection is unlikely to be a major problem. Hospitals are likely to use all generated electricity on site. Schools will export over weekends and school holidays. Through the Piclo scheme being trialled by Open Utility (www.openutility.com) it should be possible for electricity exported from schools to be sold on to other public estate users (such as council offices) at a discount. Roof-top solar on the public estate has great potential for raising awareness and acting as an exemplar to the private sector and to householders.
6. Rooftop solar can be funded by power purchase agreements (PPA). Here the company or organisation installing the system meets all of the capital cost. The building occupant pays for as much or as little as wanted of the electricity generated (at a discounted rate compared with grid electricity) and any surplus electricity is exported to the grid.
7. Currently solar PPA agreements depend on feed in tariff (FIT) which guaranties income for each kWh generated for 20 years from installation. In turn they typically offer electricity at about half current grid cost and guarantee a discounted electricity cost for 20 years.
8. Funding rooftop solar through community share offers carried out by community benefit societies offers added benefits. People get a chance to make an ethical investment in tackling climate change and at the same time support cherished local services such as schools or hospitals. They can invest in the local economy rather than outside of it. Interest payments on their shares come back to the local economy. As non-profit organisations community benefit societies must channel any operating surplus into a community benefit fund. Awareness can be raised of climate change, the potential for renewable energy and the potential for community ownership. Community benefit societies also offer financial transparency and (one member one vote) democratic control. There are several examples of roof-top solar on schools being funded by community share issues (e.g. www.lowcarbonhub.org). Community Energy Warwickshire (www.cew.coop) has funded roof-top solar on hospitals with community share issues. Cardiff Community Energy has

proposed community funded PPA roof-top solar installations to Cardiff Council and to Cardiff and Vale University Health Board.

9. Community share issues should be used as much as possible in order to foster engagement, local ownership and a circular local economy. However they are not likely to come close to funding all possible installations of solar on the public estate. They could be supplemented by pension funds within Wales. Perhaps Green Growth Wales could investigate the potential for bond issues to fund energy efficiency and renewable energy development in Wales. The end of public ownership of the Green Investment Bank has left a vacuum.
10. With feed in tariff under threat in the current review by DECC, the economics of rooftop solar are about to change dramatically. FIT seems set to be either reduced very drastically or else curtailed altogether in January 2016. With or without feed in tariff the operating costs of rooftop solar are predictable over a time span of twenty years or more. PPA arrangements could still guarantee electricity prices for building occupants for 20 years. For PPA arrangements still to be financially viable for the provider the price per kWh charged to the occupant will surely need to rise. So long as the starting price offered by the PPA is no more than currently paid for grid electricity then even if there is little or no immediate financial advantage to the building occupant there is still a good case for them to go ahead with PPA solar. The occupant gets stable and predictable electricity costs that over the long term are likely to be progressively less and less than grid costs. Carbon footprint is reduced compared with grid electricity. Lastly a local solar installation and maintenance industry would be supported. If community funding is used then it brings its own set of extra wider benefits. For the organisation paying for installation and offering the PPA the most financially viable sites will be those where all or most of the electricity generated is used on site and the PPA price per kWh is higher than the export price per kWh. This would apply to most hospitals. A drive for solar on the public estate could help keep alive solar installers through the cliff-edge boom and bust of drastic reductions in FIT (or its loss).
11. We would like to see an expectation that public bodies will include a major take-up of roof-top solar in their well-being plans and that they will favour community funding of this wherever possible.

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	Smarter energy future for Wales?
Ymateb gan Royal Town Planning Institute Cymru (Saesneg yn unig)	Response from Royal Town Planning Institute Cymru
SEFW 11	SEFW 11

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

RTPI Cymru
mediation of space · making of place
cyd drefnu gofod · creu cynefin

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Website: www.rtpi.org.uk/rtpi_cymru

4 September 2015

e-mail response sent to: SeneddEnv@Assembly.Wales

Dear Sir/Madam,

Response to: A Smarter Energy Future for Wales?

The Royal Town Planning Institute (RTPI) is the largest professional institute for planners in Europe, representing some 23,000 spatial planners. RTPI Cymru represents the RTPI in Wales, with 1,100 members. The Institute seeks to advance the science and art of spatial planning for the benefit of the public. As well as promoting spatial planning, the RTPI develops and shapes policy affecting the built environment, works to raise professional standards and supports members through continuous education, training and development.

The response has been formed drawing on the expertise of the RTPI Cymru Policy and Research Forum which includes a cross section of planning practitioners from the private and public sectors and academia from across Wales.

Thank you for the opportunity to contribute views and evidence to this inquiry.

We have found the focus and questions set by the Committee very broad ranging. Our particular interest relates to the questions on energy efficiency and demand reduction and the role of the planning system:

- How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?
- What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

Planning needs to balance a number of different issues when granting consent for a wide range of developments. This means that planning is unable to solely focus on one specific issue. However, as planning policy evolves the importance of all development being 'sustainable' is increasing, as part of this more holistic approach different elements of energy efficiency are considered but are still balanced against a number of other considerations.

In our recent response to the 'Development of an Energy Efficiency Strategy for Wales' http://www.rtpi.org.uk/the-rtpi-near-you/rtpi-cymru/policy-in-wales/ we highlighted the potential contribution of the Welsh Government's policies on both planning and

sustainable transport towards the energy efficiency agenda, comments which have equal relevance for this consultation. We drew attention to planning's important role in encouraging and facilitating buildings and urban design that meets high sustainability standards.

We believe it is important that the process of designing a building takes on sustainable building standards as a central principle, rather than relying on potentially expensive renewable energy bolt-ons to meet energy savings. Building regulations is the route for sustainable building standards but issues such as siting, orientation etc. are best dealt with through the planning system. Both disciplines need to work closely together; ensuring roles are clearly defined to avoid uncertainty and duplication.

The role of planning should be emphasised in expecting new development to contribute to energy efficiency, filling in any gaps left by building regulations to ensure higher environmental standards. Planning should actively support the retro-fitting of energy efficiency improvements to existing stock, for example through playing a proactive role in urban regeneration schemes.

By influencing the location and density of new development, planning can reduce car travel and influence the level of demand on transport and journey distances to encourage walking and cycling.

We also refer to our response to the Building Regulations, Part L Review (2012). http://www.rtpi.org.uk/media/12673/121022_rtpi_cymru_building_regulations_response.pdf

RTPI Cymru believes that sustainable development must balance economic, social and environmental objectives to address the challenges of climate change. We are aware that higher standards do not always sit comfortably alongside economic impact and therefore consideration needs to be given to how best to build wider stakeholder support particularly in the development industry, taking into account impacts on development costs, viability, delivery, five year land supply etc.

If you require further assistance, have any queries or require clarification of any points made, please contact RTPI Cymru on 029 2047 3923 or e-mail Roisin Willmott at walespolicy@rtpi.org.uk

Yours sincerely,

[redacted]

[redacted]

Director
RTPI Cymru

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Ynni Cymunedol Cymru (Saesneg yn unig)	Response from Community Energy Wales
SEFW 12	SEFW 12

Re: Consultation - A Smart Energy Future for Wales?

1. **The energy mix**
   - How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?
   - What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

1.1 As an ideal we would support the work carried out by Zero Carbon Britain[1] who detail how using current technologies we can become a zero carbon society by 2030.

1.2 The report details a technically robust scenario in which the UK has risen to the challenge of climate change by rapidly reducing greenhouse gas emissions to net zero. It demonstrates that we can do this using only currently available technology, whilst maintaining a modern standard of living, eating well, and meeting our energy demand at all times with 100% renewable UK energy sources.

1.3 In their scenario electricity supply from renewables exceeds demand 82% of the time. However, it also requires us to reduce the total energy demand by 60%. They propose managing variability to meet demand 100% of the time by:

- Shifting energy demand by using 'smart' appliances, demand management, and short-term energy storage (pumped storage, batteries, heat storage and hydrogen) for storage over hours or days. This means supply meets demand a further 3% of the time.
- Using **long-term energy storage** (for weeks or months) in the form of **carbon neutral synthetic gas** to cover demand the remaining 15% of the time. This represents only 3% of total electricity supply, but is crucial to managing variability as it can be dispatched quickly as and when necessary.

1.4 The **ZCB energy model** used to develop this scenario is one of the most detailed studies of energy variability to date. The model uses hourly weather data (sunlight, wind speeds, temperatures etc.) over ten years – a total of almost 88,000 hours – to test the scenario under real life conditions.

2. **The grid**
   - How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?
   - What changes might be needed in terms of ownership, regulation, operation and investment?

[1] http://www.zerocarbonbritain.org/ZCBrtf%20-%20Executive%20summary.pdf

2.1 It is clear that one the most significant factors holding back the deployment of renewable energy in the UK is grid capacity. In Wales a number of Community Energy Projects have been abandoned or constrained by grid capacity. By way of example: Upper Conwy Valley hydro with 920kW potential constrained to 100kW by grid connection and now unlikely to be built; Ogwen hydro 900kW re-sized to 499kW; Anafon hydro with 500kW capacity re-sized to 270kW due to the connection costs. In addition to these mid-scale schemes, countless small community and farm scale schemes will not be built because of grid constraint or connection costs. As an example one 18kW scheme on a farm in Mid Wales near Builth Wells was quoted a connection cost of £5.7 million for line re-inforcement due to grid constraints. This scheme would have cost £100,000 so the connection cost was totally out of proportion.

2.2 Some active network management (ANM) can be beneficial in maximising the capacity in the network. However, ANM should not be used as a reason for delaying strategic grid investments. It is particularly costly for small schemes (£20,000) and it constrains the outputs of generators reducing the return for the generator.

2.3 Active network management and storage may provide future opportunities to resolve some of these issues. However, they are currently immature technologies that are not able to deliver carbon reductions in the short term. We support continued research and any pilots in the effectiveness of these options where they could ease pressure on the grid. This should not be used as an excuse to stop strategic grid investment now. If we are to see continued investment in Renewable Energy in Wales then some investment into the grid needs to be made for the general benefit and should be paid for by means other than existing and new connection customers. It is worth noting that other strategic networks all receive state funding for part of the infrastructure development, for example trunk roads and rural broadband. It seems perverse that one of the vital national infrastructure networks that is hampering our ability to meet our climate change commitments is actively prevented from supporting strategic reinforcement by its regulator.

3. Storage

- How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

3.1 Again referring back to the Zero Carbon Britain report[2] they have carried out extensive research into options available to us with current technologies. In particular the section on balancing supply and demand provides detailed analysis of the options available to us. We should invest in technological advances in this area but for now we need to implement what technologies already exist.

3.2 In their scenario electricity supply from renewables exceeds demand 82% of the time. They manage variability to meet demand 100% of the time by:

[2] http://www.zerocarbonbritain.org/ZCBrtf%20-%20Executive%20summary.pdf

- Shifting energy demand by using 'smart' appliances, demand management, and short-term energy storage (pumped storage, batteries, heat storage and hydrogen) for storage over hours or days. This means supply meets demand a further 3% of the time.
- Using **long-term energy storage** (for weeks or months) in the form of **carbon neutral synthetic gas** to cover demand the remaining 15% of the time. This represents only 3% of total electricity supply, but is crucial to managing variability as it can be dispatched quickly as and when necessary.

4. Ownership

- To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

Having **ownership** of an energy asset in your community can help you:

4.1 Deliver Social & Economic Purpose, because it:

- Allows generation of income that can be re-invested locally
- Provides jobs, training and business opportunities
- Can reverse economic decline of areas and attract investment
- Enables more intensive use of assets and services when control is closer to community
- Allows better stewardship of local assets because the community owns and uses them
- Enables local people to make ethical investments that support the local economy
- Local ownership ensures that interest on shares is re-distributed within the local economy

4.2. Change Attitudes and Relationships, because it:

- Gives the group credibility with funders / other stakeholders
- Heightens the group's profile and improves perceptions of it
- Instils a renewed sense of pride and confidence in the community
- Provides local people with a meaningful stake in the future development of the place in which they live and/or work
- Can increase participation - membership, volunteering, attendance at meetings
- Encourages, through its success, further ideas and activity – ripple effect!

4.3. Move towards financial self-sufficiency, because:

- The organisation can generate income from the asset
- Can benefit directly from free or low cost energy if the Energy source is linked to Community Building.
- There is incentive to invest to reduce running costs of buildings - e.g. energy efficiency

- It gives your Balance sheet strength - which you can use as security

4.4 Build organisational sustainability through:

- Independence/ control over future of asset allowing you to make long-term plans
- Leverage, enabling you to negotiate further investment
- The development of skills and capacity locally that taking on and managing a building encourages
- Attracting new people with additional skills
- Building long-term support from community

4.5 To illustrate some of these points we can look to Scotland where Community Land Scotland who represents Community Land Owners in Scotland has produced a report on the impacts of the transfer of land to community ownership. Of 12 Community organisations surveyed they demonstrated the significant impact of Community Ownership in general as they were able to increase the value of the land by 244%, increase their total turnover by 254% and invest in a range of improvements such as affordable housing, business units, tourist facilities and Communications infrastructure. By far and away the biggest investments they had made were in Renewable Energy, at least 48% of all investment was in Renewable Energy and at least 40% of future investments was planned to be renewable energy. These schemes have provided a steady income and although modest in scale are around 20 times more valuable economically to them than if they were privately owned and they were provided with a Community Benefit fund[3]. This also highlights the benefits of social ownership in general and how it can revive once declining areas into prosperous places with job opportunities.

4.6 In a report commissioned by the National Trust[4] they also highlighted some of the key benefits of Community Ownership as providing: Autonomy; Resilience; Community Empowerment; Education; Sense of Place and support to the Local Economy.

4.7 A recent report highlights the economic benefit of Community Hydro Projects. As well as the economic benefit of the Development itself, they also look at the economic benefit of how these schemes use the surplus they create to re-invest in the local community. They estimated that for every mW installed it would provide £300,000 of Gross Value Added and provide 10 Full time Equivalent (FTE) jobs. It was identified that the annual surplus was used for a mix of educational, community retail and recreational activities, along with a

[3] http://www.communitylandscotland.org.uk/wp-content/uploads/2014/06/FINAL-Community-Land-Scotland-Economic-Data-Report-140414-For-Release.pdf

[4] http://www.nationaltrust.org.uk/document-1355801605221/

good proportion of physical refurbishment and 'pump priming' for further, low carbon investment[5].

4.8 These figures are subject to change particularly given the recent proposals announced by DECC in July and August 2015 on FIT pre-accreditation and FIT levels. If these changes go ahead it is likely to threaten the viability of the majority of Community Energy schemes in Wales, unless we can look at alternative ways of financing them.

4.9 However, in the UK we could be benefitting more by enabling Community Energy groups to distribute their energy directly to the Communities they are based in or to their members. Community buildings can benefit from free or low cost energy if the installations are connected to them such as Egni PV Co-operative.[6] However, at the moment it is incredibly difficult and impossible without an intermediary for local households to purchase electricity directly from the community owned generators. If we are to support more local people (particularly those that have less or no capital to invest in schemes) to benefit from Renewable installations we need to make this process a more feasible opportunity for Communities. It may be possible to develop models similar to those that already exist and are being used by Local Authorities to buy electricity from local generators to benefit local householders as well. CEW are looking to explore these opportunities further:

- Through the Piclo scheme being trialled by Open Utility (www.openutility.com) it should be possible for electricity exported from schools to be sold on to other public estate users (such as council offices) at a discount.
- Rooftop solar can be funded by power purchase agreements (PPA). Here the company or organisation installing the system meets all of the capital cost. The building occupant pays for as much or as little as wanted of the electricity generated (at a discounted rate compared with grid electricity) and any surplus electricity is exported to the grid.

4.10 If Community Energy generators were able to do this more easily then it could provide a way forward for Community Energy that is not so reliant on Government controlled schemes such as the Feed in Tariff (FITs). A great example of a future vision for communities in Wales is Feldheim[7] a small agricultural village with around 130 inhabitants located 80 km southwest of Berlin. It owns and manages its own heat and electricity networks through an independent local utility company established in partnership with a local private developer, (Energiequelle ltd.), local agricultural cooperatives, the local government and the citizens of Feldheim. Feldheim hosts a number of wind turbines (74.1 MW) which were developed by Energiequelle, some of which feed into Feldheim's

[5] http://regenwales.org/upload/pdf/071015091201Impact%20of%20Small%20and%20Community%20Hydro%20in%20Wales.pdf

[6] http://egni.coop/

[7] http://www.gov.scot/Publications/2014/08/1223/8

community-owned electricity network. The community owns a biogas plant (500 kW) which runs on the by-products of pig and cattle farming and feed into Feldheim's community-owned district heating network. The output of the plant is in turn used as agricultural fertilizer. The town has a woodchip boiler and an electric battery in planning stage for back-up of heating and electricity respectively.

4.11 Among the many benefits of Feldheim's approach is the considerable lower cost of energy compared to normal private utility rates (17€ct/kWh vs. 28€ct/kWh - a 40% saving) increasing local value to the region in the form of local tax revenue, job creation, and long-term security of energy supply. This demonstrates the potential benefits of local ownership and how it can provide a model to support areas with high levels of fuel poverty.

4.12 Germany provides a vision of how things could be in Wales. In Germany in recent years their 'Energiewende' (energy transrtion) strategy has led to cross party political support for targets including one for a 50% reduction in primary energy use by 2050 and one for achieving an 80% renewable electricity share of total consumption by 2050. In early 2012, around 25% of Germany's power was generated from renewable sources; in 2011, over 380,000 people were employed in the renewable energy sources industry; Only 13% of Germany's 60 GW of renewable energy is owned by utilities, with the rest being owned by households, communities, and farmers among others.

5. Energy efficiency and demand reduction

- How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?
- What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

5.1 Building regulations could ensure all new build properties and renovations met minimum energy efficiency standards. We would be supportive of significantly increasing this requirement on energy efficiency as we need to reduce our energy useage by 60% if we are to achieve Zero Carbon Britain's vision for the future. We have the technology to create zero carbon homes as demonstrated by Passivhaus standards and the Solcer House developed by Cardiff University[8] at a cost acceptable to Social Housing benchmarks. This will also enable the diversification of the housing sector with new innovative companies taking the opportunity to break into the market.

6. Communities - making the case for change

- How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy?" Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

[8] http://www.solcer.org/

6.1 Yes, there are currently over 80 Community Groups in Wales that are looking to take control of their energy future in Wales through developing Community Energy projects. Community Energy Wales has created a database of these organisations.

6.2 There are many communities that are looking to take action on climate change, over 320 community groups and organisations across Wales have contacted Renew Wales for support in taking action on climate change.

6.3 One of the main motivating factors for Community Energy is that Communities want greater responsibility for their energy. We want to work with Local Authorities to identify what potential opportunities exist for developing opportunities to create renewable energy that is locally owned. We need a grid and an electricity distribution system that supports local people to be able to purchase energy locally when available. This will particularly benefit those in areas of Fuel Poverty.

6.4 We want to support Local Authorities and other public bodies to make best use of public assets such as roof space, unused land etc. We would support a Welsh version of Community Rights which exists in England. However, we feel that these rights could go further and we can build on what exists currently in England and extend it. A useful reference is the latest Community Rights report which suggests ways it could be used more effectively.[9]

6.5 We also need a better replacement for Green Deal. There is an excellent example in Wales of the public sector, business and communities working together to improve energy efficiency. Robert Owen Community Banking Fund's zero interest loan finance scheme to improve energy efficiency or generate renewable energy is a great example of how we could do things differently in Wales.[10] Often schemes like the Green Deal would exclude those that were less well off as they were unable or uneasy about taking on the rates of interest that were available through this scheme.

[9] http://www.publications.parliament.uk/pa/cm201415/cmselect/cmcomloc/262/262.pdf

[10] https://www.rocbf.co.uk/zilf_faq

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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Ofgem evidence to inquiry into 'A Smarter Energy Future for Wales?'

Introduction

Ofgem is very grateful to the Environment and Sustainability committee for providing us with the opportunity to respond to the consultation on 'A Smarter Energy Future for Wales?' Ofgem is the independent regulator of the gas and electricity markets across GB. Our priority is to protect consumers' interests, which we do through the promotion of effectively functioning markets and networks.

Response

Your consultation addresses many of the key energy issues facing our society – how do we transition to a sustainable energy mix whilst maintaining a secure supply for all and keeping bills down. It will not surprise you that we are already leading on a number of workstreams related to these issues and which may be useful for the Committee to consider.

- **Smart Grid Forum (SGF)**

The DECC/Ofgem Smart Grid Forum was created by DECC and Ofgem to support the UK's transition to a secure, safe, low carbon, affordable energy system. The main issue discussed within the DECC/Ofgem Smart Grid Forum is how electricity network companies will address significant new challenges as they play their role in the decarbonisation of electricity supply. A number of subgroups have been set up under the SGF to help progress their work, including Work Stream Six and Work Stream Seven (see below).

https://www.ofgem.gov.uk/electricity/distribution-networks/forums-seminars-and-working-groups/decc-and-ofgem-smart-grid-forum

- **Work Stream Six (WS6)**

WS6 sits under the SGF it brings together stakeholders to investigate the commercial and regulatory challenges of implementing the smart grid solutions. WS6 is chaired by Ofgem and comprises of representatives from the electricity Distribution Network Operators, electricity suppliers, consumer groups and other industry stakeholders. WS6 published an interim report in April 2014, which set out high level options through which customers can participate in smart grids alongside the roles and relationships industry parties will need between each other and with customers: https://www.ofgem.gov.uk/publications-and-updates/working-documents-work-stream-six

WS6 has investigated the commercial and regulatory challenges of implementing a smart grid in Great Britain. It will publish a report in October 2015 which will describe how such challenges can be overcome culminating in a number of recommendations to address the identified barriers.

- **Innovation**

As part of the RIIO price controls we introduced a Network Innovation Stimulus. The Stimulus includes two annual Network Innovation Competitions (NICs): one for electricity network companies and one for gas network companies. In addition the Low Carbon Network Fund (LCNF) was established under the last distribution price control and allowed up to £500m of funding to support

projects sponsored by the distribution network operators (DNOs). The projects trial new technology, operating and commercial arrangements. (The Electricity NIC has replaced the LCN Fund.)

The objective of the NICs and the LCN Fund is to help network companies understand what they need to do to provide security of supply at value for money as Great Britain moves to a low carbon economy.

https://www.ofgem.gov.uk/electricity/distribution-networks/network-innovation

- **Flexibility Project**

Launched in January 2015 the Flexibility Project will develop a strategy to enable and enhance the efficient provision and use of flexibility sources (demand side response, distributed generation and energy storage) across the supply chain in the GB electricity system. The aim of this is to ensure the energy system becomes sustainable while continuing to deliver resilience and value for money as its operation changes. The Ofgem strategy will be published in September 2015.

https://www.ofgem.gov.uk/publications-and-updates/open-letter-facilitating-efficient-use-flexibility-sources-gb-electricity-system

- **Quicker, More Efficient Distribution Connections**

We published an open letter earlier this year outlining the existing arrangements for obtaining an electricity connection on the distribution network and how new capacity can be created on the network in anticipation of future connection requirements. We asked respondents how these arrangements can be improved. We also describe various options to enable further anticipatory investment. These include new funding mechanisms proposed to us by our stakeholders and highlight what barriers there may be and ask what could be done to address them. We plan to publish our next steps on this project in autumn 2015.

https://www.ofgem.gov.uk/publications-and-updates/quicker-and-more-efficient-distribution-connections

- **Non Traditional Business Models (NTBMs)**

In February 2015, we published a discussion paper on the potential benefits offered by new entrants to the energy market with non-traditional business models. This discussion paper is the start of a longer-term engagement with NTBMs through which we want to better understand their drivers, consumer benefits (and risks), how they could transform the energy market and how regulation may impact upon them both now and in the future. We plan to publish on next steps on this project in autumn 2015.

https://www.ofgem.gov.uk/publications-and-updates/non-traditional-business-models-supporting-transformative-change-energy-market

If you would like further information on these projects or other areas of our work then please let us know.

