

Agenda – Environment and Sustainability Committee

Meeting Venue:	For further information contact:
Committee Room 3 – Senedd	Martha Howells
Meeting date: Wednesday, 2	Committee Clerk
December 2015	0300 200 6565
Meeting time: 09.15	SeneddEnv@Assembly.Wales

Private pre-meeting (09.15–09.30)

1 Introductions, apologies and substitutions

2 Inquiry into 'A Smarter Energy Future for Wales?' – Local ownership and supply

(09.30–10.20)

(Pages 1 – 12)

Dr Richard Cowell, School of Planning and Geography, Cardiff University

Attached Documents:

Research Brief

E&S(4)–34–15 Paper 1

Break (10.20–10.30)

3 Inquiry into 'A Smarter Energy Future for Wales?' – Local ownership and supply

(10.30–11.30)

(Pages 13 – 18)

Michael Jenkins, Principal Sustainable Development Officer, Bridgend County

Borough Council

Philip Walton, Strategic Director (Projects), Wrexham County Council



Attached Documents:

E&S(4)-34-15 Paper 2

E&S(4)-34-15 Paper 3

4 Inquiry into 'A Smarter Energy Future for Wales?' – Local Ownership and Supply

(11.30-12.30)

Bill Edrich, Commercial Director, Bristol City Council

Gail Scholes, Director of Energy Services, Nottingham City Council

Jo Gilbert, Head of Robin Hood Energy

5 Papers to note

E&S(4)-34-15 Paper 4

(Pages 19 – 29)

Attached Documents:

E&S(4)-34-15 Paper 4

E&S(4)-34-15 Paper 5

(Pages 30 – 33)

Attached Documents:

E&S(4)-34-15 Paper 5

6 Motion under Standing Order 17.42 to resolve to exclude the public from the meeting for the following business: Item 7

7 Fourth Assembly Committee Legacy: Draft letter to the Business Committee

(12:30-12:35)

(Pages 34 – 38)

Attached Documents:

Draft letter to the Business Committee

Private de-brief (12.35-12.45)

Agenda Item 2

Document is Restricted

Dr Richard Cowell
School of Planning and Geography
Cardiff University
Glamorgan Building
King Edward VII Avenue
Cardiff
CF10 3WA

2 September 2015

Dear Madam/Sir,

Please find below my submission to the National Assembly for Wales Environment and Sustainability Committee inquiry into A Smarter Energy Future for Wales. This follows on from the advice I offered at the invited stakeholder event on 18th June 2015. I thought it might be helpful to provide a written note of the points I made.

Yours faithfully,



+++++

1. I am delighted that the National Assembly for Wales Environment and Sustainability Committee are pursuing the issue of energy transition. I see it as a positive signal that the tentative moves underway towards devolving limited energy decision-making powers to Wales are triggering serious interest in how Welsh institutions can play a more active role in steering us towards a low carbon future. Grasping this steering role may well require a sea change in the approach and assumptions that surround energy in Wales:
 - from seeing energy investment primarily as a source of inward investment, to be welcomed for its job creation benefits, to viewing these investments as part of an energy system, with connected social, economic and environmental implications;
 - to recognise that achieving an effective and fair energy transition requires more than considering how powers may be passed to the Welsh Government, but how powers to steer energy development are distributed across a variety of actors at different scales
2. These themes inform my main points, which I have organised below under each of the question themes. Although I offer no specific evidence on it, I would also like to emphasise that critical to the Inquiry's decarbonisation objectives is significant progress on reduced energy consumption. This is central to Germany's Energiewende.

The energy mix

3. I note that the inquiry questions lead with issues of energy mix, and ask about the mixture of distributed generation resources that best meets Wales' renewable energy needs in respect to the supply of electricity, gas and heat. I do hope, however, that the committee sees the issues of technology, networks, demand management, ownership and communities as more

fundamentally connected, rather believing that technical feasibility is the dominant, driving concern, for a number of reasons:

4. As analysts of future energy transitions have noted, there are – in technical terms – multiple possible pathways towards decarbonised energy futures. Some pathways, (the traditional ‘bulk power pathway’), might place greatest emphasis on Wales becoming a site for large numbers of industrial-scale renewable energy plants, equivalent in their output to match energy consumption in Wales, thus enabling Wales to achieve one interpretation of what it means to be a ‘100% Renewable Energy Region. Alternative pathways allow a greater role for smaller-scale, ‘distributed’ sources of generation, and closer integration between the provision of electricity, heat, storage, demand side management and transport.¹ So, technology alone does not wholly determine future energy pathways; instead, choices should be more widely based on their environmental, social and economic qualities.
5. Moreover, different pathways have radically different implications for the appropriate distribution of powers. The ‘bulk power pathway’ tends to inform arguments that all is needed from the Welsh Government is to take steps to adjust planning processes to expedite the delivery of major infrastructure projects. Wales is still, in effect, at the ‘end of the pipe’ in governance terms. Other pathways, based more heavily on distributed energy technologies, may require the Welsh Government to acquire the powers to more effectively encourage and coordinate multiple energy flows within Wales. This may entail both the more assertive use of existing powers (e.g. for building energy efficiency) but also more double devolution – enabling actors at city region, local government and community level to take a more active role.

The grid and ownership issues

6. One of the major factors in the UK that has disincentivised the emergence of major new independent actors is the market structure of the grid and distribution network and how this distributes rewards between different companies. It has certainly often been remarked that current arrangements work against new, intermittent sources of energy like wind, solar and tidal/marine sources.
7. Research in Denmark offers ways of thinking about solutions that are highly germane to the Committee’s considerations, in that Denmark is investigating how to move from its present position in which 25% of electricity is supplied from wind to a position where 100% of energy for electricity and heating comes from renewables by 2050. The research of Dr Frede Hvelplund in Aalborg University proposes that the key ingredient is the development of ‘intermittency infrastructure’, whereby renewable electricity supplies are linked to storage, to heat provision (district heating, heat pumps), including (in future) facilities for charging electric cars. This infrastructure helps improve the security of supply aspects of renewable energy intermittency but also reduces costs, by making effective use of periods of ‘surplus’ generation.²
8. A key part of Hvelplund’s argument is that management and operation of this intermittency infrastructure is best achieved by decentralised organisations, such as municipalities. This is because they would operate at a scale that can link and coordinate multiple, fluctuating, small-scale suppliers and sources of demand, and do so with lower transactions cost than other ownership forms. Others examine the case for Municipally-Owned Energy Service Companies performing this role (see footnote 1).

Communities - making the case for change

9. There remain important arguments for encouraging more communities to take an active role in supplying energy and managing demand, in terms of local value capture, job creation and energy security. There is thus a need to keep building on the kind of work done under Ynni'r Fro. However, the 'community energy' agenda also needs to be viewed in a different way if its contribution to wider energy transformation is to be enhanced. There is a need to look at the overall structures and incentives in current systems of energy provision, and the space they allow for such local energy initiatives. The fact that Welsh institutions have a limited role in shaping systems of market support, or grid regulation is unhelpful. Other countries have done better than the UK in, for example, structuring feed-in tariffs to assist community-owned schemes.
10. Moreover, it is likely that the scope for communities to take a lead role in energy transformations is limited by the availability of communities with the cohesion, skills and resources to take a major role in what is a complex and difficult area. Perhaps the language should widen to consider communities as just one part of a wider 'social' or 'civic' energy architecture, in which municipalities, cooperatives or other forms of local enterprises have more of a role. This would better reflect what has happened in Germany, where a diversity of enterprises is involved, not just community-led/community-owned schemes.
11. There is likely to be a positive link to issues of social and political acceptability. An Achilles Heel of the 'bulk power pathway' is social unacceptability: its reliance on major, industrial-scale infrastructure which raises questions about the environmental impacts and distribution of costs and benefits, and the side-effect of placing pressures on government to de-risk such investments by instituting planning processes that delimit the scope for challenge, further exacerbating public distrust and opposition. A more distributed energy pathway, offering an array of mechanisms for social participation, may offer publics more ways to feel that they benefit, and that they have some control, and so may be less prone to public opposition. It could raise new challenges, in the UK, in terms of cultivating public trust in local government.

How to cultivate agency for change

12. Perhaps the most challenging issue is not one explicitly addressed by the inquiry – how does one bring desirable future energy pathways into being? The problem is that energy transition processes that rely heavily on hearing the views of existing organisations inevitably risk being shaped by the short-term interests of those organisations, which creates a high degree of path dependency in future options. Given that the energy landscape in Wales (as in the rest of the UK) is dominated by major energy companies, many of whom have large investments to deliver, it is not surprising that views presented about future energy pathways tend to be dominated by the delivery of projects already somewhere in the delivery pipeline. The challenge for the Committee (and also the Welsh Government) is therefore:
 13. How to gain the insights of the categories of actors that are likely to be very important in alternative future energy pathways, especially those relying more heavily on diverse

and distributed energy activity, but which may be weakly developed at present. The evidence from Denmark and Germany is that action by communities and cooperatives *but especially by municipalities* has been crucial in driving forward the move towards more sustainable energy futures: both in taking action within their local areas, and in maintaining wider national support for supportive policies (such as feed-in tariffs). The Committee should actively encourage evidence from local government, beyond Wales, including those in England which have progressed further in energy provision, to understand how they have been able to do what they have, and what would enable them to do more.