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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

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BY EMAIL
Committee Clerk
Environment and Sustainability Committee
National Assembly for Wales
Cardiff Bay
CF99 1NA

4th September 2015

A smarter Energy Future for Wales

Dear Sir / Madam

Thank you for providing us with the opportunity to respond to the above consultation.

This response is on behalf of the all RWE companies operating in the UK and we welcome this opportunity to engage in working with the Assembly on matters of Welsh energy policy.

Within the UK, RWE Generation operates and manages a flexible portfolio of coal, oil, biomass and gas-fired power stations, producing more than 10% of electricity used in Great Britain. We also manage a portfolio of cogeneration plant. In the UK, RWE Innogy is at the forefront of producing energy through renewables sources. The gross operational renewable generation portfolio that RWE Innogy are involved in totals near 2,000MW across UK wind farms, hydro plants and biomass generation.
Specifically within Wales, we generate electricity at Aberthaw Power station (coal) and Pembroke Power Station (gas) as well as from 890MW of renewable generation plant, making RWE the largest generator of electricity in Wales.

Our retail business, RWE npower supplies ca. 5.4m residential and non-domestic customers with energy, energy efficiency and holistic energy solutions, including Energy Performance Contracts. RWE npower is committed to providing our customers with innovative products and services which support and deliver more energy efficient outcomes. We have a long history of delivering energy efficiency measures in Wales under EEC1, EEC2, CERT, CESP and now ECO. In April, npower Business Solutions bought RUMM, the specialist Welsh energy management company as part of our broader strategy of helping our larger customers better manage and control their energy usage.

1. The Energy Mix (decarbonisation and energy mix

1.1 Efficient delivery of carbon reductions within the electricity sector

Having invested heavily in both renewable energy generation and high efficiency fossil fuel generation in Wales, we are fully supportive of efficient measures to mitigate the damaging impacts of climate change.

Whilst there is a clear role for national, regional and local measures in sectors falling outside the Traded sector of the EU ETS, we believe that climate change management at regional level is potentially inefficient and sub-optimal for consumers who will have to pay through their energy bills or taxes. Costs of decarbonising electricity should be optimised at a UK level and carbon pricing should be at EU level and ultimately at the global level to ensure emissions reductions are delivered at least cost.

We are supportive of a strengthened and properly functioning carbon market through the EU Emissions Trading Scheme and welcome the establishing of a Market Stability Reserve and the recent legislative proposals from the European Commission.

RWE Generation UK plc

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1.2 Renewable electricity generation deployment

It is welcome that The Environment (Wales) Bill 2015 sets a 2050 emissions reduction target and five-yearly carbon budgets and complementary progress reviews. However, because to date Wales has fallen short on reducing carbon emissions at the necessary pace, there is an urgent need for significant new deployment of readily available emission reduction solutions. Figures in the latest Climate Change annual report show against the (non-statutory) target of a 40% cut in emissions by 2020, the level of reduction achieved so far falls well short of what is required with emissions from Wales rising between 2011 and 2012 (the most recent year for which statistics are available). Emissions in 2013 are forecast to show an even bigger increase due to a 20% increase in emissions from the energy sector. The Welsh energy mix should shift towards an increased share from renewables and gas. This should be in conjunction with improved energy efficiency and emission reductions from the heat and transport sectors.

1.3 Overcome existing barriers to the deployment of renewable electricity:

Whilst we are of the view that grid access should be equal for all users, there are a number of barriers in place that slow the rate of power sector emissions reduction. The consenting process for UK renewable energy projects and new grid infrastructure is slow and costly, thus moderating deployment.

Regarding the barriers in the planning process we see a chance for National Assembly to step in and determine NSIP 132kV grid connections. With DECC handing back planning to local authorities in England, there is an opportunity for National Assembly to have a say over Section 36 and NSIP projects in Wales.

A key barrier to additional deployment is central UK Government policy on renewables. Investor confidence is being harmed by the UK Government approach to renewable energy especially relating to recent measures relating to solar and onshore wind. The potential for onshore wind and solar PV to be ineligible for participation in future Contracts for Difference is a particular risk, especially given to potential for these low cost renewable technologies to operate under a subsidy free CfD.

There is a clear role for the National Assembly to work with Westminster to explore such mechanisms, particularly in promoting a subsidy free CfD for onshore wind.

1.4 What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

Whilst we have no particular view of the best balance between electricity, gas and heating sectors in Wales, we believe there is a key role for the National Assembly to:

- Further promote energy efficiency;
- Secure contributions from the heat and transport sectors;
- To support a properly functioning carbon market through a reformed EU Emissions Trading Scheme; and
- To support the ongoing deployment of renewables

2. The grid

The grid infrastructure in Wales is at capacity. Both distribution and transmission connections require large financial commitments on the part of developers and can take many years to complete. This access along with associated cost of consenting and time to construct are barriers to deployment of all energy projects.

One critical lesson to be learnt from the TAN8 process is that if any future strategic search areas for renewables are designated these should consider access to existing grid infrastructure so that the length of new lines and the cost of reinforcement works is considered alongside other factors. What is needed is strategic planning of upgrades to the grid network – outside and independent of the development process - in parallel with strategic planning of the changes to the renewable energy generation mix.

3. Storage

Whilst we have no particular comments, we welcome innovation in this area and are keen to see cost reduction in storage solutions in order to enable their wider deployment at both large and small scale.

4. Ownership (public and community ownership of generation)

Given recent UK policy announcements and barriers to investment in renewables, community investment within the renewable electricity sector appears challenged, despite considerable previous effort in encouraging shared community ownership of renewable generation.

However, the investigation in Wales of the desirability and feasibility of community investment , given these constraints would be welcome.

5. Energy efficiency and demand reduction

Whilst we have no detailed comments on the planning system or impacts of a higher energy efficiency standard in Wales for new housing, we are very supportive of the proposed Energy Efficiency strategy for Wales as proposed by the Welsh Government and look forward to working with the Welsh Government to deliver on its vision for Wales of ensuring Wales can meet its full energy efficiency potential and become a major exporter of energy efficiency technology and know-how.

Within the Welsh Government's Consultation we note that the proposed strategy will cover a ten year timeframe. We agree and support this intention to set out a longer term framework given that some of the key enablers for greater energy efficiency will be realised over the medium term (including the roll out of smart metering and the development of smart grids and a broader transition to half hourly settlement for electricity).

RWE npower agrees with the approach proposed by the Welsh Government, whereby tackling the barriers to energy efficiency will be addressed through a multi-agency and partnership approach; understanding that different customer segments and sectors all have different needs, different levels of engagement regarding the benefits of improved energy efficiency and that these require diverse approaches and differing and tailored levels of support. Furthermore RWE npower remains very supportive of the Welsh Government's approach to continue to provide additional funding for support and measures to improve energy efficiency through the Welsh Government Warm Homes Nest and Arbed.

Since the publication of the consultation, we note the announcements that no further funding will be made available to the Green Deal Finance Company, likely resulting in its closure and that there is to be an independent review undertaken by Dr Bonfield (into standards, consumer protection and enforcement of energy efficiency schemes). Until this review is completed and there is clarity as to what any future framework for financing, consumer protection and managing energy efficiency improvements may comprise, it is unclear to what extent this may impact the proposals to support the take up of energy efficiency measures amongst the able to pay. From that perspective, we are particularly supportive of research into the feasibility and potential impact of establishing a paid for service that facilitates the assessment and installation of energy efficiency improvements for middle and higher households and would welcome the opportunity to understand the research parameters and its future outputs.

6. Communities - making the case for change

We have no additional comments

Yours faithfully

Paul Mernagh
Policy Adviser

RWE npower (on behalf of RWE operating companies in the UK)

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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

[redacted]

Alun Davidson
Committee Clerk
Environment and Sustainability Committee
National Assembly for Wales
Cardiff Bay
CF99 1NA

4th September 2015

Dear Mr Davidson

Calor Response to Environment & Sustainability Committee 'A Smarter Energy Future for Wales?' Consultation

Throughout the Fourth Assembly the Environment & Sustainability Committee has held a series of important enquires on Welsh energy policy. As A Smarter Energy Future for Wales will be one of the Committee's final enquires, Calor would like to take this opportunity to thank Committee Members and Clerks for their work since 2011, and for the frequent opportunities to provide written and oral evidence.

The terms of reference and questions for this inquiry place significant focus on the generation of electricity. While Calor does not engage in this activity, we wish to use this response to highlight the importance of domestic heat generation and transport fuel to our national carbon emissions. Changes to this infrastructure, also provides a crucial avenue through which Wales can help tackle climate change, increase energy efficiency, and save money.

As the UK's leading supplier of Liquefied Petroleum Gas (LPG), we are keen to highlight LPG's wide variety of applications from providing a versatile fuel for heating for both domestic and commercial use – particularly in off-gas grid rural areas, to a viable alternative transport fuel. LPG also has a lower carbon footprint than commonly used alternative fuels such as heating oil, coal and charcoal.

Home Energy Efficiency & Domestic Carbon Reduction

It is Calor's view that the Welsh Government are yet to realise the full potential of low carbon LPG technologies for the cost-effective reduction of emissions in areas of the economy where transformation may be hardest to achieve i.e. off-grid rural areas. While we recognise that there are a range of controls out there with many of new products coming to market, Calor is working to ensure compatibility for our off-grid customers through sustained investing to bring low carbon space heating and electricity generation technologies such as micro CHP, boiler/heat pump hybrids and LPG driven heat pumps to market.

These products provide consumers with low carbon alternatives to the current range of LPG and Heating Oil Boiler technology. Deployed at scale, Calor is set to offer consumers in rural areas easily adoptable, low carbon solutions which utilise an established and secure fuel supply infrastructure and in some cases empower customers to take greater ownership and generate their own energy to feed back into Wales' increasingly diverse network.

Policy support is required at both a UK and Welsh level to start the UK market and achieve capital cost reductions to close the capital gap with standard condensing boilers. At a Welsh Government level, ECO should also be reviewed, with the aim of securing ECO funding to complement existing Welsh schemes such as NEST and Arbed, to ensure uptake of energy efficiency measures in off-grid homes.

Over the long term, a clear path could be set for future changes in Welsh building regulations Part L with respect to replacement of heating systems. At present, condensing boilers must be fitted. In future it may be possible to set a new minimum performance standard (for example, requiring controls, or a minimum efficiency for heating equipment or installations). A long term plan to transition to more efficient low carbon LPG heating in rural Wales would generate significant policy and economic benefits and render Wales a leader in this emerging field.

Heating technology	Carbon emissions (tCo2/year)	Carbon emissions (tCo2/lifetime*)
Heating oil boiler	3.39	28.17
LP-gas boiler	2.95	24.57
LP-gas driven micro-CHP	2.82	23.47
LP-gas driven heat pump	2.04	17.01
LP-gas driven hybrid heat pump	1.72	14.36
LP-gas driven fuel cell	1.36	11.32

*lifetime, assumed to be 10 years for all technologies. Lifetime carbon emissions are discounted at 3.5% social discount rate

Furthermore, from 2016 bio-propane will be available for our UK consumers. Up to 40,000 tonnes per year could be made available to the UK market – enough bio-propane to more than meet the energy needs of all of Calor's customers in Wales. This new product, which is exclusive in the UK to Calor, can provide a fully renewable fuel which can deliver lower carbon energy in any existing LPG appliance. Replacing existing fossil fusels with biopropane will result in significant carbon savings across Wales' off-grid network. Combined with the next generation of LPG technologies and extremely low carbon, yet entirely reliable, versatile and reassuring range of heating options will be available to support achievement of emissions targets.

Automotive LPG: lower carbon, lower cost

Automotive LPG has been in wide use for UK drivers since 2000. To date around 150,000 drivers benefit from using this cleaner and affordable fuel from 1,400 refuelling sites across the UK. There is potential to increase the shift from petrol and diesel to LPG as the infrastructure is already in place and can be expanded at no cost to the taxpayer if demand can be further incentivised.

The landmark decision by the Supreme Court in April 2015, in favour of the environmental law firm, Client Earth, to force the Secretary of State for Environment, Food and Rural Affairs to submit a new National Air Quality Plan to the European Commission by the end of the year will require an urgent assessment of the quick and effective measures policy makers can implement to bring down harmful emissions from transport. LPG can significantly improve local air quality:

- The European Commission's GHG intensity calculations contained within the Fuel Quality Directive confirm that, on a well to wheel basis, LPG Autogas emits up to 21% less CO2 than Petrol and up to 23% less CO2 than diesel.

- LPG emits lower level of harmful particulates (PM). The actual figures are 0.000000106 kg/km for LPG and 0.000001022 for petrol. LPG emissions are an order of magnitude lower.

- LPG emissions are lower particularly on hydrocarbons, NOx and PM, which are considered to be the worst actors with respect to air quality.

Calor has quantified the impact on UK air emissions from substituting LPG cars for diesel cars between 2016 and 2029. The study shows that it is possible to achieve a 90% reduction in NOx and PM by such a displacement. This transition would have a quantifiable impact in Wales as it has the potential to contribute towards improving air quality in Wales' Air Quality Management Areas (AQMAs). AQMAs began in 1997 and mark out areas where local authorities feel air quality objectives are not like to be met. There are currently ten Welsh authorities that contain such areas: Powys, Monmouthshire, Cardiff, Rhondda Cynon Taf, Swansea, Carmarthenshire, Neath Port Talbot, Newport, Caerphilly and Pembrokeshire. Alongside combatting emissions across Wales, policy should focus on implementing a transition from gasoline and diesel fuelled vehicles to LPG vehicles in these AQMAs in order to reduce harmful emissions.

This focus need not contradict current policy to support electric vehicles, but if progress on air quality is to be made quickly, a transitional and cost-effective pathway to zero-emission vehicles must be adopted. To do so it will be essential for Wales to fully appraise what conditions are required to enable consumers to make the switch. This should be done in discussion with vehicle manufactures, and by looking at equivalent examples across Europe.

While some aspects of this work can only be done at a Westminster level, it is vital that the Welsh Government looks at what can be achieved at a devolved level. For instance, local authorities and public sector organisations are already using LPG to cut emissions and reduce operating costs. In Wales this is best evidenced by the Ynys Môn case study below.

Case Study:
Delivering benifits for the public sector

Isle of Anglesey Council reduces its carbon emissions whilst making 'phenomenal savings'.

Isle of Anglesey County Council has 63 LPG vehicles in their fleet of 172 road vehicles. The majority of these are vans, used by highway inspectors, waste management inspectors, and home carers as well as for general council duties. With another seven vehicles carrying a full warranty to be purchased this year with the conversion done before delivery, the use of LPG is set to rise.

Having used autogas LPG now since 2000 the Fleet and Driver Manager, Noel Roberts, says he has lots of proof to back up the 'phenomenal savings' they have seen from this switch to running diesel vehicles to this dual fuel option. So much so, that it is now policy for Anglesey Council to buy dual fuel vehicles.

Not only are the cost savings high on their average of 12,000-15,000 miles per year on each vehicle, but looking at the complete picture, CO_2 emissions have been reduced. Since the process started, a number of reports and submissions have been produced, proving that these vehicles are really making the promised difference with vehicles tested over 750,000 miles over a one year period, and have proved the test of time of LPG.

Isle of Anglesey County Council now has its own tank on site for refuelling using 107,000 litres last year. On-going servicing and care isn't a problem either, with a reputable garage able to help out with any LPG queries to keep the fleet running at all times.

Calor is keen to engage further with the Environment & Sustainability Committee on these issues and have provided an enclosed 'Efficient gas heating technologies as a

[redacted]

realistic option for Wales heating decarbonisation' presentation for consideration and an annex to our consultation response. We would also be willing to provide oral evidence to the Committee during the autumn term if requested.

Regards,

[redacted]
Corporate Affairs Manager

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
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Ymateb gan Grŵp Cartrefi Cymunedol Cymru (Saesneg yn unig)	Response from Community Housing Cymru Group
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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

CHC response to the National Assembly for Wales' Environment and Sustainability Committee inquiry into a "smarter energy future for Wales"

The energy mix

How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

1. Welsh Government in 2010 committed to two greenhouse gas reduction targets- To reduce emissions within all areas of devolved competence by 3% each year from 2011 to 2020 and to reduce all Welsh emissions by 40% by 2020. CHC understands that progress towards the 40% residential target requires a reduction in non-electricity based emissions from households, so achieving this target requires further energy efficiency measures to reduce heating demand, plus significant uptake of renewable heating technologies to reduce the carbon-intensity of heating. Given what is required, achieving a 40% emission reduction in the residential sector by 2020 will be extremely challenging. Our analysis indicates that around 2.2 million additional energy efficiency measure installations will be required between now and 2020 for the target to be met; this is almost 3 times the number of installations made from 2007 to 2014. Significantly greater investment will therefore be required for a reduction in source emissions to be achieved. Estimates in a Bevan report on poverty states that it will take 78 years for Nest to reach each and every home suffering from fuel poverty in Wales.[1]

2. We also need to reduce carbon emissions by shifting to renewable energy generation. Schemes such as the Feed-in Tariff scheme have big potential for reducing carbon emissions and cuts to the tariff have had big impacts on community's ability to install renewable energies. The key objective in the first instance should be to increase the uptake and public acceptance of renewable technologies in the early days and social landlords have an important part to play in achieving this objective. Social landlords can and should play a vital role in the roll out and eventual mainstreaming of renewable technologies.

3. Appropriate incentives and subsidies would enable RSLs to install renewable technologies into their properties and in communities at a faster rate available in order to help reduce fuel poverty. We strongly suggest that attractive incentives exist for social housing providers in order to support the social housing business model and stop schemes becoming regressive in their application. Incentives should form an important part of the process and this could include financial incentives as well as other incentives. Regulatory drivers should include the need

[1] http://www.bevanfoundation.org/publications/rethinking-poverty/

for financial incentives and disincentives introduced by Government (including forms of subsidy), stronger enforcement, council tax reductions, etc.

4. We must also focus on the reduction of energy use at the point of use through behaviour change (whilst Welsh Government does not have control over electricity generation, their actions can have significant influence on electricity consumption by end-users).

What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

5. There is potential for making more use of certain technologies such as biomass, combined heat and power, district heating and cooling. We need to consider good practice from other countries including Denmark's experience of district heating, with Denmark being one of the most successful nations in spreading low carbon heat networks. One of CHCs members, for example, is installing a new Biomass energy centre to complement existing gas fired gas boilers. One of our members is also exploring the potential for a district heating energy service company, although this is not an area that the RSL sector have a lot of experience in installing.

6. CHC's members have been mostly active in installing solar photovoltaics and renewable heat technologies (mostly solar thermal, heat pumps which do have further potential). Experience of installing solar PV has generally been positive and solar PV is increasingly becoming economically competitive. Although there has been positive feedback following the installation of renewable heat technologies, it can be accepted that renewable heat technologies are generally less well known and there are more hassle factors associated with their installation, which increases the barriers to installation. There are barriers to design, installation, operation and maintenance of renewable heating systems in particular. RSLs are still assessing the effectiveness, running costs and tenant satisfaction from installations. What is evident from projects is that householder education is an important factor to improve both the acceptance and operation of renewable heating systems.

7. The sector hasn't got much experience in installing hydro, although some RSLs have been involved in working with other partners to install Hydro. Although it has been stated that natural flow hydro and thence for small hydro will not itself likely lead to regionally significant employment or carbon-mitigation impacts, a report shows that small hydro developments can have significant local socio-economic impacts, often in challenged communities and places.[2] Wales should harvest its abundant rainfall and prioritise this as there are thousands of untapped streams

[2] http://regenwales.org/resource_85_The-Economic-and-Social-Impact-of-Small-and-Community-Hydro-inWales

pouring off hillsides across Wales and the potential for micro hydro is almost limitless.

The grid

How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

8. The grid and distribution network in Wales has significantly affected the ability of projects (particularly small and medium sized) to connect to the grid. The lack of availability of the grid and the cost of new connections is a barrier to development. CHCs members have found the capacity of the national grid to be a barrier in the past with regards to installing renewable energy systems. How we address this needs to be considered further by OFGEM, the Distribution Network Operators, Government and other partners.

9. The privatised grid in much of rural Wales is owned by Western Power Distribution (WPD) and as the grid is full for the foreseeable future in many parts of Wales, it can be very expensive to upgrade the grid and connect even small scale schemes. Due to the high levels of embedded generation currently connected, or seeking connection to the distribution networks, there are areas in south Wales where significant reinforcement work is required.

10. Following the UK Government's decision to launch a consultation on electricity distribution costs in the north of Scotland, CHC feels that the same could be considered for North Wales which has the second highest regional energy costs. However, CHC would go a step further and argue that we need a major overhaul in this area and big investments in infrastructure are needed to create a flat national rate.

11. Smarter strategies appear most cost-effective, with modelling showing that a smart grid strategy of using innovative smart solutions in conjunction with conventional reinforcement options appears to be more cost effective than using conventional solutions alone.

What changes might be needed in terms of ownership, regulation, operation and investment

12. CHC recently welcomed OFGEM's consultation into Non-traditional Business Models[3], which acknowledged an increase in enquiries about new ways to interact with the energy market with many proposals seeking new and non-traditional business models.

[3] https://www.ofgem.gov.uk/publications-and-updates/non-traditional-business-models-supportingtransformative-change-energy-market

13. The consultation notes a range of issues, including that Wales has experienced an increase in the development of localised generation as technology, systems and processes are developed. This has resulted in an upward pressure on the networks. The shift to "local" has also promoted the question of how to capture the ownership of such interests to help retain benefits in Wales. These discussions form part of a longer-term engagement in this area to help understand drivers, consumer benefits and risks. As part of developing Smart Living, there should be proactive discussions on types of models that could be beneficial for organisations and communities in Wales to consider. Planning needs to account for more recognition of benefits and social ownership and we need active promotion of social ownership in communities.

14. CHC is currently active in helping our members secure energy supply for RSL tenants via local energy production through renewable energy systems. CHC wants to address the market failure impacting on low income households and impact fuel poverty directly through price. The feed-in tariff schemes work very well where they have been installed, but there is a lot more to be done now around enabling communities to generate their own power and thereby have a greater control over future fuel usage and costs. CHC would like to see the ability for more direct local supply and, for example, a generator (e.g. ESCO) being able to sell directly to a customer at a good price.

15. There is a significant and growing appetite amongst our members to intervene directly in the market and therefore CHC is looking to set up a partnership to weigh up options for setting up an energy supply company. A good example is the "Our Power" model in Scotland[4], which is a new independent energy supply company and the first in the UK to operate on a non-profit distributing basis. In the future, Our Power hopes to develop renewable energy projects as part of its business for the benefit of local communities.

Storage

How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

16. Energy storage not only has the potential to provide back-up power in case of power cuts, but storage can also help electricity grids run at average rather than peak load, therefore reducing the chances of power cuts in the first place. Energy storage can also be used to obviate the need to upgrade or install new grid capacity. Puerto Rico, for example, has set a 30% storage requirement for any new renewable capacity. Storage is also proving invaluable for isolated communities that have no access to the national grid, with "islanders in particular enjoying continuous power without the need for additional diesel generation".

[4] http://news.scotland.gov.uk/News/Power-to-the-people-1b3b.aspx

17. Renewables, together with energy storage, open the possibility of communities and individuals becoming energy self-sufficient. CHCs members do not have a lot of experience in assessing energy storage mechanisms, but CHC understands that the costs today are prohibitively high for mass adoption, but there are already residential energy storage solutions on the market and costs will come down. Support from Government and others would be essential in driving the use of energy storage mechanisms into the market due to initial costs and significant commercial risk.

18. It could also lead to a point where demand from the grid is much reduced. This raises important questions about who will pay for grid maintenance - initially at least only the wealthy may be able to afford renewables and storage, leaving those who can't afford them to pick up the bill. Therefore, if Wales did decide to pursue energy storage options, this must be taken into account in helping to enable low income households to get access to new technologies so that they aren't disproportionately affected.

19. There are an increasing number of energy services companies able to provide everything their customers need to generate and store their own energy. The ultimate beneficiaries could be consumers. Large-scale generation and national grids are not going to disappear overnight, if ever, but CHC would like to see individuals and communities having the power to choose their own energy futures.

20. The huge problems in grid capacity across large areas of Wales (most notably mid and west Wales but also across all of Wales) could be considered as a great opportunity to incentivise innovation in the smart grid and storage sectors, particularly if Government funding and structural funds are used to financially support projects which demonstrate a diminishing need for upgraded or new infrastructure. We need to consider the potential for energy storage, smart grids and other technological advances. CHC understands that locally installed energy storage could, in principle, be able to connect islands of generators and users without the need for "wider" grid connection.

Ownership

To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

21. Please see our answer above to the question "What changes might be needed in terms of ownership, regulation, operation and investment?" We have insufficient knowledge of this area to make a full response.

Energy efficiency and demand reduction

How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?

22. Improving the energy efficiency of homes is one of the key levers to tackling fuel poverty. Energy efficiency lies at the heart of discussions about energy. A home which is highly energy efficient can provide the occupants of those buildings with a more comfortable experience, lower fuel bills, enable reductions in carbon emissions and help ensure increases in energy security for individuals, businesses and communities. Wales has responsibility for setting energy efficiency requirements for new buildings. The integration of renewable energy technologies when feasible into the built environment offers clear benefits and an additional improvement in the skills and expertise of the workforce operating in the sector in Wales. The Welsh Government needs to increase its support for the smart energy sector and commission an assessment of potential impact of the smart grid and storage sectors.

What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

23. CHC is committed to its members delivering economic, social and environmental benefits through the building of new homes. In assessing the environmental, social and economic impacts of Wales setting higher energy efficiency standards for new build housing, there are several to take into account. In making the argument for increasing standards, increases in the energy efficiency requirements for new-build could support the skill base of our construction sector ready for the forthcoming requirement for all new buildings to be “close to zero carbon” by 2020. Zero carbon buildings can also mean reduced energy bills for tenants, lifetime energy use would be drastically reduced (reducing greenhouse gas emissions, fuel bills, fuel poverty), improvements in people’s health and this would result in economic cost savings to the NHS and whole-life savings for tenants. A project that is of particular interest to our members and the health service at the moment is the Boiler Prescription service which is being delivered by Gentoo.[5]

24. In making the argument against, or in making the argument in regards to how much and how quickly standards are increased, our members report that development costs have increased in recent times with ever improving standards as there are many different tiers of design criteria that our members are required to meet for new build properties. As well as the mandatory Building Regulations and Code Level 3 applicable to all new build dwellings, affordable homes also have to be compliant with DQR (Development Quality Requirements), WHQS

[5] http://www.gentoogroup.com/news/gentoo-group-launch-boiler-on-prescription-pilot/

(Welsh Housing Quality Standards) and Lifetime Homes. Although this additional level of design results in consistency in design and standards across the affordable homes sector, it should also be noted that this comes at an extra over development cost. The review of Part L under the building regulations and the intention for the requirement to install automatic fire suppression systems in all new residential dwellings from spring 2014, as outlined in the domestic fire safety measure, will add to that cost and they are coming at a time when there are a lot of difficulties in the sector including viability challenges and technical challenges to be looked at.

25. It is important that these changes are balanced against the backdrop of the current financial situation, cuts in social housing grant and increasing housing demand. The viability of development schemes is challenged with increasing standards and less rental income/grant. Furthermore, there is considerable financial pressure on the sector at a time when there are significant cuts to the welfare system which are considerably impacting the income of RSLS. With the cuts to welfare reform, there will be a greater need for more efficient properties in terms of accommodation which could have a larger floorprint and associated build cost but may be necessary in order to meet housing need. Our members have commented that rising standards will driver developers including RSL's away from build.

Communities- making the case for change

How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy? Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

26. Taking into account the energy hierarchy, energy reduction should be considered firstly before considering energy efficiency. Undoubtedly the first and best option is to use less energy, to be less profligate. With less waste, the adoption of modern technologies, better insulation, regulation and planning, we can save over 35% of our total energy bill and Wales could reduce its internal consumption from ~100 TWh to below 65TWh.[6] Useful figures can be seen within this article in the footnote[7]. Therefore a priority should be to increase energy efficiency and reduce our total national energy use without increasing imported embedded energy.

27. In England, 100% of business rates from new energy projects are retained by local authorities and we believe Wales should emulate this approach as the retention of local business rates from renewable energy projects would help link projects with the communities in which they are based, and support the "fairness"

[6] http://www.clickonwales.org/2015/07/the-energy-conundrum/

[7] http://www.clickonwales.org/2015/07/re-energising-wales-2/

principle of supporting the local authorities which play host to more developments.

28. Wales must reconfigure and re-engineer its energy supplies to a “zero carbon”, minimal greenhouse gas (GHG) emission format. Energy is essential to the Welsh economy and though we are traditionally an exporter of electricity, we are likely to become a net importer from 2016. We face many unique challenges, as well as opportunities, in terms of developing our energy resources in a way that is compatible with our obligations to future generations and greenhouse gas emission targets

If you require any further information on the content of this submission, please contact Shea Jones at xxxxxxxxxxxxxxxxxx We are willing to provide oral evidence to the Committee if required.

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	Smarter energy future for Wales?
Ymateb gan Y Cymoedd Gwyrdd (Cymru) CIC (Saesneg yn unig)	Response from The Green Valleys (Wales) CIC
SEFW 17	SEFW 17

A SMARTER ENERGY FUTURE FOR WALES: Response of The Green Valleys CIC 3rd September 2015
Prepared by Chris Blake, founding director and willing to give evidence in person.

1. Before answering some of the questions raised by the committee I am going to make a few observations about the current position by way of *background*.
   - In 2013[i], despite having abundant natural resources, Wales was producing just 10.1% of its electricity from renewable sources, less than the UK average and way behind Germany at 23.4%.
   - The vast majority of those renewable generators are owned by large corporations – the majority of them foreign owned and foreign financed.
   - Consequently, the income from renewable generation is not staying in Wales. There are very few community or socially owned renewable projects in Wales. Westminster policy has supported foreign developers to use the landscape of Wales to profit from the levy on consumers' fuel bills.
   - As you are aware the Westminster Government is rapidly closing the support under the Levy Control Framework (RO, FIT, CfD) on the basis that the budget (and cap) for 2020 will shortly be fully committed. There have been over 5 years of missed opportunity – a new commitment from Wales is needed - but at a time of great uncertainty and acknowledging that Wales currently controls neither the economic incentives nor the regulatory framework that drive renewable investment.

2. *A question of priorities* Any answer to the questions that are being asked will vary depending upon your strategic priorities. I recommend that the committee give urgent attention to its priorities and goals for renewable energy generation, as this will dictate policy choices. For example, priorities ***could be***:
   a. *Maximize energy output (MWh)* - this will lead to a focus on very large scale, high efficiency projects, typically onshore wind and PV, and experience shows that these will be delivered most quickly by commercial developers.
   b. *Security of supply* – this will encourage a diversity of distributed resources and encourage farm and community scale developments close to the point of consumption.
   c. *Maximize economic benefit for Wales* – here ownership will be crucial: mutual, social and community ownership will hold profits within the country and will also give scope for using electricity generated to address fuel poverty (one of the failures of the current generation programme).

3. Whatever the intention, the outcome of the last decade of (mainly Westminster) policy has been maximizing energy output (priority *a*, above) as evidenced by the large on and offshore wind farms. Value for money (kWh/£) will always be important so further development of large generators is vital to meeting energy needs and carbon targets. There has been some progress towards secure and distributed supply especially through deployment of FIT for domestic PV and farm and community scale renewables (priority *b*, above) supported by the small scale FIT. However, delivery has been slow (apart from <4kW PV) and is now hampered by FIT degression and grid constraint in rural areas. The goal of maximizing economic benefit for Wales has not been delivered. An insignificant fraction of Wales' renewable resources are in social ownership. Apart from land rental and relatively small community benefit funds there has been very little economic benefit to Wales from renewable generation.

4. Wales needs to deliver RE at scale as well as maintaining a variety of smaller, distributed projects. I believe Wales can deliver these priorities by focusing on two priorities for its renewable energy policy for the next 10 years:
   a. Deliver large scale, socially owned schemes
   b. Continue to support a variety of farm and community scale projects across Wales.

   The responses and evidence given below reflect these priorities.

The energy mix

How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

5. Renewable generation still requires some financial support (something that all other technologies receive – from tax incentives to oil exploration to nuclear decommissioning from Public spending).

This review is taking place when there is considerable doubt about the future of the financial support for the renewables sector in the UK. Future support from Westminster is unknown although it is likely that until 2020 the Government will argue that since the LCF support has been allocated earlier than expected, no additional spending is required until after 2020. Against this policy assumption there are some rational responses to inform Wales' future energy policy:

a. *Go Large*. Focus on the lager schemes where economies of scale get closer to grid parity.
b. *Local supply*. Actively develop models that allow direct resale of generated electricity (local supply). If generators were able to sell directly to consumers at a price above the minimum export price but below retail pricing then the impact of the declining FIT could be mitigated. Active support and piloting of direct sale initiatives is vital to the funding of future renewable generation. It also promises a potential challenge to fuel poverty – the socially owned wind farm that sells to the housing association tenants at a reduced tariff?

    [We have a bizarre situation, regulated by OFGEM, requiring all generators to sell big ESCOs at the wholesale rate (around 5p per unit) who then resell that power at 5p per unit. Imagine that OFGEM regulated the production and distribution of carrots –all growers would be forced to sell to the big 4 supermarkets at wholesale prices –making farmers markets are illegal!]
c. Support distributed generation where electricity can be used on site (saving 15p per unit on purchase) – this would mean supporting farm and domestic schemes where electricity is used on site and encouraging on-site consumption to replace fossil fuel.

This focus on large scale, local supply, and generating at point of use is independent of any particular technology and aligns with the priorities set out in paragraph 3 above.

What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

6.
    a. For electricity the answer is largely given above – larger, renewables schemes with the ability to local supply, and smaller renewables alongside local demand.
    b. For gas, large scale AD from domestic waste is one of the technologies that have been overlooked – in part because of LA waste management contracts.
    c. For properties that are off the gas grid there needs to be continuing support for biomass heating and electric heat pumps which can be an ideal partner for renewables that have a strong winter generating capacity (wind and hydro). TGV have installed a 30kW microhydro scheme in mid-Wales as a partner to ground source heat pump that is heating efficiently a large multi-room property. Support is needed to encourage integrated solutions.

The grid

How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

7. Grid capacity is a major constraint on renewable generation in many parts of the UK. Once again this is an area where community renewable generation projects are at a material disadvantage when compared to commercial projects. We have had direct experience with rural grid constraint (£5.7m reinforcement cost of an 18kW community microhydro project). Commercial developers have the experience and the balance sheets to be able to employ grid consultants to ensure that they design schemes that reserve all of the available capacity on our constrained, legacy network. There is clear evidence of market failure under the current "market" regime of regulated by OFGEM . One absurd consequence is the insistence that the existing grid is used optimally ("value of money argument") even when to achieve this generators (supported under the LCF) are being given constrained connection offers or having generation curtailed. In other word the determination to avoid under-used assets in the distribution network are requiring under-utilisation of generation assets. Common sense requires some redundancy in the distribution network and full utilisation of generating assets – the opposite of the current situation.

8. For some DNOs (WPD in mid-Wales is an example where I have direct experience) the heralded solution is Active Network Management (ANM). From 2017 all connection offers in that region will be ANM offers – requiring the developer to pay for an inter-trip (a switch) and secure communication to the network management system maintained centrally by the DNO. Under certain network conditions generators will be remotely switched off to maintain the network within safe operating parameters. As noted above, this prioritises grid resource efficiency over generation asset resource efficiency. It also acts as a further barrier to community and smaller distributed generation since the cost (met by the developer) of ANM connections will typically be another £40k. Not a problem for a 30MW wind farm but critical for a smaller community or farm-scale project.

What changes might be needed in terms of ownership, regulation, operation and investment?

9. The DNOs have neither the remit nor the appetite for distribution grid investment. Developers are utilising the legacy grid rather than invest in large-scale reinforcement themselves and planned cooperation between developers has not materialised (research by REGENSW has highlighted the barriers to a market driven investment).

10. This can probably be achieved by any one of two options, (a) public ownership of the grid in Wales, (b) modifingy existing regulation to allow a funded social enterprise to make strategic grid investments and to recoup a proportion of the investment from the existing "second comer" rules where subsequent beneficiaries of the investment pay a proportion.

Storage

How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy.

11. Wales needs to be cautious about the use of "technological fixes" to solve structural grid constraint caused by lack of investment. Westminster and the DNOs are offering magic solutions of mass storage and active network management (see para 7 above). Battery storage will become important but we need to keep some perspective on the current state of the technology. The much-heralded TESLA battery is effectively a £2,000 wallet which holds £1 worth of electricity. The experimental vanadium ion battery on the island of Ghia cost £3m and holds about £60 worth. Batteries will have a place and although unit costs are falling the technology is not economic and still at the experimental stage. This is best left to DNOs, academic and corporate research budgets for now. But we should cooperate with externally funded trials but this is not an immediate solution.
    Energy storage *does* makes perfect sense when the energy is stored for direct use and not for later release into the grid. For example, electric vehicle batteries or electric heating of hot water in buffer tanks for domestic heating. These require intelligent energy management systems and should be supported.

Ownership

To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

12. In conversations with DECC officials they freely acknowledge that there are market failures in the energy generation and distribution markets. The system of regulation is favouring the big 6 ESCOs and neither consumers nor the Welsh economy. The case for social ownership or state supported strategic investment in the grid has been made in para 10 above. Some large scale renewable generation also needs to be in social / mutual ownership. In para 3 above I highlight that the vast majority of money paid by consumers to support renewables has gone to foreign owned developers and their overseas investors. We have collectively failed to retain the benefits within the Welsh economy.

13. The reasons for this failure inform the proposed solution. Community projects have been too slow-footed to compete with the professional, well-financed developers who have secured the

best sites. Many of the sites for RE in Wales are on publically owned land (LA, NRW, Crown Estate) but taking the risk of site development (where the big returns are made) requires both expertise and an appetite for commercial risk that the public sector does not have.

14. I believe there is urgent need to establish a municipal / social RE development body with the aim of developing large scale projects on the public estate in Wales. This needs to be done nationally – not at the local authority level with a professional assessment of the best sites. Of course it should have been done 5 years ago when LCF support was plentiful and the best sites were available. However the scope for renewable energy in Wales is still considerable and much of the public estate is still undeveloped. There will be (even if we have to wait until 2020) a new support framework for RE and work needs to start now on securing sites and gaining permissions. Through this agency the economic benefits of development can be retained within Wales. As a municipal generator it would also have scope (if effective local supply regime was established) to offer supported tariffs for those in fuel poverty – something that the market will never provide.

Energy efficiency and demand reduction Not answered – not an area of direct experience.

Communities - making the case for change

How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy?"

15. All we can say with certainty is that the present system is not working for consumers, the economic health of Wales, those in fuel poverty, or delivering on energy efficiency. But is working very well for the shareholders of the ESCOs and DNOs. I have argued that large scale RE is needed in Wales and that at least some of future development should be municipally owned. There is also a role for smaller community owned distributed generation. In particular the ESCOs have failed in delivering energy efficiency measures to the domestic market (lack of trust and conflict of interest the two main contributors). Communities have a key role to play in engaging with and delivering changes in behaviour and installation of energy saving measures. One option would be to link further support to community energy projects to commitments to deliver community based energy efficiency measures. Taking FIT out of the income equation would allow community generation projects to receive European grant funding for construction (something State Aid rule prohibit with FIT) and could come with requirements for substantive change at the householder level.

Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

Experience with Ynni'r fro suggests that communities can't deliver the big energy projects consistently. But to meet our carbon reduction obligations and the follow the spirit of the Future Generations Bill, Wales needs to continue to develop large scale RE projects. I believe (at least some of) these projects should be socially owned (a partnership between municipal landowners, LAs and local communities) to harness the full economic benefit for Wales and potentially start to address fuel poverty through local supply. Communities do have a key role to play – developing small and medium scale projects and in particular to delivering the energy efficiency agenda.

In conclusion there are four main priorities: 1) establish a municipally owned development company for RE large-scale projects to harness wealth and start to tackle fuel poverty through direct supply; 2) continue to support distributed farm and community scale projects where electricity is used on site (and support integrated projects such as heat pumps with wind or hydro schemes); 3) Use financial support for community projects to drive community-led action on energy efficiency; 4) Ensure there is strategic investment in the distribution grid.

[i] *Energiewende Wales?*, Karen Whitfield, National Assembly for Wales Research Service

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan South Hook LNG Terminal Company Ltd (Saesneg yn unig)	Response from South Hook LNG Terminal Company Ltd
SEFW 18	SEFW 18

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

South Hook Business Use

Dear Sir / Madam

NAW Environment and Sustainability Committee Consultation: A Smarter Energy Future for Wales

We welcome the Welsh Assembly's Environment and Sustainability Committee inquiry into 'A Smarter Energy Future for Wales' and appreciate the opportunity to make the following comments for consideration:

1. **The energy mix and need to enhance energy security in Wales**
   The South Hook LNG Terminal Company Ltd. (South Hook LNG Terminal) notes the need for Wales to achieve a smarter energy future, including low carbon energy supply, energy demand management and energy storage, at a sufficient pace to achieve the necessary reductions in emissions. However, the importance of non-renewable sources of energy, such as natural gas and other conventional fossil fuels, should not be forgotten or underestimated, as these continue to play an important role in ensuring energy security in Wales, which requires reliance on a diverse mix of energy sources. Natural gas, specifically, plays a significant role in the future energy mix for Wales and will provide a valuable contribution in the move towards a low carbon energy system.

   The South Hook Terminal continues to contribute a significant daily contribution to UK energy needs, a recent highlight being that, on 18 August 2015, South Hook LNG Terminal was responsible for delivering just over 30% of the UK's gas requirements. Such figures are reflective of a significant, safe and reliable operation that plays an important role in supporting the Country's energy infrastructure, and demonstration of a strong insurance against supply disruptions.

   Based at the Port of Milford Haven, South Hook LNG Terminal is an important facility contributing not only to the energy mix but to the employment and social development of the region.

2. **The Grid - How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?**
   The South Hook Terminal is one of the major contributors to the diversity of UK energy security. The decision to build South Hook LNG Terminal, underpinned by a very significant financial investment, demonstrates the long term commitment of our Shareholders to the UK energy market. Therefore, in order to provide safe and reliable services to our Users, South Hook LNG Terminal's reliance has always been and continues to be, on the effective transmission services provided by the NTS (The Grid).

3. **Energy efficiency and demand reduction**
   We support the initiatives for improving energy efficiency measures across Wales. In addition, we would like to highlight that, it would be more effective and efficient to

incorporate any opportunities for improved energy efficiency at the design stage of new builds. This would enable more efficient implementation at design and planning stages as opposed to retrofit of such measures later on or when an existing installation is substantially refurbished.

Two additional recommendations from a business perspective is the importance of ensuring continual improvements and consistency of service delivery in:

- Clear and consistent energy policy; and
- Streamlined and clear planning regimes and regulations.

In the meantime, we thank you for the opportunity to contribute to this inquiry.

XXXX XXXXXXX

XXXXXXXXX

Health, Safety, Security, Environmental & Quality Manager

South Hook LNG Terminal Company Ltd

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Cyfeillion y Ddaear Cymru (Saesneg yn unig)	Response from Friends of the Earth Cymru
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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Friends of the Earth Cymru submission to the Welsh Assembly's Environment and Sustainability Committee's inquiry into a 'Smarter Energy Future for Wales'

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1. Introduction

Friends of the Earth Cymru is dedicated to protecting the environment and promoting a sustainable future for Wales.

Friends of the Earth Cymru has been at the forefront of the call for an 'Energiewende Cymru', organising an Energiewende Cymru conference last year, and we have submitted extensively on energy futures issues to the Energy and Climate Change Select Committee.

2. Summary

Friends of the Earth's Cymru's vision is that we in Wales create a framework to mirror that in Germany where their Energiewende (Energy transition) has led to a situation whereby the political, financial and planning structures positively support and encourage communities to start their own renewable energy projects. In Germany this has led to a situation where (in 2011) over 380,000 people were employed in the renewable energy sources industry and where only 13% of Germany's 60 GW of renewable energy is owned by the big energy utilities, with the rest being owned by households, communities, and farmers among others.

If we can remove the various current barriers to more community renewable energy projects in Wales, we would likely see an exponential increase in these projects year on year helping fight climate change, helping to meet Wales's climate change targets, stimulating technology innovation and the green economy at the same time as well as increasing energy security and crucially strengthening local economies and providing more social justice for communities.

If we think that on average, a household in Wales spends on around £616 on their electricity bills and around £797 on their gas bills then we can make a rough estimate (based on 1,319,000 households in Wales) of £1.86billion which largely flows out of Wales to the big 6 energy companies. Imagine if a greater percentage of this were spent in Wales and was circulating through local economies.

Friends of the Earth Cymru would like to see:

- 100% renewable electricity in Wales by 2030
- That Wales receives a fair proportion of Green Investment Bank funding (GIB currently has a target of investing £330bn in the UK's green economy by 2020, so on a proportional basis of Wales having approximately 5% of the UK's population, Wales should expect £16,500,000 of investment)
- That key financial instruments such as Feed in Tariffs (FiTs) and Renewable Obligation Certificates (ROCs) be devolved to Wales and maintained at least at current levels
- That energy market rules in Wales are changed to permit and prioritise local energy supply so that people can buy electricity generated by community renewable energy groups directly rather than via large utility companies
- That the Welsh Government work with partners to plan what the right kind of transmission grid would be in Wales to support an Energiewende
- That the Welsh Government seeks the devolution of control of the electricity transmission and distribution grids serving Wales
- That Distribution Network Operators (DNOs) become subject to regulations set by Welsh Government
- That there is priority access in Wales to the National Grid for community renewable energy schemes
- That connection offers to the grid in Wales should be based on standard cost assessments with any differences in actual costs being recovered through general cost recovery by DNOs
- That there is an agreed timeframe for grid connection agreements for community renewable schemes in Wales
- That there is a presumption in favour of community renewable energy projects under the Planning System
- That the Planning System in Wales particularly values the social benefit of community owned energy schemes
- That the Welsh Government work with Local Authorities and other relevant partners to map renewables resources in community areas so that communities know where to plan their renewable energy schemes
- That the Welsh Government sets a target for energy consumption reduction in Wales
- That the Welsh Government sets a target for community renewable energy in Wales
- That the Welsh Government work with Local Authorities and other relevant partners to ensure that all publicly owned buildings (including schools) in Wales have suitable renewable energy system(s) installed on the property

2.1 Given the current context of the UK Government's systematic dismantling of the market structure for renewables, the Welsh Government needs to provide an alternative structure – this is the moment to diverge from the Westminster position. In the last three months the UK Government have: ended support and the route to market for onshore wind; changed planning rules in England to make building onshore wind almost impossible; ended the RO for solar early; announced an effective end to the Feed-in tariff (FIT) placing 20,000 jobs at risk in the rooftop solar sector alone; announced a delay to the next CfD rounds and extended the climate change levy (CCL) to cover renewable energy.

2.2 This is not just about the loss of subsidies, but about removing the mechanisms to install renewables with no replacement policies. Wales can achieve a 'smarter energy future', but it needs to create a devolved and stable financial framework, a stable legislative framework, and a devolution of powers including the control of the grid and networks to Wales to make it work.