14. How to form a reasoned view on which potentially attractive major energy investments targeted on Wales ought *not* be supported, because their presence in the energy system reinforces the status quo and is likely to divert resources from, and distort progress towards pathways that may be more sustainable in the future. This should include the actions that the Welsh Government might take to accelerate the phasing out of fossil fuels, not just fostering alternatives.
15. How to move beyond recommendations that just list potential actions, to consider seriously how these might be turned into a coordinated programme. Systems of energy provision can be highly resistant to change, and if the Committee is persuaded of the merits of pathways involving greater use of distributed provision, and greater local integration of electricity, heat and demand-side management, then thought needs to be given to how such activities can be layered onto and, over time, displace current modes of energy provision.

¹ See Realising Transition Pathways Engine Room (2015) *Distributing Power: A Transition to a Civic Energy Future*, Realising Transition Pathways Research Consortium.

² Suitable sources for this work include: Hvelplund, Frede; Möller, Bernd; Sperling, Karl (2013)

‘Local ownership, smart energy systems and better wind power economy.’ *Energy Strategy Reviews*, Vol. 1, No. 3, 03.2013, p. 164-170; and, in more simple form,

<http://www.folkecenter.dk/mediafiles/folkecenter/frede-hvelplund.pdf>.

Agenda Item 3

NAW Environment and Sustainability Committee

Evidence from Bridgend County Borough Council

What models for local ownership of generation and local supply of energy would work best for Wales?

Consider there to be five main business models for a local authority to generate and supply energy these are:

1. Becoming a fully licensed supplier in its own right,
2. Forming a joint venture with an energy supplier,
3. Operating under the “licence lite” approach. Under this structure the Council fulfils some operational delivery duties and another company takes responsibility for the remainder.
4. Establishing a partnership with an existing energy supplier. The partnership operates under the suppliers existing licence with the operational aspects of the business being shared,
5. Creating a white label, under which the Council licenses the use of its brand to an energy supplier who uses it to supply energy to local customers.

For reasons of risk and finance I would consider points 2 and 4 to work best within Wales.

What is the appropriate scale for action – national, regional, local or community?

I would advocate that local (local authority level) is the appropriate scale. Bridgend CBC has been progressing with the development of heat networks to offer residents an alternative to gas to heat their homes. The structure and complexity of these schemes means that in many cases the local authority is probably best placed to progress these schemes in partnership with the private sector, offering a brand that is trusted by the public.

The creation of an Energy Service Company at this local level still offers challenges and has associated risks as well as a need to successfully engage with residents in order to build the level of trust and interest required for residents to make the transition away from their traditional methods of heating their homes. Once established at this local level it may be possible extend out beyond the local authorities boundaries and to regionalise at some future point.

Should local authorities be encouraged to take on/reprise their role as energy suppliers?

Prior to the Second World War local authorities through boards had responsibility for providing gas, electricity and water to residents through local infrastructure. The local boards were amalgamated into regional and national entities after the war and formed the basis of the privatised “big six” utility companies in existence today.

Local authorities could play a significant role in the evolution of a de-centralised energy system. The emergence of the concept of local government reprising its role as an energy

provider has coincided with the austerity measures which have seen the most severe cuts to local authority budgets in decades and therefore this can be seen as an area that is not a priority for local government. However, authorities should be encouraged and supported to look beyond financial pressures and the associated risks of developing energy supply opportunities to see the broader benefits both to themselves and the communities they serve.

Generally we would expect that a de-centralised energy system supplying heat and possibly electricity to Bridgend communities would yield the following benefits:

- Job creation and new business opportunities locally but also huge potential with national roll-out.
- Skills and training development leading to a more highly skilled local work force that are advantageously placed to take advantage of new business opportunities across the region.
- The development of a new business model for energy generation and supply which creates new revenue streams for improving local services.
- Greater availability of affordable energy which will address fuel poverty and improve life expectancy.
- Development of a decentralised energy system utilising new energy sources and providing a greater degree of energy security for Bridgend communities.
- The creation of a decarbonised energy supply leading to a reduction in carbon emissions.
- Improved community cohesion through engagement and empowerment of residents and businesses.

What can we learn from local government and other stakeholders elsewhere in the UK?

Local Government in England and Scotland have pushed ahead with the de-centralised energy agenda and could certainly offer organisations within Wales a valuable insight into how to develop the agenda. I would expect them to be able to give advice around:

1. The resource required to create a business model and how this links to the capacity of the local authority.
2. The start-up costs required to develop the business model through to operational capability.
3. The key risks (real and perceived) in establishing a new and viable energy supply business and guidance on how to mitigate the risks.
4. Operational issues associated with running an energy company.
5. Likely levels of income generation for the local authority from the energy supply business.
6. An understanding of the different roles that a local authority could play in the new business.
7. How might the new business help the local authority to meet its wider objectives (e.g. fuel poverty etc.)?

**SOLAR POWER
IS COMING
TO WREXHAM!**



Phil Walton
Strategic & Performance Director
Wrexham County Borough Council



**Predictions are very difficult; especially
about the future!**



GOVERNMENT POLICY

**Floundering with a large degree of
pointlessness!**







Wrexham's Green Credentials.....

2008

- Low investment
- Energy inefficient property portfolio
- Small Renewables budget
- Other Priorities (WHQS)
- Carbon Reduction not corporately significant

2014

- Largest domestic solar PV scheme in UK
- Commercial PV delivered
- Carbon Trust Standard
- High performing Welsh LA in CRC league table
- Established a recycling annual invest to save budget
- Annual renewable budget
- £4m CESP funding levered in
- ECO Procurement framework
- 3 MW solar farm
- Exploring RHI opportunities



Our solar journey.... Conditions for success

- Senior Buy in
- Strategic Priority
- Ambition & Drive
- Innovation & Creativity
- Circumstances / Fortune
- Strong Project Management ethos
- Sound Business Case development
- Prepared to take risks / Holding our nerve!
- Common sense
- The right people!

In the midst of massive FIT uncertainty

Above not normally synonymous with LA's

Set against a backdrop of worst economic downturn in living memory



Project particulars.....

2600+ Houses	175 flats	4.5+ MW
8.2 average no of panels	25,000+ panels fitted	
Up to 3000 tonnes of CO2	Completed in just 190 days	
Over 8000 tenants	£350k + electricity savings for tenants	
63 People employed locally (45%)	All panels made in Wrexham	
£400k surplus expected in 2014/15	Saving up to £100 per year	
Up to £10k FIT income per day	£15m surplus FIT income over 25 yrs	



Summarising the benefits

The environment

Up to 3000 tonnes of CO2 saved pa

The Council

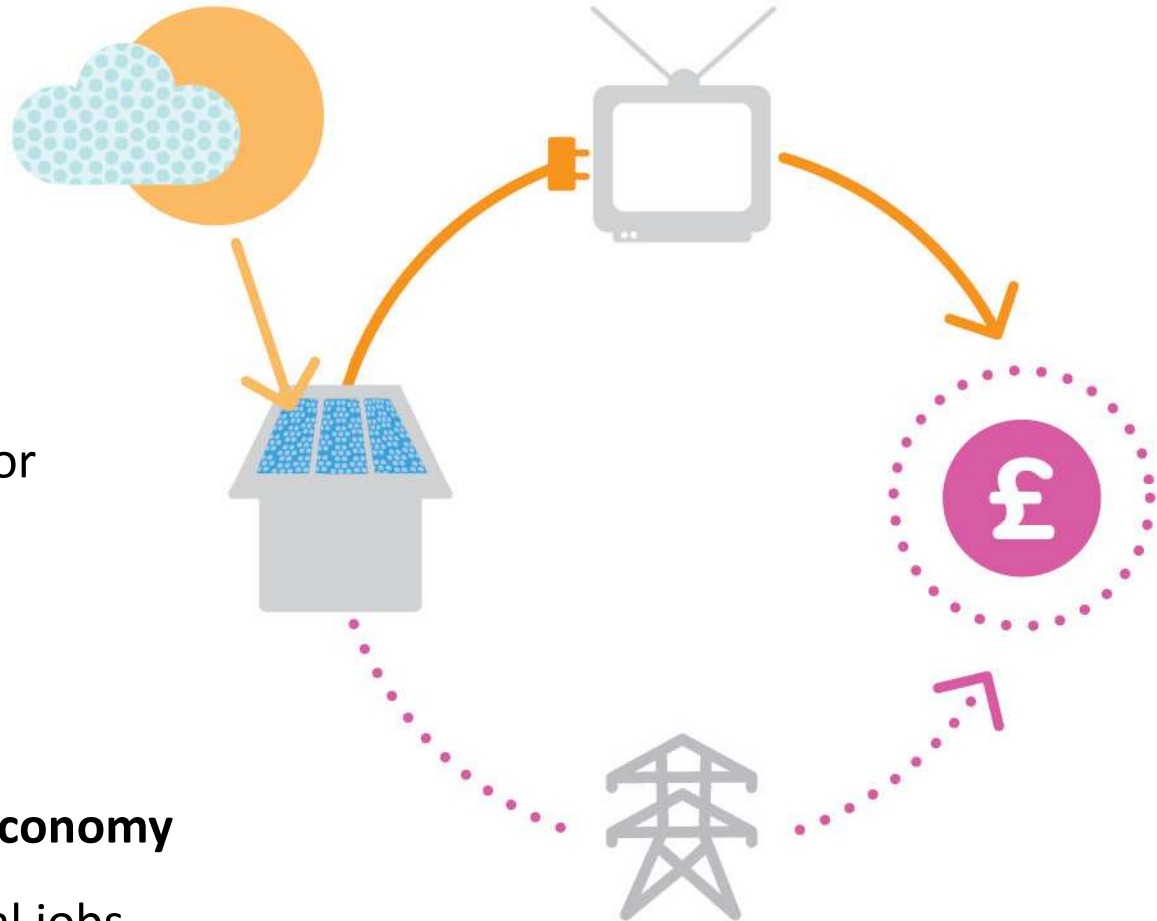
Up to £700,000 income pa for 25 yrs. Also reputation