2.3 Friends of the Earth Cymru do not believe that the current infrastructure and regulatory framework can deliver these changes at the rate of change that is necessary – the mandatory community ownership framework is not in place, Wales needs to introduce its own FiTs in face of Westminster's actions, it needs to have its own Ofgem to change the way connections and supply operate, and Welsh local government needs a strong role in driving forward decentralised renewable energy projects in partnership with communities. The recent changes to planning with the creation of regional tiers could also spell trouble for the public perception of energy projects if these decisions are seen to be imposed.

2.4 Friends of the Earth's proposal is that the Committee should make a recommendation to the Assembly/Senedd/Welsh Government that an opportunity in the next five years will be offered to every citizen in Wales to purchase a share in a Welsh-based energy co-operative. For low-income households this should be facilitated by Credit Unions. The public sector should lead on anchoring the long term investment e.g. district heating anchored to hospitals where possible; and storage e.g. providing public land for the building of energy storage facilities. The business sector should lead on projects e.g. on business parks and industrial estates, acknowledging the need for a share of these projects to be offered locally, and build apprenticeship, technology and knowledge links with educational institutions. Farmers should be encouraged to develop sites on condition that shares are available for neighbouring communities.

2.5 As is demonstrated by the UK Government's current actions, there is a devastating impact on Wales's jobs and prospects as a result of some aspects of energy policy not being devolved. The Committee should recommend decisive and quick action by the Senedd/Welsh Government to demand devolution on the relevant areas.

3. The energy mix

3.1 Wales can decarbonise its energy system by taking decisive action. The introduction of FiTs in Germany took around 14 years (from the first review of the original 1990 legislation) to the installation of around 160 TWh of renewable electricity in 2014 (see http://energytransition.de/2012/10/renewable-energy-act-with-feed-in-tariffs/) – Wales uses around 24 TWh per year of electricity. It is therefore necessary to a) have a good, fair framework in place that rewards investment and is socially acceptable; and b) ensure that this framework is in place for the long-term (with opportunities for revision but not for scrapping).

The key actions are: create a FiT for Wales; legalise for mandatory access to the grid; legalise local supply; provide investment vehicles for storage (i.e. make the finance available); and give targets to all public authorities (including local authorities) to engage in energy production, distribution and storage. The creation of the FiT could for instance be financed through a re-banding of council tax bands and a charge on the higher band properties.

3.2 In our view the distributed generation resources that best meets Wales' renewable energy needs must be assessed by the local councils (hence the problem if planning for energy is taken away from councils and given to the regional tier). Some local authorities have already assessed their renewable resources. An estimate is that to achieve the supply of e.g. 42 TWh of electricity – this should be derived from onshore wind 4GW (£0.8 billion capital costs), offshore 6GW (£2.1 billion); tidal 4GW (£0.9billion); solar – roof and ground mounted 1GW (£0.1billion); hydro 1GW (£0.2 billion).

3.3 Heat, which is responsible for around 30% of Wales' energy use, needs some additional measures to electricity generation. Firstly this should be dealt with by demand reduction e.g. insulation and energy efficiency measures public investments in social housing and low-income households, and low interest investment loans backed by Government for home improvements. Off gas grid households could have solutions such as local biomass boilers (again supported by low interest loans backed by the Welsh Government), and for those on the gas grid but not in conurbations, biogas derived from the agricultural and food industry waste in Wales is a possible solution that needs to be explored and invested in – it has significant potential, as well as for shared CHP systems in conurbations. The main problem with digesters in Wales is that their development so far has not been in partnership with local authorities – both restricting the recycling potential of the authorities, and restricting the most efficient use of the products generated. Widespread solar thermal deployment

and ground source heat pumps should also be supported as household and business investments through a system of low-interest improvement loans.

4. The grid

4.1 The original feed in tariff legislation in Germany had grid access and grid agreements simplified – crucial to speed and scale of deployment. Wales simply has to get this done – the network operators are simply not set up to deal with household and small decentralised projects coming through at scale. In addition the costs of connection are not commensurate with the projects being connected – the upgrade to the grid to change to a decentralised web is an overall cost, rather than one which each small project carries the burden. In fact the whole layout of the grid in Wales is not set up for a small country with lots of geography. If each town and village had its own sources of electricity and heat then it needs to be able to store and use that electricity and heat in the most efficient way possible. This means that investment in storage and a 'spider's web' of connections, rather than 'spokes of a wheel' connections radiating out from a centralised power station is required.

4.2 Wales would benefit from a far better system of regional balancing, and focussing on its own needs first and foremost – that is the point of devolution. The Welsh Government has to ask itself where the next public investments will go in the grid and who are they for.

4.3 A long view needs to be made of grid investment decisions. It makes no sense upgrading the grid to cope with a new generation of centralised power stations when there are strong drivers for decentralised electricity generation. A whole new approach to the grid needs to be explored, including the model mentioned above that provides for connections between local grids instead of a strongly centralised operation. These powers should be devolved to Wales in the upcoming Wales Act.

4.4 In terms of ownership, the Welsh Government needs to use its powers to introduce a mandatory share offer for electricity generation projects that are connected to the grid, and are larger than own use. The Danish Renewable Energy Act sets out a very clear, tried and tested example of this (http://www.ens.dk/en/supply/renewable-energy/wind-power/offshore-wind-power/nearshore-wind-tenders/relevant-legislation).

4.5 In terms of regulation, it has to be possible for local co-operatives and ESCOs to supply the electricity they generate to the locality in which they are generating. The University of Leeds has published a research report on the options that are possible including short, medium and long term changes. (https://research.ncl.ac.uk/ibuild/outputs/local_electricity_supply_report_WEB.pdf.)

4.6 Distribution network operators must operate for the benefit of small as well as large producers. This means that engagement with small producers has to be regulated, so that the social benefits of the growth in small producers (which is not a direct benefit to the DNO) can be realised. In Germany the connection process is such that it is set out in a strict timeframe in law, and the merit order applies, so that renewable electricity is prioritised over other sources and 'used first'.

5. Storage

5.1 Energy storage mechanisms are crucial to enable more and more renewable energy to be utilised – both in terms of increasing efficiency, and also to smooth out levels of supply to the grid. Nottingham and Manchester (www.energy.manchester.ac.uk/research/energy-storage/) are both exploring energy storage systems. Storage solutions do however require investment at this stage, and new build or public sector projects could provide opportunities to develop solutions which could then be taken forward more broadly. Home energy storage solutions are common e.g. storage of large quantities of hot water is part of having a home biomass boiler, however the intermediate level e.g. storage for a district needs to be further explored (for an example see Wilhelmsburg, Hamburg http://www.iba-hamburg.de/en/themes-projects/energiebunker/projekt/energy-bunker.html)

5.2 Because energy storage is in an early market phase, Wales could reap significant early mover advantage. The Welsh Government should apply considerable thought to the economic and investment potential for being a leader in this field.

6. Ownership

6.1 Local Government needs to reprise their role as an energy supplier. This makes sense in terms of the public buildings they have to service and in terms of generating an income in cash strapped times. Barnsley, Newcastle, Bristol and Manchester for example are all deploying community and local energy projects.

Barnsley - https://www.barnsley.gov.uk/news/event-launches-exciting-solar-panel-scheme-for-barnsley/
Newcastle - http://www.narecde.co.uk/case-study/newcastle-city-council-energy-master-planning/#.VemXaRHBzGc

Bristol - http://www.bristol.gov.uk/page/environment/energy-service
Manchester - http://www.agma.gov.uk/latest-news/launch-of-greater-manchester-s-energy-plan/index.html

Mandatory community ownership has been discussed extensively, but it simply needs to be done – too many of the existing onshore wind farms in Wales have no community ownership. In order to gain further public acceptance a share must be offered for investment. If the Welsh Government could consider a national administration agency (similar to Denmark) then even those costs would not fall on commercial developers of renewable energy projects in Wales.

6.2 The example of Schonau near Freiburg in Germany demonstrates how a small community can take on and manage the grid for broader public benefit. Any co-operative can employ the same trained staff as a commercial grid operator, the point is that the co-operative will deliver greater public benefits. The National Grid is a commercial operator and in 2013 made a £1.5 billion pay-out to shareholders (http://www.theguardian.com/business/2013/nov/21/national-grid-profit-payout-shareholders-ofgem). If the company was a not-for-profit along the lines of Dwr Cymru, that profit could have been ploughed back into the grid improvements. Wales must regain ownership of its grid as a matter of devolution.

7. Energy efficiency and demand reduction

7.1 The planning system must have strong rules to shape development. The planning system in Wales is under pressure from the HBF and other volume housebuilders who have successfully lobbied for changes in England which has broken the plan-led system – speculative development is rife, and provision of affordable housing and quality are continually challenged. The issue in Wales is that with 3 development plans in force at any one time, housing must remain a local issue with the local council because of the detail of place-making – transport, access to environment, design, resource use (e.g. water, land quality) are all issues to do with a particular place and knowledge is required of that place to make the best decision. Building Regulations need to be updated as soon as possible to make Passivhaus standards a requirement for all new housing. Given the housing pressure and the number of developments on local authorities' books', now is not the time to be wasting investment building homes that will need almost immediate retrofitting. It is simply not cost effective to be making constant small upgrades. The best return on investment is to build passivhaus or zero carbon upfront, and then to reap the benefit of that over the lifetime of the building.

7.2 The benefits for Wales, across environmental, social and economic factors, could be very substantial if Wales set higher energy efficiency standards for new build housing (e.g. Passivhaus or Energy Plus). For example, housing providers in Wales would be able to export their knowledge and expertise in the enormous market in England when that country is required by European legislation to apply zero-carbon housing standards from 2021 (http://www.epbd-ca.eu/themes/nearly-zero-energy).

8. Communities - making the case for change

8.1 Communities have to take responsibility for meeting their energy needs. It has to be about how much energy we are using, and wasting, and how we can change that. Unfortunately it is 'hard work' and therefore there need to be incentives – at the moment to retrofit your home or to engage in producing energy is difficult, time-consuming and requires all sort of hurdles to be overcome. The Committee should look at the start to finish of a householder or business journey to reduce energy use and to install renewable energy and look at what can be made easier. Business and industry should have financial incentives e.g. lower business rates directly tied to increasing their energy efficiency and investment in renewable power generation. Low interest loans are also a useful vehicle for a comprehensive retrofit programme.

8.2 In Germany, their Energiewende has been an organic process fuelled by cross part political support, financial support and more helpful planning regulations. It is imperative that we address issues such as the planning system, financial support, grid connection and supply rules.

The best thing we could do in Wales is to replicate the success of the Energiewende is to create a situation whereby communities find it easy (rather than difficult) to start and progress their own renewable projects. This involves sweeping away all the current rules and regulations which act to hinder these projects rather than support them. If communities for example were able to become direct suppliers and thereby able to offer cheaper electricity tariffs for example to households in their communities then we would see a rapid increase in community projects starting all around Wales. If people further benefitted by being able to become joint owners of a scheme by investing small amounts of money then they would further benefit and if the minimum price of investment was small then it would become attractive to all.

Communities all around Wales, whether urban or rural, wealthy or disadvantaged, all have the potential to benefit hugely from local renewable schemes with potentially cheaper fuel bills, reduction in fuel poverty, more money circulating in local economies and more long term local sustainable jobs which would in turn help sustain rural and disadvantaged areas.

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Yr athro Gareth Wyn Jones (Saesneg yn unig)	Response from Professor Gareth Wyn Jones
SEFW 20	SEFW 20

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Economic and Social Policy and Energy

1. **Summary:**

1.1. Affordable, flexible, portable, reliable energy supplies have been at the heart of western and global economic development and Wales' historic contribution to it. Similarly, affordable, flexible and reliable, **"low carbon"** energy must be central to Wales' economic rejuvenation.

1.2. This short paper makes the case for maximising the exploitation of our small scale [i.e. below 50MW and within Welsh Government (WG) competence], dispersed, renewable energy resources through a large number of community, local or individual schemes so as to promote local work creation, maximise local profits and multipliers and increase Wales' resilience to future energy price increases and global shocks.

1.3. Wales' small-scale energy resources could amount to at least 5TWh of electricity and 10 TWh of heat. These will need to be supported and complemented by large scale, conventional, 'commercial' schemes, which should also, dominantly, if possible exclusively, be exploiting renewable resources e.g. tidal flow, tidal polders and off shore wind. But the former have a significant developmental and social potential.

1.4. The total renewable energy potential of Wales and adjacent inshore waters has not been formally assessed. In 1.8 below I list possible sources. There is an urgent need to add quantitative estimates of the physical potential of each followed by a cost benefit analysis. It is not clear what proportion of the 2011 annual demand of 98 TWh in all categories of energy [space heating, transport, industry, home etc.], of which I7 TWh is electricity, can be met from renewable sources and or/ be saved by better management.

[NB. There was a substantial decline in total energy demand between 2006 and 2011 from ~126 TWh to ~98TWh. Due in part to the economic depression)

1.4.1. Within this 'demand' there remains significant room for energy saving by better management, improved spacial planning, improved space insulation etc. and technological innovations. A >20% increase energy-use efficiency should be possible.

1.4.2. But in the case of electricity, this will be off-set by **increased** demand due to the increased electrification of transport (cars and trains) and the use of air and ground source heat pumps for space heat.

1.4.3. These technologies while increase electricity use *per se* offer major saving in the total energy use budget [see Mackay, Without-the-hot-air: e.g.[a] EV cars 15-20 kWh per 100km cf. 70 - 100 kWh per 100

km for standard petrol car; [b] ground source heat pumps are <5 times as energy efficient as direct use of an electric fire].

1.4.4. The % of energy as electricity will increase even if the total energy chain is reduced and decarbonised and a target demand of 25 to 30TWh of electricity, much of which could be supplied form renewable sources by 2030, seems not unreasonable.

1.4.5. A massive annual increase in demand from energy-dependent economic growth would of course undermine these figures (a 2% annual growth doubles demand in 35 years).

1.4.6. Logically, the decoupling of economic activity/growth and wellbeing from incremental increases in energy use must be a major strategic WG objective. Cf. Denmark

1.4.7. These data do not include embedded energy and GHGs in imported goods, freight from outside Wales and air flights etc.

1.5. Wales' household energy use in 2006 amounted to ~27 TWh per annum approximately 20TWh used for space heating (85% gas and some oil) and 6.3TWh of electricity. By a strategic combination of local energy generation, improved energy use efficiency and management and heat pumps, this may well be satisfied from renewable locally-controlled sources.

1.6. A strategy based on realising the economic advantages of energy saving combined with local, dispersed, energy generation is advocated so as to change both the public perceptions and the local economic returns. Anecdotal evidence suggests that household renewable energy generation has a powerful influence on efficient energy use at a household level. The general public are largely unaware of the size and complexity of the issues, tend to NIMBYism and perhaps can only become aware if the problems are personalised i.e. how would you and your community meet your own energy demands?

1.7. This document is based on semi-quantitative estimates. A major recommendation is for WG to undertake a comprehensive analysis that would include an analysis of the costs and the economic returns, jobs created and retained, energy generated and saved, carbon saved and its value under various credible scenarios.

1.8. Sources of renewable energy which require assessment include: Wind - terrestrial and off-shore; Water – micro and meso hydro electricity [river flow and small dams], hydro electric potential of exiting dams and of pressure reduction values in water grid; Sun - solar photovoltaic, direct solar heating; Biomass – wood fuel, other biomass source including clippings; Sea/tidal - tidal lagoons, tidal flow turbines, wave energy; Wastes - anaerobic digestion of wastes [animal slurry and manure and human food wastes, methane from ruminants; Geothermal – hot rocks; Ground source heat pump; Air – air source heat pumps; Waste incineration.

1.9. In Section 8 a number of WG interventions are proposed which could immediately move this strategy forward at little or no cost.

2. **Rationale**

2.1. The costs of hydro-carbon fuels are projected to rise. The International Energy Agency (IEA), World Energy Outlook 2012 forecasts that global energy demand will grow by over a third in the period to 2035: the main increase in demand will be in China, India and the Middle East. This will be mirrored in prices. In the UK, central estimates of crude oil prices are projected to rise by 18% by 2030. The US/Canada shale gas and oil is contributing significantly to the market although it is unlikely that it will be replicated in Wales, UK or Europe for geological, social and political reasons [see New Scientist, 10th Aug 2013]. However there are doubts whether the extravagant claims made for cheap unconventional hydrocarbon sources in North America will be realised, but nonetheless, the expansion of these gas resources is influencing energy costs in the USA and already leading to diversion of some coal from US to Europe for power generation. Even so, in the US coal use is more than keeping pace with gas. While gas produces less CO_2 per kWh of energy, a number of studies suggest that 'fracked gas' will reduce net CO_2e emission little.

2.2. Wales has a high proportion of poor households; people on long-term sickness benefit, unemployed or in low wage employment. Fuel poverty is a significant issue for many Welsh families living in poorly heated and inadequately ventilated homes. In 2008 some 1/3 of million homes in Wales were recorded as in fuel poverty. Many Welsh communities, consequently, are very vulnerable to medium and long-term increases in energy prices as well as to annual and short-term price fluctuations. WG Energy Statistics show that average gas consumption per consumer was 13,600kWh, and average electricity consumption per household was 3,850kWh in 2011. (Equiv. Ofgen numbers- 16,500 and 3,500 kWh respectively.)

2.3. Wales has high % of over 65s living on small pensions vulnerable to cold and less likely to have access to private transport.

2.4. In dispersed rural communities, general energy costs are very significant. The 2008 Living in Wales Poverty survey estimated that around a fifth of households depend on a main heating fuel other than gas; these will be dominantly rural. Many 'off-the-gas network' households rely on fuel oil and/or coal or some wood for heating. Heating oil prices rose by 22% in 2011 compared with 2010, showing the vulnerability of these households to high and variable home heating costs and also transportation costs. Associated loneliness, depression and ill health are significant problems.

The related excess mortality is estimated to be over 1,000 annually *in Wales.*

2.5. Wales has an aged housing stock with a large % of dwellings with energy inefficient, solid brick or stonewalls. In the characteristically wet climate of western Wales (most of the Objective 1 region), cavity wall insulation is not recommended and consequently more innovative but expensive insulation measures are required. These physical factors increase fuel bills, make energy saving more difficult and foster ill health.

2.6. The total energy cost to Wales is in £billions. Based on the average consumptions figures above, Welsh households spend on average ~£1,300 per annum on energy, with space heating typically the heaviest item. With 1.3 million households [2011 census], this implies a cost of ~£1.7 billion, in this sector alone. The total energy cost must be of the order of £8 -10 Billion.

2.7. Climate change, caused mainly by CO_2 emissions from hydrocarbon combustion, poses a major threat to all countries and communities, but especially to poor ones. As recognised by the CIA as well as the UN, it is a threat to the existing, globalised socio-economic order as well as creating specific threats to global food and water supplies and costs and to communities due to extreme weather events e.g. flooding as well as general social unrest and forced migration.

2.8. Major increases in the exploitation on hydro-carbon fossil fuels are incompatible with avoiding catastrophic climate change. The broad issue of anthropogenic climate change has been widely discussed and will not be pursued in the paper.

2.9. The need for affordable, low-carbon energy is driven by geo-physical reality as well as national economic and social concerns. It is reflected the WG, UK and EU policies to cut total greenhouse gas emissions by 80% by 2050. But WG implementation has been sluggish.

2.10. However the existing market place protects the interests of the large energy companies better than those of small consumers. There is an obvious danger that poor Welsh communities will be faced with ever increasing costs imposed by companies over which they and WG have no control.

3. Wales' Current Energy Mix

3.1. Wales has a complex and changing energy-demand profile, comprising electrical energy (~20 %), space heating, fuel for transportation and fuels for a variety of industrial requirements. These are currently supplied by

coal, natural gas and nuclear fission with a small contribution from renewable sources. These profiles are analysed in more detail in Annex 1, which also includes the energy flow diagrams produced for WG in 2006/7.

3.2 Welsh Government Statistical Bulletin on Energy Generation and Consumption, 2011 gives a more recent but less detailed picture. Prior to 2008, electricity production was about 35TWh but dropped to 27.3TWh in 2011. Renewable electricity generation has increased from 1.37TWh in 2007 to 2.16TWh in 2011. Gas is the main fuel for electricity generation (10.7TWh in 2011), with coal and nuclear making significant contributions – around 5-6TWh.

3.3 Wales' total energy consumption is 98TWh in 2010, composed of 1.7TWh from coal, 8.96TWh from manufactured fuels, 42.8TWh from petroleum products, 26.5TWh from gas, 15.8TWh from electricity and 2.1TWh from bioenergy and waste. Industry and commerce is the largest consumer sector (47TWh), the domestic sector consumes 27TWh, and the transport sector consumes 23TWh.

3.4 The ways in which electricity is consumed and generated are important in considering at low carbon renewable sources. Of the 27.3TWh generated in 2011, the main destinations of the electricity were

- 4.27TWh was used in generation and for pumped storage,
- 3.65TWh was exported to England
- 1.47TWh was lost in transmission and distribution.
- 17.91TWh was consumed (cf. 2010 consumption figure of 15.8TWh in Para 3.3)
- 2.16TWh was generated by renewables, comprising 1.45TWh from wind, wave and solar, 0.44TWh from thermal mainly, and 0.27TWh from hydro.

3.5 No single energy source will support each of the energy demands, although it is noteworthy that Scotland generated 13.79TWh from renewables – mainly hydro and wind/solar/wave in 2011 (DECC DUKES 2012). A similar position in Wales would mean that we would be well on our way to meeting our electricity consumption from renewable sources.

3.6 The situation is made more complex by the need to **match electricity generation and consumption instantaneously**, not just on an annual basis. Apart from tidal and biomass sources, renewable energy sources are not predictable, and therefore requires some back-up either from storage systems, such as pumped storage schemes, or rapidly activated energy systems such as gas [CO_2 producing spinning reserve]. Consequently the nature, cost and reliability of the each energy source and its relation to the relevant demand must be considered. If Wales can develop a mix of low-carbon, low-cost energy sources to meet demands, it will go a very long way to ensuring a successful sustainable economy into the future and would address many of the social and environmental issues noted in para. 2.1 to 2.10. Some renewable sources are likely to

have complementary generation profiles and, as discussed a length by Mackay [Without the Hot Air], a number of options exist and can be developed to regulate and even out both supply and demand. Electricity demand is already variable on a daily and annual basis. This demand profile is well characterised and managed but is not geared to the supply profile of renewables.

3.7 The conventional approach to **electricity** generation and distribution has been, from the days of the CEGB, to build a small number of large generating units, connected by the High Voltage grid from which radiate out the supply, at successively lower voltages, to the myriad customers. This approach means individual and communities are tied into the large companies and, despite the political doctrine of 'choice', have in practice very limited options. The centralised system also leads to annual distribution and transmission losses which were are about 1.45TWh in Wales in 2011.

3.8 The centralised approach is relatively easily managed, favours the large energy companies **but**, equally important, distances people from the reality of the economic and environmental issues we face - – whilst ensuring that they bear the costs. For example, it is reported that, at proposed Hinckley C Nuclear Power station, EDF are seeking a 35 year post start-up agreement at ~£90 per MWh, compared with current wholesale price of £45 per MWh, in order to recoup their investment, reported as £14billion [The Times]. The cost of the Severn Barrage is/was reported at £25B to produce 16.5 TWh annually and would [have] require[d] similar guarantees to raise the required investment. This approach will not encourage individuals, households and small companies to engage directly with their energy supply nor with energy saving, other than by imposed energy poverty.

3.9 Similarly, gas and oil supplied for space heating, transport etc. are controlled by a small number of international companies. Formal Welsh Government responsibility is limited in this area and to energy from installed capacity sources of 50MW and below. It has little leverage in some areas but the alternative approach outlined here would align with its current authority.

4. The Dispersed, Renewable Source Approach

This can be seen as complementary to the standard centralised model, but until continuity of supply can be ensured, cannot replace it.

4.1. The approach is predicated on exploiting the range of renewable energy sources within Wales and its adjacent seas **and** promoting their local and/or community ownership. The various resources are exemplified

below [4.5]. Their development would create **many thousands** of small schemes dispersed throughout Wales [e.g. from 3kW roof PVs installations to >50MW hydro or wind schemes], owned locally by individuals and/or communities. Their installation would favour small local contractors. They would have short lead-in times compared with the macro schemes such as Wylfa B and would disperse economic activity throughout the country and promote social inclusion. In conjunction with our HE/research sector, the policy should lead to the development of new exportable, low-carbon, small scales technologies, suitable for the developing world.

4.2. Such a policy has significant implications for both National Grid and even more, for the local networks, run by the two 'Welsh DNOs' and WG involvement with these bodies. This is expanded upon below under **Section 7 Issues**.

4.3. The evidence clearly shows that energy saving through better energy management, use of low energy goods and greatly improved insulation etc. is the most effective way of achieving the economic, social and environmental objectives of WG. However the evidence also suggests that improved awareness and important psychological changes, whereby energy is seen as a social/community responsibility, are enhanced by local dispersed generation i.e. a potential win-win.

4.4. A dispersed, communal strategy could buffer the people, especially the vulnerable, from rising energy costs as they would be part-owners of the asset and/or recipient of favourable local tariffs.

4.5. There is a range of potential dispersed renewable energy sources that can supply electricity, heat and small volumes of gas. As noted, electricity demand will reflect **both** decreased demand due improved efficiency and demand management **and** increased demand from electrification of transport e.g. electric cars and use of ground and air source heat pumps.

4.6 Current Welsh electricity demand is ~ 17TWh per annum. To a first approximation, a saving of 20 to 30 % would partly off-set any increased demand due to adoptions of electric vehicles. [See Examples 6. – for the massive decreases achieved by National Trust Wales]. N.B. electrically propelled vehicles require less than a quarter as much energy per unit distance as petrol/diesel vehicles [see Mackay].

4.7 A range of renewable energy sources is available, should be deployed and **must** be part of comprehensive strategy. **Heat sources** include fuel wood, other biomass, direct solar, ground and air source heat pumps (which requires electricity and are only valuable in well insulated homes), biogas from anaerobic digesters, potentially renewable electricity in tandem with excellent insulation, CHP, H_2 from renewable sources. **Electricity sources** include wind, PVs, small and medium hydro, hydro from existing dams, tidal flow, tidal polders, tidal barrages, wave energy.

5. Crucial questions:

- How much of the required, low-carbon, renewable energy can come from dispersed sources within Wales and how much must be produced by large commercial initiatives or imported? [see Mackay "Without the hot air" for detailed analysis at UK level and potential European-wide solutions]. A primary need is to define what is technically possible, and what might be acceptable to society – as MacKay has done.
- How can the economic and social advantages of energy efficiency be realised widely?
- What will be the scale of capital investments required and how can they be realised? How much work will be created? What are the estimated local multipliers?
- What will be the returns on that investment?
- What are the significant blockages to realising this potential?

It is not possible to answer the above questions definitively but below, examples are enumerated which suggest that the potential is sufficiently large to make a material difference to the Welsh economy, and that they could improve local resilience, help achieve climate change emissions targets and address the triple bottom lines of sustainable development. Copies of correspondence with WG are appended as Annex 2.

6. Examples:

There will be a need to prioritise the resources in terms of reliability of supply, and costs/access to technology. Clearly PV and on-shore wind are already the relatively cost-effective with a declining need for subsidy. The same is true for home grown wood biomass for heating. Imported biomass for electricity production is much suspect. Anaerobic and waste incineration and small scale hydro can give good returns on investment. Off-shore wind has a large capital outlay but a large potential. Wave and tidal polders and flow are at a proof of concept stage but the latter are very attractive as they are predicable and Wales enjoys high and rapid tides. Whilst not discussed in any detail in this paper energy saving must be a major priority.

6.1. Currently Wales has some 23,000 home PV installations [WWF Jan. 2013] and a few large PV farms. The distribution is patchy and does not correspond to the light/irradiance potential, which is highest near the coast and, fortuitously, closely follows Wales' population distribution pattern. A modest national installation target of 150,000 [~10% of households], (small 3 to 4 kW roof units at a 10% load factor} would produce 3,000 x 150,000 = 450GWh of electricity. With some large installation on the west coast and the new materials e.g. from Corus/Tata Steel, clothing industrial and farm sheds, a putative target of 1TWh annually by 2025 seems feasible. Currently PVs cost ~£1,500 per installed kW down to £1,000 for large schemes producing ~900 kWh per kW

annual production with life expectancy of over 20 years. In USA PV electricity is reported to be down to ~50 cents per installed W and is claimed to be cheaper than gas and wind.

6.2. WG policy is for Wales' woodlands to increase to 400,000ha by 2040. This forest of mixed hardwood and conifers should produce a sustainable annual increment of ~ 1Mtonne which, when dry, would produce 3.7 TWh (based on 60% to 30% reduction of moisture content on drying and energy content of 4.6MWh per dried tonne) of direct heat on burning as well as income employment and additional cash if carbon is fully priced.

6.3. National Trust in Wales has achieved cost effective, energy saving of over 40% in its pre 2012 property portfolio.

6.4. The hydro-electric scheme at Hafod y Llan has 640 kW capacity and will generate ~ 1.5 GWh. The scheme is costing £1.8m (funded at 5% interest) and is expected to pay for itself in 7 years by producing some 1.5 GWh per year and over £1/4M per year, with low maintenance costs, assuming 12p per kWh. There is little doubt that Wales being wet and hilly could support perhaps 50 to 100 schemes in the range 500 to 1000kW and several hundred micro hydro schemes of 20 to 50 kW. The potential is of the order of 0.5 TWh. See also Green Valleys Initiative.

6.5 ETSU [2009] reported a potential of 27 to 63 MW in meso hydro electrical schemes in upland Wales – equiv. at 50% load factor t0 ~0.25 TWh.

6.6. Estimates are required on generation potential of exiting dams

6.7. Anaerobic digestion/farm biogas.

6.8. Community Wind Power See Neil Lewis Menter Cwm Gwendraeth

6.9. Solar heating [Mackay 1.3 kWh per m^2 - 2.5 m^2 would provide an average house with most of it hot water]

6.10. Ground and air source heat pumps [some water heat sources e.g Plas Newydd on Menai]

6.11. Large scale projects with lower but not negligible community potential

6.12. Tidal flow

6.13. Tidal lagoons. The proposed tidal lagoon in Swansea Bay is forecast to produce a reliable electricity output of 0.4TWh annually. Successful exploitation could lead to a larger scheme at Colwyn on the North Wales coast. The financial model is based on community investment and local benefits which include low electricity tariffs.

6.14. Off shore wind. Mackay suggests that for shallow off-shore, the UK area is 40,000km^2 with power output of 120GW. Ten per cent of this operating at 40% load factor would produce 42TWh annually but creates strong public reaction

6.15. Wave??

6.16. Other??

As an individual I do not have the resources or capacity to undertake a full survey of resources — it is vital that detail work is undertaken immediately.

7. Issues:

7.1. There is no comprehensive survey of Wales' physical renewable energy potential.
7.2. No clear strategic priority integrating matters of importance [a] work creation, [b] energy poverty etc. [c] carbon reduction targets [d] urban and rural generation has been developed.
7.3. DNO connection/ fees, additional pylons/ transformers/ links to National Grid. Smart control systems for control of local and national electricity systems will be essential
7.4. Cost benefits taking into account energy saving/engagement/ dispersal of assets and wealth/ psychology.
7.5. Intermittence - energy storage must be addressed.
7.6. Backup by conventional energy sources

8. Immediate no/low cost Interventions.

Aspects the Welsh Government should address now

8.1 Planning system still is still a piecemeal. Individual planning officers not trained in renewables and interpreting policy which results in long time periods and uncertain outcomes from authority to authority. Advise for developers specifically ecological, aesthetic and archaeological is often contradictory (plenty of examples)

8.2 One size fits all approach in development process inadequate. This approach is having a disproportionally and high economic impact on micro and peco sector. An area where there is a current small expansion in Wales with small manufacturers and developers but the statutory process for a £40k hydro is exactly the same as a £1.4m scheme. Wales have the potential to be market leaders but are held back in our own country (much easier in Scotland on sub 50kw)

8.3. Using existing legislation such as the 'licence lite' mechanism Wales could break new ground in energy trading between small generators and communities / fuel poor individuals. It needs a whole country approach to add value to the energy we generate and retain more of the benefit at a user level. The National Trust are currently working with others to develop a 'Sleeving' mechanism to do just this. But there is so much more opportunity in Wales

8.4. The changes in NRW are having a very immediate and negative impact on renewable energy sector in across Wales. W G need to address this quickly in terms of clarifying roles and responsibilities, ensuring greater clarification on economic development role for the new body and establishing a quality management process in NRW service delivery

8.5. The Electricity Grid in Wales is very patchy in terms of capacity and quality. The WG has a n important role to play in assisting where it can with levers such as RDP resources to target capacity issues blocking renewable energy generation in large areas of Wales. WG has a role to play with the two District Network Operators who are developing multiple billion pound local grid overhauls. Value could be added in considering local generation in the roll-out plans. A more immediate role for Welsh Government is to engage with the DNO's to improve quality of service to developers. This includes timely responses and work. Consistent advise and costs across the two DNO's. Encourage the DNO's to have a more active role in realising the economic potential in local renewable energy generation

8.6 The WG role in education and training of renewable energy is to be applauded. This is laying the foundation for the development of renewable energy generation. But if the patchy and sometimes contradictory approaches highlighted above continue, Wales will not be a good place to grow companies, manufacturing and sustainable energy

Summary of potential, costs and impacts

Annex 1

An array of data suggest that perhaps up to 30% of electricity and other energy sources could be saved by better management and insulation.

A useful format for addressing the issues is to consider major 4 areas:
[1] Electricity – generation, distribution and use
[2] Space heating - household, office and commercial
[3] Transport – cars, buses, trains.
[4] Industrial demand.

In each of these sectors increasing energy use efficiency and minimising current waste and future increase in demand by good design and regulation must be prioritised. A 30% saving is equivalent to ~30TWh, equivalent to the outputs of four Wylfa A or four Aberthaw power stations. For comparison the projected Hinckley C nuclear power station is anticipated to have a 3.2 GW capacity at a cost of >£14billion, and produce at a load factor of say 80%.

[1] Electricity - Current use of ~17TWh can be reduced by better efficiency [minus 20% = 3.4TWh] but electricity usage will increase because of the electrification of transport and space heating by ground and air source heat pumps. (Electric cars use some 15kWh per 100km compared with an average conventional car using 68kWh per 100km; see Mackay). Therefore 100% electrified cars should reduce energy demand by x 4, although at a significant capital cost. Based on an estimate that cars use about 2/3rd of the transport energy, then the energy for the car sector would reduce transport sector energy

of 23TWh by perhaps 11TWh. Taking into account, crudely, these changes then it can be suggested that electrical supply should rise by about 4TWh for cars to about 21TWh. The demand impact of heat pumps etc. is factored into earlier estimates.

(Note that an installed capacity of 1GW would, with a 100% load factor, produce 8.7TWh per year so equal to an installed capacity of > 3 to maybe 10 GW depending on the ave. 70% load factor =. *Not sure what the point is here.*

[2] Space heating – if it is assumed that 37kWh/day is required for all heating (see Mackay p 53), with 3 million population we use 40.5TWh annually. Insulation should decrease requirement by 30% [-12TWh]. Better insulation opens the way for efficient heat pumps. As discussed below, other options include local community-based heat schemes and wood fuel and renewable gas from anaerobic digesters. A rough and conservative estimate suggests that 400,000ha of woodland as is WG policy by 2030 should produce sustainably 1million cu. meters per year of timber which, dried, would equate to 3.7TWh. All new build should be near carbon zero.

[3] Transport – Current use about 23TWh in 2010. As indicated above for electricity use for cars, energy use could be reduced by 11TWh by [a] a 20 year programme to bring EVs and H_2 vehicle and engines, the latter generated by renewable energy. Even with grid electricity for charging electric cars, the effective emissions are about 100 g CO_2/km, and with decarbonisation of electricity generation, the emissions would be even less. [b] This should be combined with a clear Spatial Plan to reduce commuting, encouragement for children to walk or cycle to school, and increased use of video link/ teleconferencing and more local supply chains etc.

[4] Industrial demand – Current (2010) use is recorded as 47TWh. There are fiscal pressures to reduce energy costs but this remains a very difficult area. Refinery energy use would drop with decarbonisation of energy. It seem likely that carbon capture as currently being piloted in Norway will be essential for some major industrial processes such as refineries and steel works

Re-energising Wales

- In 25 years the World and Wales must re-configure and re-engineer its energy supplies to a zero carbon format.

- There are no simple or cheap solutions; every possible energy source has its own advantages and disadvantages.

- However, as Wales has substantial and varied *per capita* on- and off-shore renewable energy resources, this global challenge offers us the potential to re-energise our economy, much as coal energised Victorian Wales when "Coal was King", Cardiff its Queen and Rhondda its workhorse!

- WG figures show we use, internally, ~100 TWh of energy annually in all forms of which only about 20% is as electricity: these figures does not including embedded energy in our imports, most travel and much food etc. Assuming an average of 10p per KWh this equates to an annual outlay of £10billion. (TWh = 10^{12} or a million-million Watt hours)

- Our use of energy is profligate (equivalent to 4 one-bar electric fires burning continuously day in day out to sustain for each of us).

- The major priority must be to increase energy use efficiency and reduce our total national energy use to ~60-65 TWh a year without increasing imported embedded energy!

- This requires much better space insulation (stronger new build regs. and retro-fitting to existing building including ~1.2m homes), rapid move to x3 more energy-efficient electric vehicles (EVs), adoption of ground- and air-source heat pumps in well-insulated buildings, adoption of energy efficient lighting and other goods, integrated, efficient, electrified, or possibly H_2 fuel-cell based, public transport and railways e.g. Cardiff-Valleys Metro, encourage walking and cycling especially to school, much improved spacial planning to minimise commuting etc.

- Several EU countries have ambitious energy saving targets; so should Wales.
- Of the ~60-65 TWh of energy required in 2035 a large proportion, perhaps up to 40TWh, will be as electricity and the remainder mainly heat.

- The basic question is therefore reframed as:- **over 20 years can Wales pursue a economically viable strategy for a ~35% decrease in energy use and the generation of ~40 TWh of zero-carbon renewable energy and ~20TWh of heat energy?** (NB. The food chain will use up all our residual carbon/Green House Gas allowance).

- The available data suggest strongly the answer is **yes** and consequently there is no compelling case for massive public investment in high-risk nuclear electricity and/or fracking etc.

- In this forum it is not possible to consider the options in any detail. M**y main recommendation, which I hope will be endorsed and pursued by this conference, is that the IWA should urgently seek the resources to set up a small task force of independent experts covering all the relevant physical, technical, engineering, economic and social aspects to assess the potential and come up with a detailed, costed, timed plan.**

- Since the renewal resources are varied, dispersed and locality-dependent, they offer great scope for community and personal enterprises throughout Wales that will yield local economic gains.

- Thousands of dispersed generating units also require the development of smart, local, nested grids and re-assessment of the approach of and to the DNOs. In Germany there is a move to the municipalisation of the local grids. This should be explored.

- While some of the renewable energy resource e.g. the large marine tidal lagoons demand on large infrastructure projects, there is merit in developing thousands of small schemes throughout Wales i.e. an emphasis on dispersed community and individual generation. This required a reappraisal of planning obstruction and guidance cf. Scotland. Local energy

schemes offer the prospect of long term fiscal flows into communities and catalysing local enterprises as well as job creation.

- The approach is very different to the classical "CEGB model" of centralised generation, dispersal, control and ownership which means a decadal transfer of profits abroad and bleeds resources from communities. The dispersed model also implies a shift in the relationship between people and energy and much greater individual and local responsibility.

- In summary: the re-energising strategy has four components:
  [a] an integrated effort to save energy and lower energy demand, which will also improving life styles, and health etc.,
  [b] the promotion of renewable energy resources, especially but exclusively, dispersed locally-owned generation,
  [c] local, nested smart grids and
  [d] development of electricity storage capacity in batteries, pump storage and maybe, in time as hydrogen storage for fuel cells.

- This 20-year strategy is potentially transformative for Wales, economically, socially and environmentally, and will create a large number of jobs in urban and rural areas and a much more resilient, self-reliant and dynamic society for the low carbon age.

- Through personal engagement, hopefully people must be encouraged to be more aware of the options open to them, if catastrophic social and environmental changes are to be avoided, and that constructive solutions are available.

- Just as the City of London and south-east England exploit their comparative advantages of financial muscle, political power and geographic location, we in Wales must leverage our own comparative advantages. One of these is our range of renewable energy resources.

Appendix: Sources of renewable energy etc:

A. Electricity:

Wind: Off shore wind turbines
Terrestrial wind turbines
Solar: Photo-voltaics
Biomass: (Undesirable as it's much more efficient to burn directly for heat -conversion to electricity incurs >60% loss)
Hydro electricity: Small sale hydro
Retrofit existing large reservoirs
Small new reservoirs
Pump storage – no net gain but to store surpluses
Marine: Tidal lagoons - depend on tidal rise and fall
Tidal flow - essential water mills
Wave energy?
Geothermal: [improbable in Wales]

B. Heat:
Biomass; sustainable local wood
Ground, air and water source heat pumps: use electricity by 3 fold increase in efficiency.
Methane from AD plants:
Solar heating: mainly water

C. Electricity storage

Pump storage as in Dinorwig and Ffestiniog
Local battery storage.
Use of the batteries of Electric vehicles (EV's) as storage systems.

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Highview Power Storage (Saesneg yn unig)	Response from Highview Power Storage
SEFW 21	SEFW 21

National Assembly for Wales Consultation

A Smarter Energy Future for Wales?

A Highview Power Storage response

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HIGHVIEW
POWER STORAGE

Highview Power Storage (HPS) welcomes the opportunity to respond to this consultation. HPS is an award winning, UK based energy technology company focused on a cleaner, more efficient and secure energy future. HPS has developed a proprietary energy storage technology that uses surplus electricity, at times of low demand/low cost, to make liquid air, which can be stored and released later to generate electricity at times of high demand/high cost.

HPS technology uses proven components from the industrial gas and power generation sectors, is unconstrained geographically, uses no exotic/rare materials and produces no harmful emissions. It has the potential to provide a large scale, long duration solution to the challenges to the electricity supply chain associated with increased intermittent low carbon generation and low carbon technology.

The energy mix

How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

Answer:

What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

Answer: No Comment

The grid

How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

Answer: No Comment

What changes might be needed in terms of ownership, regulation, operation and investment?

Answer: Energy storage (ES) could make a significant contribution to electric power systems by providing benefits across the entire value chain. To date, the deployment of ES has been limited, in part, due to the current electricity market structure and regulation.

The main problems identified in projects such as the Smart Network Storage project ran by UK Power networks are the following:

1. Undetermined asset class for ES as such and unbundled electricity system limiting stakeholders, in particular distribution and transmission system operators, from appropriating ES benefits. Currently ES is classified as a generation asset limiting the ability of Distribution System Operators (DNO) and Transmission System Operators (TSO) to recover investments in this type of assets. This issue has been raised at European and International level and some progress has been made in the state of New York. Distribution Utilities will be allowed to own storage systems that are located on utility property and meet the following criteria - they must be integrated into the distribution system architecture and used to enhance overall grid reliability and integration of increased levels of distributed energy resources.

   The proposed change in regulation is the creation of a separate asset class for ES and associated rules for regulated and competitive operations.

2. The lack of ES deployment experience results in the absence of common standards and procedures for evaluating, connecting, operating and maintaining ES. This in turn results in barriers to the deployment of storage.

   Integrating the findings of energy storage demonstration projects in codes and standards and furthering the knowledge and experience on ES assets is a necessary step to streamline its deployment.

Additional barriers to the deployment of storage as presented in a paper published in 2014 by Anuta[1] et al. are the following:

1. Renewables integration policies. No benefit for controlled and dispatchable RES.
2. Transmission and distribution use charge, tax exclusions and renewable energy subsidies
3. Energy storage not being considered as a renewable energy source (RES) under RES targets

Storage

How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

Answer: In general terms, the marginal costs associated with the integration of renewables into the energy portfolio of a power system increase with the share of renewables. The Potsdam-Institute for Climate Impact Research analysed the impact of wind integration on the levelised cost of energy (LCOE) of a power system as a function of the final share of wind in the energy portfolio. The study was based on the German power system where the penetration of renewables is among the highest in the world, but the study is applicable to other countries. As can be seen in **Error! Reference source not found.** below, the LCOE of wind remains constant at €60/MWh and is labelled as Generation costs whereas Integration costs increase proportionally with the share of wind. Integration costs are divided into Profile costs, Balancing costs and Grid costs and account for variability, uncertainty and location-specificity respectively. Profile costs are associated with over generation and the need to cycle base load power plants. Balancing costs are associated with the costs incurred by the Power System Operator to keep the balance between power supply and demand. Finally, Grid costs are associated with grid reinforcement costs. The dashed line and shaded area reflect short-term integration costs before the power system adapts to the deployment of higher shares of variable renewable energy sources.

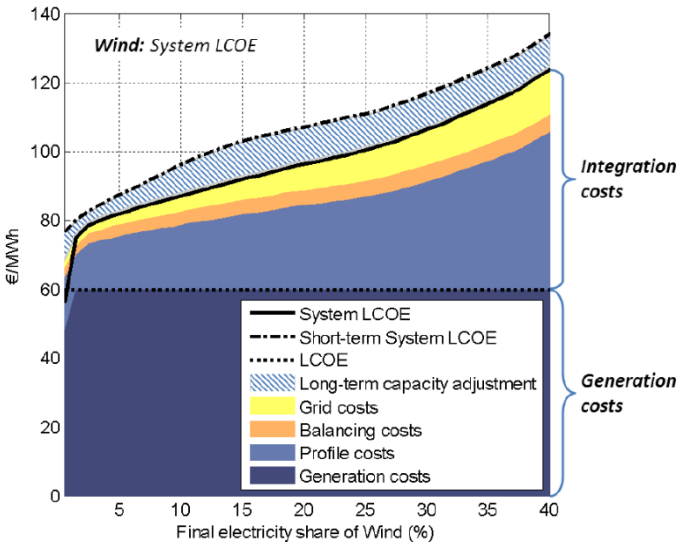

Figure 1. Source: Ueckerdt Falko , Hirth, Lion (2012): "System LCOE: What are the costs of variable renewables?" , Potsdam-Institute for Climate Impact Research.

Energy storage (ES) can be used to reduce Integration costs. In California, where the share of renewables is significant and Profile costs associated with the integration of solar PV are expected to be significant by 2020, the regulator has required investor owned utilities to procure 1.3 GW of ES for

[1] "An international review of the implications of regulatory and electricity market structures on the emergence of grid scale electricity storage"

different applications. These include network reinforcement deferral, which is seen as a cost effective alternative to traditional reinforcement. The procurement mandate requires that ES projects be evaluated based on a cost benefit analysis. This implies that the benefits that a storage system can generate are as important as its costs. *Table 1* presents the levelised cost of energy for a range of ES technologies for power and energy intensive applications as presented in a study[2] supported by the European Commission.