The tenant

£100 - £300 pa saving

The economy

Local jobs, training, skills etc



Pack Page 24



Stimulating the local economy & supply chains

- 47% of workforce recruited locally
- 75 people (jobs)



Admin / TLO x 9



Electricians x 20



Panel installers x 15



Local scaffold companies x 5



Plus – panels sourced locally



Warehouse staff x 10



What else went well....?

- On time (almost)
- Under budget
- Putting Wrexham on the map / reputation
- Well received by tenants (buy in)
- Procurement
- Outcome of FIT review
- Partnership working
- Local employment
- Communications
- Weather
- Health & Safety



Not everything went to plan....

Pack Page 28



*What do you
want from a
Solar Scheme?*



Wrexham Solar Farm Berthengron Farm, Legacy, Nr. Rhosllanerchrugog



Background

- Carbon reduction and energy efficiency has been a council priority since 2008
- Build on the success of previous carbon reduction projects.

Domestic PV

- Largest Social Housing Solar PV scheme in Europe
- 2700+ properties retrofitted with PV.

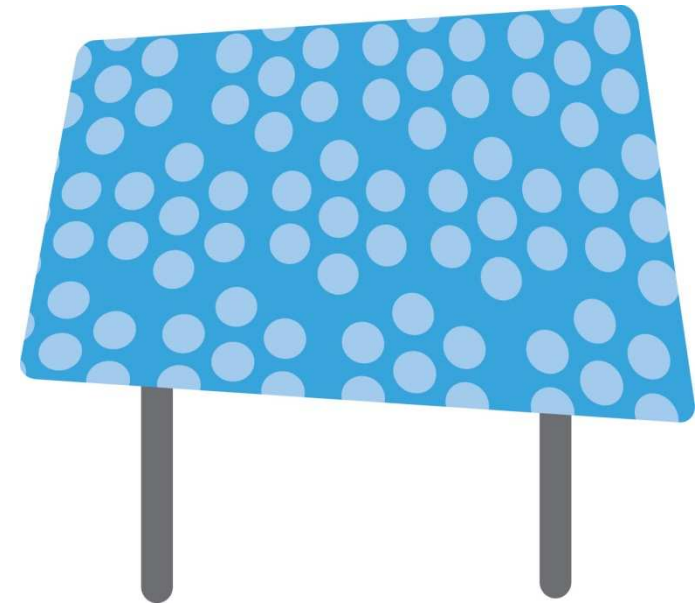


Schools PV

- 15 Schools and 2 commercial buildings retrofitted with PV. This is an installation of almost 0.3Mwp

Why a Solar Farm?