Overview of technology LCoEs for power- and energy-intensive applications
EUR/MWh

	Power-intensive application example (1 h of storage)				Energy-intensive application example (8 hrs of storage)				Long-term storage (2,000 hrs of storage)
	2013		2030		2013		2030		2030
	Low	High	Low	High	Low	High	Low	High	Low
Li-ion	138	573	38	106	181	754	76	218	1,000s
NaS	n/a	n/a	n/a	n/a	196	269	42	68	1,000s
Flow-V	155	238	57	97	148	239	50	96	1,000s
Lead	211	379	59	110	114	262	39	98	1,000s
CAES-A	27	n/a	19	n/a	49	n/a	37	n/a	1,000s
LAES-A	40	82	32	66	71	166	57	133	1,000s
PHES	18	28	18	28	24	42	24	42	>400
P2P H_2	Electrolyser and CCPP with salt cavern storage considered for P2P H_2 – suitable for longer-term storage								140

SOURCE: LCoE model; ISEA RWTH 2012: Technology overview on electricity storage; coalition input

Table 1

As can be seen, Pumped Hydro (PHES) and Compressed Air Energy Storage (CAES) exhibit the lowest LCOE but these are geographically constrained, which might limit their ability to appropriate the value they generate. By looking at the results of a study[3] undertaken by Imperial College, presented in *Figure 2*, it is clear that a significant proportion of the value created by storage is related to savings in Distribution CAPEX (i.e. grid reinforcement investment deferral), especially by 2020, so it's evident that location will play a key role in the financial viability of an ES project. On the other hand, the LCOE of batteries such as Lithium-ion (Li-ion) is significantly higher. This is due to the costs incurred every time batteries are replaced, which are a consequence of electrochemical degradation. This is affected by how often the battery is used and is worsened if the battery is fully discharged every time it is used.

[2] Commercialisation of Energy Storage in Europe. Available online at: http://www.fch.europa.eu/publications/commercialisation-energy-storage-europe

[3] Imperial College, 2012. "Strategic Assessment of the Role and Value of Energy Storage Systems in the UK Low Carbon Energy Future"

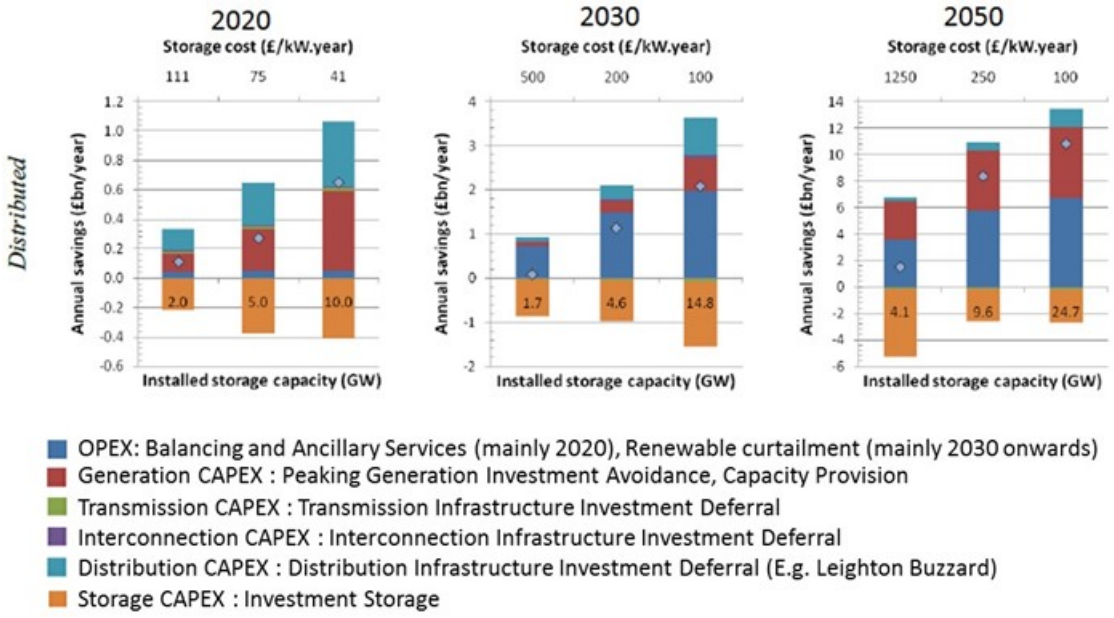

Figure 2

A Liquid Air Energy Storage (LAES) system can be located where required and because it doesn't use toxic materials, this can be achieved near demand centres where it can monetise the value it generates across different layers in the network.

Ownership

To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

Answer: No Comment

Energy efficiency and demand reduction

How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?

Answer: No Comment

What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

Answer: No Comment

Communities - making the case for change

How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy?" Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

Answer: No Comment

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	Smarter energy future for Wales?
Ymateb gan Tidal Lagoon Power (Saesneg yn unig)	Response from Tidal Lagoon Power
SEFW 22	SEFW 22

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

TIDAL LAGOON POWER

The Committee Clerk
Environment and Sustainability Committee
National Assembly for Wales
Cardiff Bay, CF99 1NA.

Sent by email to SeneddEnv@Assembly.Wales

4 September 2015

Consultation: A Smarter Energy Future for Wales

Tidal Lagoon Power aims to drive a critical change in the UK's energy mix by developing infrastructure to harness natural power from the abundant natural resource of the rise and fall of the tides.

We welcome this consultation as an opportunity to be involved with considerations on policy for a smarter energy future for Wales. Tidal lagoons could significantly contribute to a smarter energy future in Wales by generating secure and affordable low carbon energy while providing a diverse range of direct and integral economic, social and environment benefits. The Tidal Lagoon Swansea Bay project establishes a scalable blueprint for tidal lagoons, a proof-of-concept for a series of lagoons, marking the beginning of a new industry.

Our intention is to deliver a UK fleet of 6 tidal lagoons to deliver:

- Low carbon electricity - equivalent to 8% of UK electricity or 30% of UK homes, secured within a decade;
- Energy security - reliable, home-grown and near continuous power supply from proven technology, lasting 120 years;
- Affordable energy – the lowest generation cost of all electricity for the 85 years following the investment period (with a lower support cost than most low carbon electricity, with larger lagoons generating cheaper power).

There is the potential for 4 tidal lagoons to be in Wales.

How Wales is able to realise the potential of tidal lagoons and the associated industry is a matter we have been invited to address at inquiry by the Enterprise and Business Committee on 'Developing the Potential of the Maritime Economy for Wales'. The Environment and Sustainability Committee may wish to consider our forthcoming evidence to the Enterprise and Business Committee, and consider recommendations to improve co-ordination across policy areas such as economy, energy, and environment to facilitate and support timely delivery of infrastructure to achieve a smarter energy future for Wales.

Tidal Lagoon Power Ltd Registered in England and Wales No. 08163334 Registered Office: Hilton & Lucy House, Merchants Road, The Docks, Gloucester GL2 5RG Tel 01452 303 892

www.tidallagoonpower.com

Development of energy policy initiatives could help support the realisation of innovative energy-smart opportunities that tidal lagoons could deliver. Also, we are investigating how future tidal lagoons in Wales could contribute to energy smart businesses, towns and regions, through opportunities such as public and community investment and/or ownership, local energy supply options. We would encourage the Committee to consider options to identify and overcome barriers to public and community investment and/or ownership, and local energy supply options, without undermining the investment interest necessary to deliver strategic energy infrastructure.

Our main focus at this stage is to finalise the agreements necessary to start construction and to deliver the Tidal Lagoon Swansea Bay project. Nevertheless, we welcome the Committee's focus on energy policy in Wales in advance of the next Assembly. We want to continue to work with the Welsh Government and the National Assembly to progress the delivery of Tidal Lagoon Swansea Bay and future tidal lagoons in Wales, and to work together to understand and to realise the significant potential for tidal lagoons to contribute to a smarter energy future in Wales.

Please contact me at catrin.jones@tidallagoonpower.com or 07867129796 if you have any queries or wish to discuss further.

Yours sincerely

[redacted]

[redacted]

Tidal Lagoon Power

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Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	Smarter energy future for Wales?
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Cynulliad Cenedlaethol Cymru
National Assembly for Wales

RESPONSE TO WELSH GOVERNMENT CONSULTATION ON A SMARTER ENERGY FUTURE FOR WALES

September 2015

WLGA • CLlLC

INTRODUCTION

1. The Welsh Local Government Association (WLGA) represents the 22 local authorities in Wales, and the three national park authorities and the three fire and rescue authorities are associate members.

2. It seeks to provide representation to local authorities within an emerging policy framework that satisfies the key priorities of our members and delivers a broad range of services that add value to Welsh local government and the communities they serve.

3. The WLGA welcomes the opportunity to contribute to the development of an energy policy for Wales within the next Assembly and beyond, in the context of meeting Wales' commitments to contribute to the prevention of global average temperatures rising more than 2° Celsius.

General

4. The approach to decarbonising our energy system in Wales must not just consider the environmental issues but also the social and economic issues. A considered, structured and programmed approach is necessary , too rapid an approach could have significant impact upon the social and economic well-being of Wales as a whole, too gradual an approach although more socially and economically beneficial would be detrimental to the environment and the achievement of the required targets.
5. The approach needs to be considered in respect of the 'energy hierarchy': do not waste energy; reduce the consumption of energy; generate energy from renewable sources; if carbon fuels are the only resort ensure utilise low carbon technologies.
6. An energy strategy needs to be to 2050 (or beyond) with clear and distinct decadal targets working back from 2050 to the present. This will give a clear statement of intent and will provide clear milestones that need to be reached by when.

Energy mix

Q1: How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

7. It should be noted that with regards to carbon emissions there are implications associated with the fact that energy generation is a not fully devolved function.

Furthermore, carbon emissions need to be apportioned to reflect that not all of the energy generated in Wales is consumed in Wales.

8. Encouraging innovative and energy saving developments in manufacturing processes can have multiple benefits of making the processes more energy efficient thereby reducing the demand for energy but also, in these times of austerity reducing the production costs and reducing the energy bills for the industry.
9. Further innovations should be sought in technologies to reduce the need to have household electrical goods on 'standby'

Q2: What mixture of distributed generation resources best meets Wales' renewable energy needs in respect of the supply of a) electricity, b) gas, and c) heat?

10. There is a strong case for looking at local resilience but maintaining a balance between a UK distribution grid and a local generation and distribution pattern.

The Grid

Q3: How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

11. Local renewable energy schemes have been thwarted by the prohibitive costs associated with initial connections to the grid.
12. The major energy companies have a stranglehold on the market place and do not make it easy nor advantageous for local renewable schemes to feed in to the grids /distribution networks, especially with declining Feed-In-Tariffs.

Q4: What changes might be needed in terms of ownership, regulation, operation and investment?

13. Encourage and facilitate more local ownership as has been illustrated by the Energiewende scheme in Germany which enables communities to easily access loans to invest in community energy schemes. The big energy companies do not have a stranglehold on the market.
14. The Assembly could invest in spurs/connections to the grid and identify a given number of community/renewable energy schemes which would all be required to pay the same fixed connection fee to ultimately pay back the Government investment.

Storage

Q5: How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

15. By developing the public/community ownership – if the majority of energy production rested with the local schemes with the 'slack' being taken up by the major energy companies with a greater capacity to flex production up and down.
16. The use of hydro-storage techniques whereby excess energy is used to pump water to higher ground reservoirs to then be released and 'regenerate' the energy through hydropower generation and gravity.
17. More remote locations generating energy by wind-power could charge batteries when production is high; the batteries could then be transported to supplement need elsewhere.

Ownership

Q6: To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change.

18. Smaller, local communities' ownership of energy generation can enhance the understanding and responsibility of the members of the community towards energy and its use leading to more awareness and consideration of the value of energy efficiency. The Isle of Eigg in Scotland is an illustration how a community accepts the responsibility to be energy efficient and considerate.

Energy Efficiency and demand reduction

Q7: How can the planning system and building regulations be used to improve the energy efficiency of houses (both new and existing stock)?

19. The National Assembly must be stronger and determined to address this energy and emissions issue head-on with higher energy efficiency standards and stick to them in order to meet the decadal targets.
20. Investment by the Assembly in energy efficiency measures in current housing stock could reduce energy wastage and provide employment.
21. Consideration should be given to include heat source and other sustainable energy generation techniques in the planning and design of new properties and developments. Encouraging the use of renewable technologies and future-proofing

properties. New developments could ensure that the south facing aspect of all the properties utilises solar power in the most efficient way possible.

22. It is essential that Welsh Government is aware of and keeps up-to-date with technological advances to include in the design for new build [e.g. photovoltaic blocks on driveways which generates energy (stored in batteries) when the car is not there and the energy could be used to recharge an electric car when it is parked].
23. Consideration could be given to a whole house approach to planning applications for extensions. For example, it is recognised that there is energy loss from conservatories, perhaps compensatory actions can be taken within the rest of the house to mitigate any losses.
24. Real-time feedback technology can enhance awareness of energy use or abuse by the householder which can be rectified in real time, encouraging behaviour change.

Q8: What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (E.g. Passivhaus or Energy Plus)

25. This would ensure that the environmental impact would not get any worse, however this would not in itself bring about an improvement if the existing (majority) housing stock is not improved to the same higher energy efficiency standards. The same could be applied to the social situation.
26. As mentioned at the beginning the speed with which these changes are introduced can have a significant impact upon the social, economic and environmental well-being of Wales

Q9: How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy? Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

27. Already answered in previous responses.

Neville Rookes

Policy Officer - Environment, Welsh Local Government Association
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www.wlga.gov.uk

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
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Cyfoeth Naturiol Cymru
Natural Resources Wales

National Assembly for Wales

National Assembly for Wales: Environment & Sustainability Committee Inquiry
'A Smarter Energy Future for Wales?'

Written Submission by Natural Resources Wales

This document sets out the response from Natural Resources Wales on the consultation by the National Assembly for Wales' Environment and Sustainability Committee to inform their inquiry into 'A Smarter Energy Future for Wales?'

The role and Purpose of Natural Resources Wales

Our comments are provided in the context of our purpose to ensure that the environment and natural resources of Wales are sustainably maintained, sustainably enhanced, and sustainably used.

Natural Resources Wales has a wide range of roles in securing `A Smarter Energy Future for Wales` – as an advisor, regulator and land owner and manager. These include;

- Our statutory duty in relation to permitting a wide range of energy facilities. The details of this permitting role vary according to the particular types of facility in question – ranging from nuclear power stations to small-scale hydropower schemes.
- We are a statutory consultee in the Nationally Significant Infrastructure Planning process and in relation to development management applications, which includes commenting on master plans where these are produced.
- We have a statutory duty in relation to designated sites, which includes assessment of activities that might have an impact on those sites.
- We can provide advice and guidance to business before any formal applications for planning consent or operating permits.
- We also provide impartial advice and evidence to the Welsh Government and UK Government within an overall energy policy and planning framework
- As an environmental regulator, in order to minimise environmental impacts and prevent harm to human health, we regulate many of the environmental impacts which can result from energy generation, transmission and consumption.
- NRW is the competent authority for three carbon trading schemes; the CRC Energy Efficiency Scheme, the EU Emissions Trading System (EU ETS) and the Energy Savings Opportunity Schemes (ESOS).
- We own land in various parts of Wales where energy development may take place. We also manage the Welsh Government Woodland Estate (WGWE) where we encourage renewable energy production such as windfarms, hydropower, solar and biomass.

Main points

Natural Resources Wales acknowledges that Wales has a considerable resource potential in relation to low carbon energy generation including tidal and marine energy, hydro, solar and onshore and offshore wind. Promoting renewable and low carbon generation opportunities can

help contribute towards green growth in Wales creating jobs, contributing to energy security and to the reduction of carbon emissions.

We are committed to work strategically with developers and decision makers to help identify opportunities to enable the right development in the right locations.

In the context of meeting Wales's commitments to contribute to the prevention of global average temperatures rising more than 2° Celsius and the need to enhance energy security in Wales, Natural Resources Wales believes that energy policy in Wales needs to;

- Provide strong leadership on demand management, renewable/low carbon generation and storage.
- Incentivise developments through targets and funding.
- Consider the revision of existing strategies to enable a 40% emission reduction by 2020.
- Encompass goals and strategies for the short term (to 2020), mid-term (to 2030) and long term (to 2050) involving a continuous reduction in fossil fuel use, while recognising its contribution to energy security for Wales.
- Recognise different approaches are needed in Wales for large projects which deliver 'big hits' in climate change and energy security issues and smaller projects which help with issues necessary to help secure the support of civil society such as energy efficiency and behaviour change.
- Integrate investment in renewable energy infrastructure with investment in future grid provision at a national Wales scale and, locally, with distributed energy generation and heat systems, including smart grids.

We expand on these points below in response to the specific questions asked in the consultation.

1. The energy mix

1.1. How can we decarbonise our energy system at a sufficient pace to achieve the necessary reductions in emissions?

We believe that to decarbonise our energy system at pace we must ensure the right frameworks and incentives are in place. We have in place in Wales a national collaborative approach to support infrastructure investment, a policy and legal framework that allows us to manage our resources in a joined up way, a planning system focused on providing positive planning to enable the right development in the right place and the establishment of Natural Resources Wales as a single point of contact for environmental regulation and advice.

Specifically the Climate Change Strategy published by Welsh Government in 2010 sets out measures to achieve annual emission reductions of 3% pa within sectors with devolved competence from 2011 onwards. This has been strengthened by the Environment (Wales) Bill, which will put in place statutory climate change target and carbon budgeting to help drive further action on climate change, with the aim for at least 80% target reduction by 2050. In 2012 and 2013 the annual emission reduction targets have been met but with current policies it is anticipated that it will not be possible to meet the associated Welsh Government target to reduce overall Welsh emissions by 40% by 2020. We therefore recommend that in Wales we regularly undertake a stock take of policy and strategies to help meet the 40% emission reduction by 2020 and to ensure that Renewable and Energy Efficiency targets help deliver their part.

In this context it would be beneficial for Wales to have short, medium and long term energy and climate change targets supported by clear strategies and roadmaps. This would provide an opportunity to regularly review and revise the strategies in place as and when required in the short term whilst working towards the achievement of the long term goal. We understand that this is an

approach developed in Denmark[1] where currently 34% of electricity consumption is wind generated. Short term and long term goals would also provide the opportunity for Wales to plan based on the increased devolved powers with Welsh Government gaining consenting powers for onshore and offshore energy developments up to 350MW. In this context, the new National Development Framework under the Planning (Wales) Act 2015, a review of Planning Policy Wales and the spatial TANs together with the emerging Wales National Marine Plan could help provide new areas suitable for the large scale energy generation that is much needed for energy transition in Wales.

This needs to be supported with a set of scenarios providing clear information to all involved to make informed decisions. Welsh Government has captured elements of this through their recent Green Growth Wales; Local Energy which outlines action plans for the next 12 months to achieve their vision of helping communities and businesses using locally generated electricity and heat from a range of renewable installation, to supply local demand and to minimise our dependence on central generation.

It should be recognised, however, that the current economy is dependent on fossil fuel and that there will be a need to manage a transition to low carbon energy to avoid enormous consequences. In our view short term strategies should help address issues like loss of revenue (loss of tax from fossil fuel) , transition on existing infrastructure (building & transport), development of skills (to support any target we set for renewable energy), and economy.

In addition to the policy and legislative framework the finance element is key in moving Wales towards a low carbon economy. For instance, our discussions with wave and tidal energy developers, have highlighted the availability of finance for initial technology development as one of the greatest difficulties affecting the deployment of offshore renewables (offshore wind, wave and tidal stream, tidal range). The ability to secure income from energy generation tariffs over the long term is also less certain since the Contracts for Difference (CfDs) arrangements replaced the relative predictability of Renewable Obligations Certificates (ROCs).

1.2. What mixture of distributed generation resources best meets Wales' renewable energy needs in respect to the supply of a) electricity, b) gas, and c) heat?

While we are not in a position to comment on the mixture of distributed generation sources that best meets Wales's renewable energy needs, we seek to advise and to find the most balanced solution to help develop the right technology in the right place. We aim to be involved in the early stages of projects to support a solutions based approach to the development of distributed energy generation to help optimise benefit for Wales.

NRW has a key role to help facilitate onshore wind development and grid connection on the Welsh Government Woodland Estate (WGWE). This will also help demonstrate how a distributed generation system would operate together with its potential benefits. We are currently working with Renewable UK Cymru to develop the Energy Park concept in Wales. This approach aims to optimise the renewable energy opportunities on the WGWE. We are looking to manage such areas profitably by integrating development of wind, solar and hydro power, biogas units, heat pumps, anaerobic digesters and other emerging renewable technologies. The concept is founded on encouraging developers to provide the investment in grid infrastructure to an area and other projects to be invited in.

We also recognise that the significant marine energy resource around the coast of Wales (wave, tidal stream and tidal range) has the potential to contribute significantly to the mix of renewable energy needs. We recommend that a strategic assessment for tidal range is undertaken to

[1] http://www.ens.dk/sites/ens.dk/files/policy/danish-climate-energy-policy/our_future_energy.pdf

understand the overall implications and how best to deploy multiple projects across Wales. For wave and tidal stream, the successful (and sustainable) development of the two demonstration zones, in Ynys Mon and Pembrokeshire, is crucial and we believe this should be a focus of effort from government, regulators, and advisors in the short to medium term.

2. The grid

2.1. How does the grid distribution network in Wales enable or restrict the development of a new smarter energy system?

In our experience, from a marine energy perspective, grid appears to be less of a constraint to renewable energy development in Wales than elsewhere in the UK. For example, although there appears to be significant activity in Scotland, this has largely been non-grid connected or very small scale demo projects. Larger consented projects or those with Crown Estate seabed leases (e.g. in the Pentland Firth) have not resolved grid issues and so timetables for deployment are yet to be determined. Whilst access to the grid distribution network remains an issue in Wales, our view is that the solutions are likely to have a lower cost than in Scotland, which will have implications for the pace and scale of development we could see.

On land, however, the limited capacity in the north and south and the lack of significant transmission networks in mid Wales is a significant constraint to development. In order to realise any large scale renewable energy potential in Wales, strategic improvement, planning and investment in the network linked to opportunities is needed. This will reduce one of the main constraints to development and encourage a greater range of renewable energy projects.

It is also important to recognise for long term purposes, in order to maximise renewable energy, we need smart and sophisticated overall grid management which must be supplemented with the financing element on how the grid would be managed. We see value in running a smart grid pilot project such as the Smart City Kalundborg in Denmark[2], a three year project which represented an innovative approach to deepening the connection between smart grids and smart cities. The project also reflected the uptake and innovation in demand side management and provided a pathway for transition.

2.2. What changes might be needed in terms of ownership, regulation, operation and investment?

At the community and local level in order to encourage more use of localised renewable energy, ownership and uptake of energy efficiency there needs to be;

- More financial support and incentives. For instance, priority to grid access for any renewable generated with a fixed return rate for duration of time. This should be supplemented with subsidies for installing renewable energy technology.
- Communications strategies to help reach the public on their own terms with a strong focus on information and advice.
- A simplified, streamlined and transparent planning and regulation process.

At the national level we feel that there is a need to;

- Better integrate the strategic planning of energy generation with the strategic provision of grid and other distribution networks tailored to the strategic needs of Wales.
- Continue to simplify and streamline the planning and regulation process with public support and acceptance as new evidence and information arise.

[2] http://ses.jrc.ec.europa.eu/smart-city-kalundborg

- Continue to develop a coordinated approach between policy makers, industry, community, regulators, and advisors based on a ‘no prejudice’ approach in the initial planning stages. This would ensure that the full range of expertise is deployed to secure the right development in the right place.

3. Storage

3.1. How can energy storage mechanisms be used to overcome barriers to increasing the use of renewable energy?

In our view energy storage is technologically and economically viable and has great potential to enable the transition to secure, low carbon energy systems.

From the operational view energy storage could take place at many different scales. On the bigger scale pumped storage schemes like the Dinorwig power station in North Wales play a key role from an energy security perspective.

On a smaller scale, which could be coupled with energy efficiency methods, shifting energy demand by using smart appliances, batteries and heat storage have valuable roles to play. The use of electric cars that could be charged overnight at times of excess generations and charging stations in strategic locations which still allow the long car journeys is also a good solution. As transport still accounts for around 38% of the UK energy consumption (2014 figures)[3], addressing storage issues (coupled with sustainable transport measures) for this sector would be beneficial for energy transformation.

There is also great potential for demand management measures to help balance supply and demand. In this context we welcome the launch of Resource Efficient Wales in October 2014 as a single point of advice on energy, waste and water resources.

In essence, demand management could help avoid the need to scale overall power generation capacity according to peaks, which may be relatively short in duration. In this context it would be useful to explore the role of an `energy hierarchy', driven by carbon intensity and resource use, to provide an effective framework to guide energy policy and decision making. The Scottish Government has, for example, made reference to such a hierarchy in its `Energy Efficiency Action Plan`[4]. The Scottish Environmental Protection Agency (SEPA) was also explicit in their Energy Position Statement[5] on how an energy hierarchy offers an effective framework to guide energy policy and decision making.

4. Ownership

4.1. To investigate the desirability and feasibility of greater public and community ownership of generation, transmission and distribution infrastructure and the implications of such a change

Although there are a number of studies in the UK on the public perception of renewable energy / low carbon technology and engaging the public with the whole energy system[6], we think there is value in conducting a Wales specific study. This may help provide a more precise picture of the public's attitudes and opinion on different types of technology and location.

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[3] https://www.gov.uk/government/collections/energy-flow-charts
[4] Conserve and Save: The Energy Efficiency Action Plan for Scotland, Oct 2010
[5] SEPA's Energy Position Statement
[6] UKERC, Transforming the UK Energy System: Public Values, Attitudes and Acceptability
- Renewable Energy and the Public: From NIMBY to Participation, Devine-Wright, P. 2011
- Public Perceptions of Renewable Energy Technologies, Challenging the notion of Widespread Support, Demski, C. 2011

It is likely elements of this could have been captured and collated in the recent 'Wales We Want' study. The simple fact that the report[7] found that climate change was considered the single most critical issue facing future generation, highlights the urgency for energy transformation and the need for the public to be involved in these decisions.

From our own experience, not taking the public values and opinion into decision making has often resulted in the resistance to the energy (technology) transformation and conflicts. This was obvious in relation to micro-hydro projects[8] in Wales which concluded that in several sites/cases without the personal passion and belief of the individual developer in each cases it was unlikely that the projects would have gone ahead.

From NRW's recent experience of dealing with hydropower and onshore oil & gas activities (and other similar activities), our key reflections are;

- People and communities are willing and capable of engaging in energy (technology) transformation if we provide early public engagement and the opportunities for different perspectives and knowledge as part of the discussion. Some elements of this are reflected in the planning and permitting process.
- The communication strategies and methods are also key in the process to ensure the public has a clear understanding of the process, roles, impacts and benefits.
- There is a need to make clear how current and proposed changes to the energy system fit in the short and long term.
- Finally, actions and decisions should be transparent and clearly communicated.

5. Energy efficiency and demand reduction

5.1. How can the planning system and building regulations be used to improve the energy efficiency of houses (both new build and existing stock)?

To a great extent we feel that the changes to the planning and regulation frameworks introduced by the Planning (Wales) Act 2014 , the establishment of NRW and the emerging Environment (Wales) Bill provides a good framework to promote energy efficiency and demand reduction. The incorporation of climate change mitigation measures into the location, layout and design of development can make an effective contribution towards improving the energy efficiency of houses. As such, *Planning Policy Wales* and *Technical Advice Note 12 (TAN12): Design* (2014), promotes such measures in the delivery of sustainable buildings. They also recognise the role that green infrastructure can make on this matter e.g. solar shading, and sustainable drainage systems. Many local planning authorities promote such measures in their Local Development Plan policies and supplementary planning guidance. The planning policy framework in Wales is therefore generally consistent in requiring development to mitigate and adapt to climate change, and thereby makes a valuable contribution towards the objective of improving the energy efficiency of houses. However, there may be scope to give further attention on how best practice measures for mitigating and adapting to climate change become the norm for new development e.g. mitigation measures such as sustainable drainage schemes and solar shading.

Future reviews of Planning Policy Wales to reflect the respective provisions of the Well Being of Future Generations (Wales) Act 2015, the Planning (Wales) Act 2015 and the Environment (Wales) Bill provide further opportunities to embed climate change adaptation and mitigation measures with the planning system.

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[7] http://www.walesonline.co.uk/news/wales-news/article8748024.ece/BINARY/Click%20her%20to%20read%20the%20full%20The%20Wales%20We%20Want%20report

[8] The Economic and Social Impact of Small and Community Hydro in Wales: Report for Hydropower Stakeholder Group.

In addition we believe the public sector should take a leading and visible role in the wider drive for energy efficiency improvements across Wales. Working with the Carbon Trust we are in the early stages of working towards becoming a carbon neutral organisation that will involve a programme to reduce energy use throughout our offices and opportunities for micro-generation and carbon storage across the NRW estate.

Individual energy awareness and changing personal behaviours is one of the biggest challenges in addressing energy efficiency. The Welsh public sector is a major employer and could also provide a convenient and effective communications route through its employees to promote household and community energy efficiency. There would be value in developing energy awareness and advice programmes targeted at the residential level that can be run within public sector organisations.

The importance of working with large businesses to use energy more efficiently should be more clearly recognised. It is an area for which NRW have regulatory responsibilities. The EU Emissions Trading System, CRC Energy Efficiency Scheme and the Energy Savings Opportunity Scheme can help meet Wales's energy efficiency commitments through creation of both financial and reputation mechanisms capable of achieving significant energy efficiencies and greenhouse gas emission reductions from industrial activity and energy generation. We are responsible for the regulation of these schemes in Wales, which collectively, capture around 50% of the total Welsh greenhouse gas emissions. For example, the EU Emissions Trading System captures 20,000 tonnes of CO2 emissions every day from both Aberthaw Power Station and Port Talbot Steelworks.

Our primary role is to ensure participating organisations comply with the three schemes in Wales. We take an active enforcement role to ensure high rates of compliance, and thereby increase the effectiveness of the schemes, through provision of advice, guidance and support to participating organisations.

We worked with the EU, Welsh Government, DECC, the Environment Agency and other UK regulators to transpose to Energy Efficiency Directive and the EU Emissions Trading System into domestic law, and also contributed to the development the CRC Energy Efficiency Scheme Order 2013. Through ongoing collaboration with these bodies we will continue to take an active role in improving the effectiveness of the schemes and the supporting policy frameworks. Our contributions always aim to ensure the effectiveness and maximum coverage of the schemes in Wales.

5.2. What would the environmental, social and economic impacts be if Wales set higher energy efficiency standards for new build housing? (e.g. Passivhaus or Energy Plus)

We would welcome the setting of higher energy efficiency standards for new build housing. Wales could be leading the way in ensuring all new build are more energy efficient.

The 'Solcer' house[9] which is located at the Cenin site in Stormydown has Passivhaus level of energy demand and has been designed to meet the social housing standard. It uses Structural Insulated Panels (SIPs) timber panel construction, manufactured off site and has an integrated heating and ventilation system.

The UK's target for all new homes to meet the Zero Carbon Standard from 2016 comes in advance of the Energy Performance of Buildings Directive (EPBD) target for all new buildings in the EU to be 'Nearly Zero-Energy Buildings' from 2020.

[9] SOLCER http://www.solcer.org/news-items/uks-first-smart-carbon-positive-energy-house/

Projects like the Solcer Housing, successfully implemented has the potential to meet these targets in fact, it has the potential to take this a step beyond as it is UK's first carbon positive energy house. Simultaneously having high 'Passivhaus' standards for new buildings, and improving internal temperature control would reduce energy demand for heating by around 50%[10]. In addition to setting higher energy efficiency standards for new build housing there is a need for a focus on retrofitting existing homes and buildings recognising the age of the housing stock in many parts of Wales.

6. Communities - making the case for change

6.1. How can communities, businesses and industry contribute to transforming the way that Wales thinks about energy? Does the answer to this challenge lie in enabling communities to take greater responsibility for meeting their future energy needs?

In our view communities, businesses and industries can contribute to transforming behaviour in the use of energy in Wales, especially through energy demand reduction and renewable generation. A study by the UK Energy Research Centre[11] indicates that the British public wants and expects change with regards to how energy is supplied, used and governed. It also indicates that there is clear public preferences that people should be integral to future energy pathways. The study further indicates that on the supply side this is characterised by strong commitment to renewable forms of energy production and a corresponding shift away from fossil fuels while on the demand-side it relates to the development of technology and infrastructures (e.g. public transport, demand management, electric vehicle charging points) to support changes in lifestyles, with the overall goal of improvement in energy efficiency and reduction in energy demand.

Policy and regulation can help support people and communities on energy efficiency and renewable energy such as securing priority to grid access for renewable generated energies. A good example of this is the Germany's Renewable Energy Sources Act. The Act, adopted in 2000, establishes an advanced "feed-in tariff" in Germany, enabling any company or individual who meets the technical and legal requirements to sell renewable electricity into the power grid for a guaranteed, long-term price for each kilowatt-hour sold. The Renewable Energy Sources Act is regarded as the most important and successful instrument to promote the expansion of renewable energies in the electricity sector.

This effect is prevalent in some European countries such as Denmark and Germany which has been more successful with renewable energy development which was mainly achieved through the transition driven by citizens and communities. There is also a correlation that increased ownership of renewable energy leads to increased energy efficiency thus reducing demand[12]. Shifting the mind set for energy efficiency which is often seen as a burden and not as the opportunity.

Whilst enabling communities to take greater responsibility for meeting their future energy needs may bring benefits in the way energy is used and generated, our view is that policies should include effective outreach and communications strategies to help reach the public on their own terms. Better efforts should be in place to make energy programmes more accessible to citizens and communities together with a clear articulation of the multiple benefits provided by a move towards low carbon energy generation.

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[10] Zero Carbon Britain; Rethinking the Future, Centre of Alternate Technology.
[11] Transforming the UK Energy System: Public Values, Attitudes & Acceptability: Synthesis Report. UKERC July 2013.
[12] The Economic and Social Impact of Small and Community Hydro in Wales: Report for Hydropower Stakeholder Group.

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Submission to NAW Consultation: A Smarter Energy Future for Wales?

4TH SEPTEMBER 2015

WWF Cymru will focus its response to the Committee's questions on energy efficiency of existing housing stock and reduction in emissions from the residential sector. The main basis of our evidence is research we have recently commissioned EST to undertake in this area "Progress towards residential energy reduction targets in Wales' July 2015 which is provided alongside this evidence.

We are currently developing a summary of this report which we will used for public engagement and suggested recommendations for policy in this area. We however would like to share the full report with the Committee on a confidential basis until the summary is available. Content from the report will be in our evidence provided below.

Improving energy efficiency has long been advocated as a way to increase the productivity and sustainability of society, primarily through the delivery of energy saving refurbishments of the housing stock. The impact of energy efficiency measures can go far beyond energy savings, and energy efficiency improvements can be an important contributor to economic growth and social development[1].

WWF Cymru therefore consider a comprehensive strategy capable of delivering home refurbishment at the scale needed to address emission reduction targets as a cornerstone programme for implementation of WFG Act and as essential to a future programme for government.

We expect an important strategy which cross- cuts a number of Welsh Government priorities to include considerable evidence base and a comprehensive delivery plan. WWF Cymru considers current WG consultation in this area to not provide this and will be recommending changes in our submission to that consultation which closes on 9th September.

In addition to lack of evidence in current WG consultations there no publically available comprehensive picture of impact of energy efficiency (both Welsh Government and UK Government) measures in Wales. WWF Cymru considers this lack of evidence as a

[1] Spreading the Net: the Multiple Benefits of Energy Efficiency: IEA http://www.iea.org/publications/insights/ee_improvements.pdf

considerable barrier to understanding of current situation of housing stock in Wales and the effective delivery of a robust programme.

In absence of this and to help inform WWF Cymru's understanding and contribute to the discussions we commissioned EST undertake this analysis which has produced a report 'Progress towards residential energy reduction targets in Wales' July 2015.

The purpose of the study was evaluate the impact of both the Welsh and UK governments programmes aiming to improve the energy efficiency of the housing stock and the ongoing activity required in order to achieve 2020 targets. This involves quantifying the total level of energy efficiency activity which has taken place in the Welsh housing stock since the last detailed property survey in 2008, and calculating the emissions reduction this has achieved. The study has then modelled a number of policy scenarios to 2020, showing the emissions reduction potential of each and therefore the activity required for 2020 target emission levels to be met.

The analysis does include an estimation of the total costs of these refurbishments but scope of analysis does not provide the potential economic impact of refurb in gross terms across the lifetime of the capital spend or impact on fuel poverty in Wales. This is mainly because there is a lack of data in Wales to enable this analysis.

Programme impact

Our modelling indicates that, between 2007 and 2014, energy efficiency programmes in Wales prevented the release of around 2.0 MtCO2e. The programme responsible for both the greatest number of energy efficiency installations and the greatest carbon reduction was the Carbon Emissions Reduction Target (CERT), a UK government programme which ran from 2008-2012. However, whilst CERT accounted for over 70% of installations, our modelling suggests it was responsible for only 39% of the emissions reduction; other, smaller scale policies have had a much bigger impact on a per-measure basis. In particular, the Feed-in Tariff has contributed almost a third of the emissions reduction, despite accounting for only 5% of total installs.

The Welsh Government schemes Nest and Arbed, combined, accounted for 8% of the emissions reduction. Cumulatively, they have prevented the release of 0.17MtCO2e between 2007-2015. The remaining 92% of policy-based emissions reduction, 1.85 MtCO2e, is attributable to schemes led by the UK government.

Meeting the 2020 targets

Our modelling indicates that progress towards the Welsh Government's climate change targets is mixed. To date, the residential sector is on-target for its 3% year-on-year reduction commitment, leaving the sector well placed to achieve the 2020 target even with minimal ongoing action. However, future progress towards this 2020 goal is heavily dependent on grid decarbonisation. In our scenario 1 (no uptake of energy efficiency measures post-2014), 73% of the reduction in emissions seen between 2014 and 2020 is due to grid decarbonisation. Since electricity generation is outside of the Welsh Government's devolved powers, this high dependence on decarbonisation leaves progress towards the target vulnerable to processes outside Welsh Government's control. To reduce this vulnerability, Welsh Government must focus greater efforts on reducing energy consumption, rather than relying on reduced carbon intensity of the energy itself. Reducing consumption will require ongoing action to continue improving the housing stock's energy efficiency.

Progress towards the 40% residential target has been much slower. Since 'source' emissions from the residential sector are predominantly due to heating, achieving the target will require investment both in methods to reduce heating demand (for example, through insulation) and to reduce the carbon intensity of heating fuels (for example, using renewable heating sources). Our scenarios indicate that significant action in these areas will be required between 2015 and 2020 if this target is to be met. Even under a scenario modelling 100% uptake of cavity wall insulation, loft insulation, draught proofing, condensing boilers and solid wall insulation source emissions are reduced only to 3.53 MtCO2e; this is still 0.52 MtCO2e above the 40% target level.

Achieving the target will therefore also require uptake of renewable heating**.** We modelled three scenarios incorporating renewable heat. The most viable scenario which could achieve the target was a scenario which requires: 100% uptake of cavity wall insulation, loft insulation, draught proofing and condensing boilers; 25% uptake of solid wall insulation; and uptake of renewable heat into 25% of homes. In total, this would require installation of over 2.2 million energy efficiency measures, at a cost of around £5.2 to £9.3 billion.

Delivery of measures

We appreciate the scale and the cost of this work is extremely challenging but we do not think Welsh Government should shy away for recognising the scale of change needed. Getting buy- in for stakeholders to address the huge challenge collectively needs a comprehensive and transparent outline of the problem. Recognising this challenge is the only way to match the ambitious rhetoric Welsh Government has set itself through commitments to sustainable development and emission reduction targets and WFG Act and Environment Bill.

There are a number of ways we are exploring financing and delivery of these programmes.

Arbed was financed through use of infrastructure stream, recognised in the Wales Infrastructure Investment Plan. WWF Cymru considers this a smart way of financing energy efficiency measures and recommends that future programmes are also funded this way – via a long-term national infrastructure project. This should be backed up with a commitment to a multi-billion pound capital investment programme, leveraging private funding, and the kind of clarity, purpose and focus given to other major infrastructure projects in Wales.

The programme would provide grant funding for the fuel poor, low interest loans and other incentives for those able to pay, and draw on other private funding streams. To ensure that the predicted emissions savings from measures are delivered, householders should be supported to reduce their energy use as an integral part of the programme.

There is no updated version of economic and social impacts of such a programme , particularly in improving the worst performing houses in Wales and the impact that will have on fuel poverty. This is due to no household conditions data in Wales since 2008. In absence of this, the assessment WWF Cymru undertook in 2011 and 2012 on cutting emissions in Welsh homes[2], presents the general principles and assessments we would like to undertake if there were data available. In particular the possibility of bringing fuel poor homes up an energy efficiency standard and whether this would meet the scale of measures needed to meet the emission reduction targets.

Commit to and deliver a Renewable Heat Programme

[2] http://assets.wwf.org.uk/downloads/housing_report_english_summary_.pdf
http://assets.wwf.org.uk/downloads/cutting_carbon_emissions_in_welsh_homes.pdf

Our analysis demonstrates the importance of developing a renewable heat programme for Wales. This is currently an area that does not receive much recognition in the energy debate therefore we recommend that a renewable heat strategy and programme is developed which compliments the energy efficient installations.

Enhancing the take up of low carbon heat would help to reduce reliance on volatile fossil fuels, such as gas and oil, which have been the biggest driver of consumer energy bill increases in recent years and account for 60% of domestic bills. This would have consumer and energy security benefits, particularly as North Sea reserves dwindle. It would also help to create new, skilled jobs. WWF UK have produced a report on Renewable Heat which demonstrates the direction of travel for Wales[3].

Environment Bill

We see Section 2 of Environment Bill as potentially a very positive robust governance structure which will provide mechanisms enable government to address the scale of challenge. The proposed 'report on polices and procedures' (RPP) in the Bill needs to provide the in depth level of analysis of emissions reduction needed and the measures that will deliver it. Energy efficiency measures from residential sector will need to play a significant part of this. However delay in production of this report till 2018 means an unsatisfactory delay to robust plan for Welsh Government considering the level of action needed by 2020 to meet its commitment of emissions reduction of 40%. We therefore recommend that RPP is produced sooner.

The more in depth analysis and route map we are recommending in the Welsh Government energy efficiency strategy will support this work. We would have serious concerns Welsh Government if delayed commitment to substantial energy efficiency programmes until the RPP. Hope that it will be a key feature in the next programme for government.

The Scottish Government has recently committed to a programme of energy efficiency measures. We are currently exploring a comparison between this commitment and Welsh Government's.

New Build

Building regulations are the primary tool for determining the energy efficiency of new and existing building stock. WWF Cymru regrets the huge missed opportunity presented by the edecision to improve the energy efficiency of new homes by only 8% in 2013. Details on our concerns our outlined in a blog on this issue[4].

For more information, please contact: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

[3] http://assets.wwf.org.uk/downloads/wwf_heat_report_summary_web.pdf
[4] https://blogs.wwf.org.uk/blog/climate-energy/new-housing-energy-plans-are-a-wasted-opportunity/

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	A Smarter Energy Future for Wales?
Ymateb gan Grid Cenedlaethol (Saesneg yn unig)	Response from National Grid
SEFW 26	SEFW 26

National Grid submission to the National Assembly for Wales' Environment and Sustainability Committee for its inquiry into 'a smarter energy future for Wales', September 2015

National Grid's Role

1. National Grid's job is to connect people to the energy they use, safely. In providing this vital service we are acutely aware of the importance of delivering reliability and value for money for consumers. A focus on driving down costs whilst continuing to deliver greater service reliability sits at the heart of our business model. Since privatisation, network costs have fallen significantly in real-terms and reliability performance has improved as successful regulatory regimes have created the right incentives for networks to deliver more for less.

2. National Grid owns the high voltage electricity transmission system in England and Wales and as System Operator balances supply and demand in the short term for the whole transmission system. Over the next decade, we plan to invest around £20 billion to ensure that our electricity and gas networks continue to provide safe and reliable energy supplies to customers, as well as future-proofing against significant security and weather events.

3. National Grid holds licences under the Electricity Act and Gas Act for:

    a) Electricity transmission (operation of the Great Britain transmission system and ownership of the high voltage assets in England & Wales),
    b) Gas transmission (operation and ownership of the high pressure pipelines in England, Wales and Scotland), and
    c) Gas distribution network serving approximately 11million customers in England, across four networks.

    In Great Britain, National Grid does not own any electricity distribution assets (in Wales, these assets are owned by Western Power Distribution and Scottish Power Energy Networks) neither do we own any Scottish or offshore electricity transmission assets.

4. In planning and operating the UK's electricity transmission system, our duties under the Electricity Act, as detailed in our transmission licence, include the need to develop and maintain an efficient, co-ordinated and economical system of electricity transmission and facilitate competition in generation and supply. We are required by our licence to offer terms to those who wish to connect to our network and levy charges in accordance with a methodology approved by Ofgem. We are required to plan the system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).

5. In practice, we use the NETS SQSS to identify the minimum requirements for connecting generation and demand so that our connecting customers can choose between different design arrangements. The SQSS also guides the capacity and resilience of transmission that is needed between different parts of the network to facilitate an efficient energy market and maintain security of supply, for example, avoiding or minimising customer interruptions in the event of the loss of a transmission line or part of an electricity substation due to weather (storms) or interference by a third party.

6. In Wales, our transmission network meets the SQSS criteria for existing demands and generators. We have been seeking connection arrangements for new generators including those who sought connection in the TAN8 identified area where no existing transmission facilities exist.

Network Regulatio

7. Given the limited scope for competition in the transmission business, National Grid's transmission activities and charges are subject to regulation by Ofgem. Following an extensive review of the 20 years of network regulation following privatisation of the industry in 1990, Ofgem established the RIIO (Revenue = Incentives + Innovation + Outputs) price control framework for onshore transmission and distribution networks in Great Britain. This regime builds on the significant efficiency and quality improvements driven by incentive based regulation of privately owned companies[1] to ensure new challenges and the requirements of customers and consumers are met on a robust value for money basis. This regime is widely regarded as best practice and is being emulated by other regulators in the UK and other jurisdictions.

8. The RIIO regime encourages network companies to work with their stakeholders to develop robust business plans which will deliver required outputs at the most affordable prices. In the run-up to the setting of the new RIIO control for electricity transmission which commenced in April 2013, National Grid conducted an extensive consultation with all its stakeholders (including consumers, young and future bill-payers, consumer representative groups, government, other regulators (e.g. HSE), the energy sector, environmental organisations, and academic experts) to identify how we should deliver our main outputs of connections, reliability, safety and customer satisfaction at an affordable price while facilitating the transition to a sustainable low carbon economy in-line with government objectives.

9. Now that the price control is operating, National Grid's revenues adjust according to how much service our customers want. We have strong incentives to deliver our outputs at lowest cost and the benefits of outperforming plan targets are directly shared with customers. The regime encourages and supports innovation which is key to ensuring good service and lower future costs.

10. An important aspect of the regulatory regime is the confidence it engenders in investors that their investments will continue to be recognized and appropriately treated. On the basis of this investor confidence in the regime, National Grid is able raise finance for capital intensive network equipment at very competitive rates and thereby keep costs down for consumers.

11. The RIIO regime ensures significant levels of scrutiny and transparency are applied to our activities, including our investment plans and the charges on our customers that will be passed on to consumers. Stakeholders are continuously engaged throughout the process and customer satisfaction is directly measured to inform incentive payments.

Network Competition

12. Ofgem has a key role in promoting competition in the energy market and regulating the monopoly transmission and distribution network activities. They have stated that they believe it is in the interest of consumers for competitive processes to be used in deciding which companies should build and own transmission facilities.

13. Due to our combined role of system operator and transmission owner, National Grid has been able to deliver benefits to consumers from an oversight and responsibility for the end to end process of identifying the need for new transmission network, designing, procuring and building it and operating it over its entire lifetime. This ensures efficient, economic, and coordinated development and management of the equipment; provides clarity over responsibility for all aspects of the network's design and performance; and allows the optimization of investment and operational costs in order to minimise lifetime costs to the end consumer.

14. We identify that these coordination benefits are particularly important in the strongly meshed parts of the GB transmission network. Competition has been introduced into the delivery and ownership of unmeshed parts of the network (for example, the Offshore Transmission (OFTO) regime and concerning interconnectors to other markets). National Grid will work with Ofgem to ensure coordination benefits can be achieved across all the assets we operate and we will participate in competitions where we can bring benefits from our skills to consumers.

15. There is currently significant discussion about the development of competition in Electricity Transmission in GB through Ofgem's Integrated Transmission Planning and Regulation (ITPR) and Strategic Wider Works (SWW) workstreams. National Grid supports the introduction of further flexibility into the regulatory regimes to enable the right delivery route for particular types of asset. It is for Ofgem to determine the role of competition, the characteristics of projects suitable for competition, and be clear on the benefit to consumers.

[1] As an illustration on the effectiveness of this regime in driving efficiencies, Ofgem reported in 2008 that "Since 1990 the real cost of electricity distribution charges have been halved and transmission charges cut by 41%." See Alistair Buchanan's Speech at SBGI on "Ofgem's RPI-X at 20 Project" – 6th March 2008: https://www.ofgem.gov.uk/ofgem-publications/41130/sbgi-6-march.pdf

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Dyfodol Ynni Craffach i Gymru?	Smarter energy future for Wales?
Ymateb gan Bwrdd Hyfforddi'r Diwydiant Adeiladu Cymru (Saesneg yn unig)	Response from Construction Industry Training Board Wales
SEFW 27	SEFW 27

Cynulliad Cenedlaethol Cymru
National Assembly for Wales

Swyddfa Cymru
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Alun Ffred Jones AM
Chair, Environment and Sustainability Committee
National Assembly for Wales
Cardiff Bay
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Dear Alun

RE: A Smarter Energy Future for Wales?

CITB Cymru Wales is pleased to respond to the Environment and Sustainability Committee's inquiry into a smarter energy future for Wales. This inquiry overlaps to a large extent with many of the issues identified in the current Welsh Government consultation on a draft energy efficiency strategy for Wales. CITB Cymru Wales has therefore attached a copy of our response to that consultation for the benefit of the committee's inquiry.

The key areas of interest for CITB Cymru Wales in relation to the committee's inquiry are the projected growth from energy projects such as Wylfa Newydd and the Swansea Bay Tidal Lagoon and areas of policy around retrofitting and Part L building regulations.

Our recent Construction Skills Network report suggests that between 2015-19 average annual growth in output in the construction sector will be around 5.8 per cent. This presents a number of significant challenges to the domestic construction sector in finding and retaining skilled employees that can maximise the economic and social benefit of such growth.

A significant proportion of this growth relates to large infrastructure projects such as Wylfa Newydd. For instance, excluding Wylfa Newydd the projected output growth for Wales reduces from 5.8 per cent to 4.2 per cent. It is therefore crucial that work begins now on delivering the appropriate skills environment for projects such as Wylfa Newydd to allow domestic construction firms to capitalise on the growth opportunities.

With this in mind, Welsh Government should work closely with Horizon and its partners to ascertain the likely demand from Wylfa Newydd and to provide this information in good time so that CITB Cymru Wales and other providers can work with local companies to shape provision and plan their investment in training and skills to be part of the supply chain. Crucially, this will require more in depth knowledge of existing capacity within the sector in North Wales.

CITB Cymru Wales is already undertaking similar work in partnership with the Welsh Government to inform the Swansea Bay Tidal Lagoon.

In terms of retrofitting schemes such as Arbed and Nest, under the right conditions, and with the right incentives, the energy efficiency sector will continue to present a fantastic opportunity for business growth, market diversification and innovation for SMEs in Wales, while promoting sustainable development, addressing fuel poverty, energy security and climate change action.

Research by the Zero Carbon Hub suggests that a lack of knowledge and skills on energy performance across the house-building industry is a major contributor to the performance gap between intervention design and performance. This is an issue that needs to be addressed if we are to maximise the social and economic impact of retrofitting schemes.

CITB Cymru Wales believes that knowledge and awareness around issues such as energy efficiency should be mainstreamed within existing apprenticeship provision. This should include knowledge on the performance of traditional pre-1919 buildings in Wales, to ensure that our existing stock can be improved effectively.

Finally, in relation to building regulations for both domestic and non-domestic new build properties it is vital that the industry is aware of any proposed changes in sufficient time and can plan its workforce development in order to accommodate energy efficiency standards.

CITB Cymru Wales is happy to provide any additional information that may be required by the committee, including providing oral evidence.

Yours sincerely

[redacted]
Strategic Partnerships Director
CITB Cymru Wales

Energy Efficiency for Wales
CITB Cymru Wales Response

Introduction

CITB Cymru Wales is pleased to respond to the Welsh Government's draft Energy Efficiency Strategy for Wales. There is little doubt that energy efficiency and carbon reduction policies will drive significant change in the construction industry and in doing so generate substantial opportunities and challenges.

As Green Skills Alliance research demonstrates, in order to overcome these challenges and capitalise on the opportunities presented it will be vital to create a construction skills environment that allows the industry to deploy the right skills, in the right place, at the right time[1]. In practical terms, this must include widespread training to upskill the existing construction workforce and a renewed emphasis on making current qualifications and apprenticeships responsive to changing needs.

The Welsh Government has previously set out its aspirations through the environmental goals in the Wellbeing of Future Generations Act 2015 and through energy efficiency schemes such as Arbed and Nest.[2] The current proposals for an energy efficiency strategy for Wales come at a time of significant change in the qualification system, with the ongoing review into apprenticeships being of particular importance. This provides an opportunity to strengthen Welsh energy efficiency measures by underpinning them with an appropriately skilled construction workforce.

Executive Summary

Overcoming Barriers

- **Research suggests that a significant proportion of the current workforce involved in advice and assessment around energy efficiency measures do not have the required level of skill and knowledge, and that widespread upskilling is required.**

- **The principal criteria for success is a long term commitment to energy efficiency policy from the Welsh Government and the establishment of incentives to support initial market growth and provide a framework for a more self-determining, free-standing energy efficiency sector, free from the boom and bust cycles of recent times.**

- **Welsh Government should recognise the potential of SMEs to drive demand for energy efficiency retrofit and low energy buildings through established customer networks.**

- **We would recommend a strategic review of verification and certification for energy efficiency in a domestic and non-domestic retrofit context.**

[1] Pye Tait *A Green Deal Competency Framework*
[2] Wellbeing of Future Generations (Wales) Act 2015 [Online]. Available at: http://www.legislation.gov.uk/anaw/2015/2/contents/enacted & Arbed – Strategy Energy Performance Investment Programme [Online]. Available at: http://gov.wales/topics/environmentcountryside/energy/efficiency/arbed/?lang=en & NEST [Online]. Available at: http://www.nestwales.org.uk/ (accessed 7th September 2015).

- **CITB Cymru Wales looks forward to the consultation on reviewing Part L in 2016. Thorough consultation with the sector will be a prerequisite to success in achieving the Welsh Government's obligation for nearly zero carbon homes as set out in European legislation.**

Developing the Supply Chain

- **The Welsh Government should secure a ring fenced amount for skills investment on all large public sector contracts.**

- **CITB Cymru Wales notes the inclusion of Construction Futures Wales in the Energy Efficiency Strategy and agrees that such collaborative approaches are essential for the success of supply chain development.**

Skills and Education

- **CITB Cymru Wales recommends that Welsh Government consider the skills requirements of all energy efficiency proposals early on and commits resources, guided by Labour Market Intelligence (LMI), to areas of skills deficiency**.

- **CITB Cymru Wales believes that knowledge and awareness around issues such as energy efficiency should be mainstreamed within Wales' construction apprenticeship provision. This should include knowledge on the performance of traditional pre-1919 buildings in Wales, to ensure that our existing stock can be improved effectively.**

- **CITB Cymru Wales has well-established engagement mechanisms through the CITB Cymru Wales Committee and three regional fora, as well as other professional services groups. The Welsh Government should use this as a means for disseminating information and engaging with the construction sector.**

Finance

- **The range and quality of data captured in the WIIP could be increased, so that the industry has more nuanced data to work with.**

- **In order to improve WIIP further, Welsh Government should examine the inclusion of retrofitting and maintenance and repair schemes where they are of sufficient size and scope**.

- **It is vital that clarity around apprenticeship funding is provided**

<u>Overcoming barriers</u>

Energy efficiency assessments

The Green Skills Alliance (GSA) is a group of organisations, including CITB, who represent employers and workers on a national basis and are working together to provide advice and guidance across the wider green sector. A series of research projects carried out by the GSA and corroborated by the Department for Energy and Climate Change suggests that the efficacy of energy efficiency assessments is dependent on the skills of the assessors involved. **The research suggests that a significant proportion of the current workforce involved in advice and assessment around energy efficiency measures do not have the required level of skill and knowledge, and that widespread upskilling is required.** For instance, 19.4% of the workforce does not have skills around ascertaining the hierarchy

of energy efficiency measures, with a further 11.5% lacking knowledge of advantages and drawbacks of installing energy efficient measures for buildings constructed pre and post 1919.[3]

Innovation and Growth

Under the right conditions, and with the right incentives, the energy efficiency sector will continue to present a fantastic opportunity for business growth, market diversification and innovation for SMEs in Wales, while promoting sustainable development, addressing fuel poverty, energy security and climate change action. Maintaining the interest and levels of investment in training and skills from construction companies, and in particular SMEs, is essential.

The principal criteria for success is a long term commitment to energy efficiency policy from the Welsh Government and the establishment of incentives to support initial market growth and provide a framework for a more self-determining, free-standing energy efficiency sector, free from the boom and bust cycles of recent times. This should be seen within the context of wider changes to the energy landscape through UK Government policy around feed-in tariffs.

This will create the conditions within which the sector can innovate. Our labour market intelligence continues to demonstrate that industry innovation is most abundant with the SME workforce. **Welsh Government should recognise the potential of SMEs to drive demand for energy efficiency retrofit and low energy buildings through established customer networks.** Evidence suggests only 1 in 10 consumers consider energy only renovations and tend rather to carry out energy efficiency work at the same time amenity renovations.[4]

To an extent, reforms to Part L that include retrofitting in case of house extension or the building of conservatories reflects this.[5] Welsh Government needs to invest in industry innovation to give it the tools to unlock this potential further. **This could include, for example, a focus on support for 'trusted actors' or 'intermediaries' who exercise a significant influence over the decision-making of consumers at the point of sale.**

CITB Cymru Wales is also developing an innovative Wales Training Model in partnership with the University of Wales Trinity St David. This will provide an opportunity to train the next generation of construction workers across Wales in innovative techniques, including energy efficiency measures.

Trust in the Sector/Quality Assurance

Sector and trade body opinion gathered in May and June 2015 is especially strong in respect of the need for an improved, clear set of verification and certification processes that will ensure compliant, quality assured workmanship in the energy efficiency sector.[6] Whilst

[3] CITB Cymru Wales/Pye Tait Consulting. 2015. *A 'Material' Issue: Understanding and Responding to the Traditional Building Skills Challenge in Wales.* P.37

[4] UK ERC. 2013. *Understanding Homeowners Renovation Decisions: Findings of the VERD Project* [Online]. Available at: http://tyndall.ac.uk/sites/default/files/verd_summary_report_oct13.pdf P.8. (accessed 7th September 2015).

[5] Welsh Government. 2013. *Written Statement – Proposed Changes to Part L of the Building Regulations* [Online]. Available at: http://gov.wales/about/cabinet/cabinetstatements/2013/partlbuildingregs/?lang=en (accessed 7th September 2015).

[6] Supply Chain Insight Group, forthcoming 2015. Trust and Certainty: Energy Efficiency Market Viability and Supply Chain Deliverability.

evidence available from consumers that have had energy efficiency measures assessed or installed suggests their satisfaction levels are generally high, there have also been studies (mystery shopping exercises) and objective measures (quality checks) that suggest not all work is consistently delivered to the standard it should be. For instance, some stakeholders in our recent report into traditional building skills highlighted Arbed as a scheme that has suffered from inconsistent standards in the past.[7] This can negatively impact industry reputation and consumer confidence.

Examples include the high number of rejected installations in the Energy Company Obligation and evidence from the new build sector of a 'Performance Gap' between designed and as-built energy performance. Recent research has identified a number of challenges with the range of schemes currently used to verify competence with a range of suggestions put forward, including an industry competency scheme to demonstrate energy awareness.[8] There is however a need to balance the need for quality assurance with the need to reduce the proliferation of bureaucracy that can present barriers to market growth. **We would recommend a strategic review of verification and certification for energy efficiency in a domestic and non-domestic retrofit context.**

Reviewing Part L Building Regulations

Since the devolution of building regulations to the National Assembly for Wales in 2011, a number of changes have been made in relation to energy efficiency, including an 8% reduction in the carbon emissions of new build properties and a 20% reduction for non-domestic properties in relation to the 2010 regulations[9].

Part L is often seen as an area of regulation that creates barriers to house building as has been evidenced by the varied nature of responses to the Welsh Government's 2013 consultation on 40% and 25% carbon reductions on the 2010 regulations in the house building sector.[10]

CITB Cymru Wales also notes the changes proposed in England in relation to Part L as part of the UK Government's Productivity Plan.[11]

CITB Cymru Wales looks forward to the consultation on reviewing Part L in 2016 and believes that thorough consultation with the sector will be a prerequisite to success in achieving the Welsh Government's obligation for Nearly Zero Energy Buildings as set out in European legislation. In particular, it is vital that the industry is aware of any proposed changes in sufficient time and can plan its workforce development in order to accommodate energy efficiency standards. The Welsh Government should engage with the

[7] CITB Cymru Wales/Pye Tait Consulting. 2015. *A 'Material' Issue: Understanding and Responding to the Traditional Building Skills Challenge in Wales.*

[8] Zero Carbon Hub, 2014. Performance Gap End of Term Report. [Online]. Available at: http://www.zerocarbonhub.org/sites/default/files/resources/reports/Design_vs_As_Built_Performance_Gap_End_of_Term_Report_0.pdf (accessed 7th September 2015).

[9] Welsh Government. 2013. *Written Statement – Proposed Changes to Part L of the Building Regulations* [Online]. Available at: http://gov.wales/about/cabinet/cabinetstatements/2013/partlbuildingregs/?lang=en (accessed 7th September 2015).

[10] Welsh Government. 2012. *2012 consultation on changes to the Building Regulations in Wales Part L (Conservation of fuel and power)* [Online]. Available at: http://gov.wales/docs/desh/consultation/120924buildingregspartlpart1en.pdf (accessed 7th September 2015).

[11] UK Government. 2015. Fixing the foundations: Creating a more prosperous nation [Online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/443898/Productivity_Plan_web.pdf para 9.17, P.46. (accessed 7th September 2015).

CITB Cymru Wales Committee and our three regional fora on this issue and should consider its proposals in the context of the UK Government's productivity plan.

Welsh Housing Quality Standard

The Welsh Housing Quality Standards (WHQS) have allowed for an approach to drive up standards on a much wider scale than previous approaches. CITB Cymru Wales welcomes this and believes the drive to improve quality has been helped by clear expectations and timescales in this area. The WHQS has also engaged the wider public in a positive way. The Welsh Government should learn from this approach in designing future interventions.

Developing the supply chain

Procurement

Government low carbon initiatives can have a significant impact on skills needs, from the creation of new roles, to the need for existing trades to learn new skills or the rapid growth of existing sectors.

The Welsh Government's Wales Procurement Policy Statement focuses on the social, economic and environmental impact of Wales' public sector spend. The Minister for Finance's recent statement on public sector procurement highlighted increasing devolution of this area, following the General Designation on Procurement.[12] This provides an opportunity to use public spending to achieve energy efficiency goals, similar to the insistence of Building Research Establishment Environmental Assessment Method (BREEAM) standards on certain public buildings. It also provides an opportunity for further supply chain development by providing construction firms and SMEs in particular, with a degree of confidence in upcoming work by which to plan recruitment and training provision to deliver energy efficiency related work. In this respect, it is also important to provide a long time-scale in terms of funding for local authorities and other bodies delivering energy efficiency schemes.

CITB Cymru Wales believes that in developing community benefits policies further, **the Welsh Government should secure a ring fenced amount for skills investment on all large public sector contracts.** This was set out in our recent report with the Cross-Party Group on Construction entitled *The impact of procurement policy in Wales*[13]. Where appropriate, this policy lever could be used to increase the skill levels of the construction sector to deliver energy efficiency interventions, through schemes such as Arbed.

Construction Futures Wales

Construction Futures Wales (CFW) is jointly funded by the Welsh Government and the Construction Industry Training Board (CITB) through the Joint Investment Strategy (JIS) for the construction industry in Wales. CITB manages the programme on behalf of the partners.

[12] Welsh Government. 2015. *Wales Procurement Policy Statement* [Online]. Available at: http://gov.wales/docs/prp/toolkit/june15walesprocurementpolicystatement2015v1.pdf (accessed 7th September 2015).

[13] Cross Party Group on Construction. 2015. *The impact of procurement policy in Wales – a summary of consultation responses* [Online]. Available at: http://www.citb.co.uk/documents/the%20impact%20of%20procurement%20policy%20in%20wales%20-%20a%20summary%20of%20consultation%20responses.pdf (accessed 7th September 2015).

Over recent years, we have seen a growing realisation that construction activity can significantly contribute to the growth and social impact on the Welsh economy by developing both people skills and businesses. This has resulted in construction related contracts moving to longer term framework/collaborative agreements and increased demands along the whole supply chain.

The Construction Futures Wales programme aims to equip the industry to better understand the challenges it faces moving forward, and equip the workforce to better meet those challenges. This will be done through delivery of support on live projects. It will demonstrate opportunities for real savings, growth and skills development, through improvement activities and training.

CITB Cymru Wales notes the inclusion of Construction Futures Wales in the Energy Efficiency Strategy and agrees that such collaborative approaches are essential for the success of supply chain development.

Skills and education

Delivering skills that respond to local need

The Welsh Government's Policy Statement on Skills and the emerging Regional Skills Partnerships are vital to ensuring the appropriate labour market intelligence in terms of the construction sector is properly fed in to the decision making process. CITB's Construction Skills Network identifies a number of key skills needs for Wales over the coming years. For instance, Wales is set to grow at a rate of 5.8 per cent per annum between 2015-19, which is the highest growth rate of any UK country.[14] This is driven by large scale infrastructure investment such as Wylfa Newydd, the Swansea Bay Tidal Lagoon and improvements to the A465 as well as a significant body of retrofitting work through schemes such as Arbed and Nest.

In order to maximise the social and economic impact of this growth it is vital that the sector in Wales is able to attract and maintain an appropriately skilled workforce. Detailed Labour Market Intelligence (LMI) is necessary to help ascertain the needs of the sector. **CITB Cymru Wales therefore recommends that Welsh Government consider the skills requirements of all energy efficiency proposals early on and commits resources, guided by LMI, to areas of skills deficiency**.

Mainstreaming energy efficiency in work-based learning

Research by the Zero Carbon Hub suggests that a lack of knowledge and skills on energy performance across the house-building industry is a major contributor to the performance gap between intervention design and performance[15]. Our own research states that these knowledge gaps seriously jeopardise our ability to achieve the EU 2020 climate change targets.[16] **In order to rectify this situation, CITB Cymru Wales believes that knowledge and awareness around issues such as energy efficiency should be mainstreamed within Wales' construction apprenticeship provision. This should include knowledge**

[14] Construction Skills Network. 2015. *Industry Insights: Wales 2015-19* [Online]. Available at: http://www.citb.co.uk/documents/research/csn%20reports%202015-2019/construction-skills-network-wales-2015-2019.pdf (accessed 7th September 2015).

[15] Zero Carbon Hub. 2014. *CLOSING THE GAP BETWEEN DESIGN & AS-BUILT PERFORMANCE END OF TERM REPORT* [Online]. Available at: http://www.zerocarbonhub.org/sites/default/files/resources/reports/Design_vs_As_Built_Performance_Gap_End_of_Term_Report_0.pdf P.20. (accessed 7th September 2015).

[16] Build Up Skills UK, 2013, Status Quo Report.

on the performance of traditional pre-1919 buildings in Wales, to ensure that our existing stock can be improved effectively. This should be a key consideration of ongoing apprenticeship reforms in Wales.

There is also a need to promote energy efficiency awareness as part of continuing professional development. Existing workforces need the time and incentive to embark on training to improve skills in this area. Welsh Government should therefore examine ways of increasing the emphasis on training and skills as part of its energy efficiency projects.

Employer Engagement

Employer engagement is vital to the success of policies around education and skills, with both the individual and the employer being the beneficiaries of training and development. CITB Cymru Wales is well placed to facilitate this engagement from a construction perspective and has well established governance mechanisms that allow this to take place through the CITB Cymru Wales Committee and the three regional fora. CITB Cymru Wales is also involved in the Construction Sector Qualification Advisory Panel that is seeking to ensure appropriate employer dialogue in the creation and development of qualifications in Wales. This is a vital consideration in any apprenticeship reforms.

CITB Cymru Wales has well-established engagement mechanisms through the CITB Cymru Wales Committee and three regional fora, as well as other professional services groups. The Welsh Government should use this as a means for disseminating information and engaging with the construction sector. CITB Cymru Wales is keen to facilitate this engagement on the consultation on the draft energy efficiency scheme and any of its associated policy interventions.

Finance

Wales Infrastructure Investment Plan

While the Wales Infrastructure Investment Plan (WIIP) is an innovative development from Welsh Government, providing a clear statement of intent around a number of capital projects, there is room for improvement.

The WIIP should provide a more detailed pipeline of opportunities to allow Welsh companies to plan their recruitment and training in good time. The pipeline and forward work programme should be more visible and user friendly to the sector to enable better business planning.

The range and quality of data captured in the WIIP could be increased, so that the industry has more nuanced data to work with. This could be modelled using the example of the UK Government's National Infrastructure Plan and pipeline to ensure labour flows and skills requirements can be forecast/planned[17].

This could also help remedy one of the key problems for many construction companies, namely initiative churn. A large number of energy efficiency initiatives have come and gone over time and this creates uncertainty for companies.

In order to improve WIIP further, Welsh Government should examine the inclusion of retrofitting and maintenance and repair schemes where they are of sufficient size and scope. This would aid in the planning training effort and help to ensure firms that wish to

[17] UK Government. 2013. *National Infrastructure Plan* [Online]. Available at: https://www.gov.uk/government/collections/national-infrastructure-plan (accessed 7th September 2015).

deliver energy efficiency measures have the time to develop the skilled workforce they need. This is crucial if the performance gap identified by the Zero Carbon Hub is to be remedied.[18]

Apprenticeship funding

If, as suggested above, energy efficiency skills and a wider knowledge of the performance of pre-1919 buildings becomes mainstreamed in the apprenticeship programme then the funding mechanism employed by Welsh Government will become crucial to the success of energy efficiency interventions. While CITB Cymru Wales recognises that apprenticeship reform is ongoing in Wales, and the Framework for Co-investment in Skills is only at the beginning of the implementation process**, it is vital that clarity around apprenticeship funding is provided.** This is particularly pertinent in response to reforms in England following the announcement of an apprenticeship levy that could have a significant impact on Wales' funding settlement.

About CITB Cymru Wales

CITB Cymru Wales is the largest representative body of construction employers in Wales, representing over 10,000 construction companies through the CITB Cymru Wales Committee and three regional fora. We work in partnership with government, industry, and education providers to maximise opportunities for skills, training and development within the Welsh construction sector, and to provide the right skills, in the right place, at the right time to support economic growth.

[18] Zero Carbon Hub. 2014. *CLOSING THE GAP BETWEEN DESIGN & AS-BUILT PERFORMANCE END OF TERM REPORT* [Online]. Available at: http://www.zerocarbonhub.org/sites/default/files/resources/reports/Design_vs_As_Built_Performance_Gap_End_of_Term_Report_0.pdf P.20. (accessed 7th September 2015).