- Building on Wrexham's reputation for delivering large scale solar PV projects
- Innovative use of Council owned assets for securing long term income generation
- Reducing Wrexham's Carbon Footprint
- Reduced equipment costs for solar Installations
- Generation of Green Energy
- Income Generation
- Community Leadership



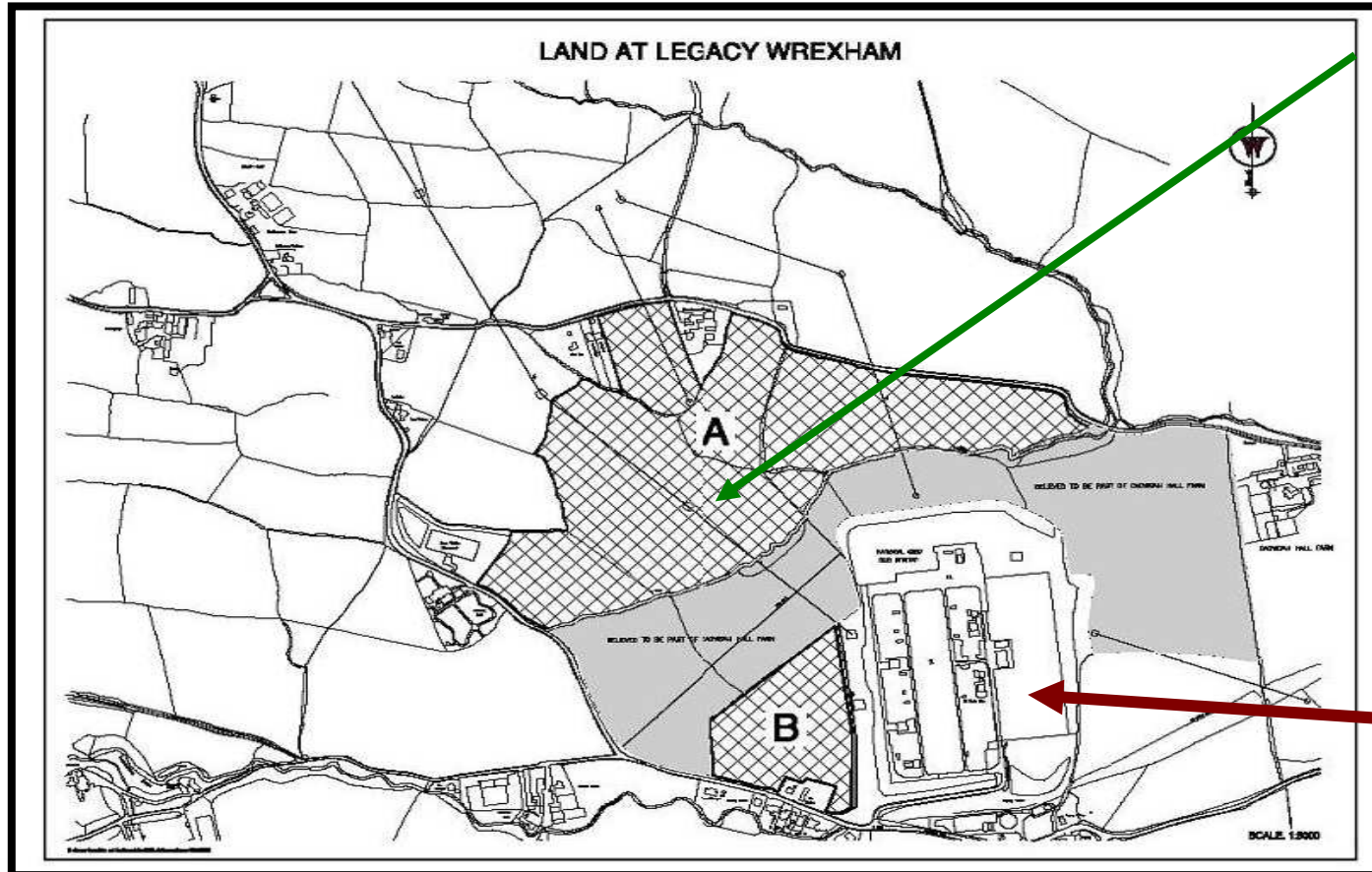
Wrexham's Solar Ambitions

- To establish a procurement framework to permit the delivery of multiple land based solar schemes
- 43.1 acre site of council owned land
- Proposed 5MW solar farm based on land close to the National Grid substation
- Planned 12,000-15,000 PV modules
- Site to retain agricultural use
- Good connectivity to the grid
- Favourable site topography



Site Map

Plot A and B:
Council owned
land



Legacy
Substation

Preliminary Works

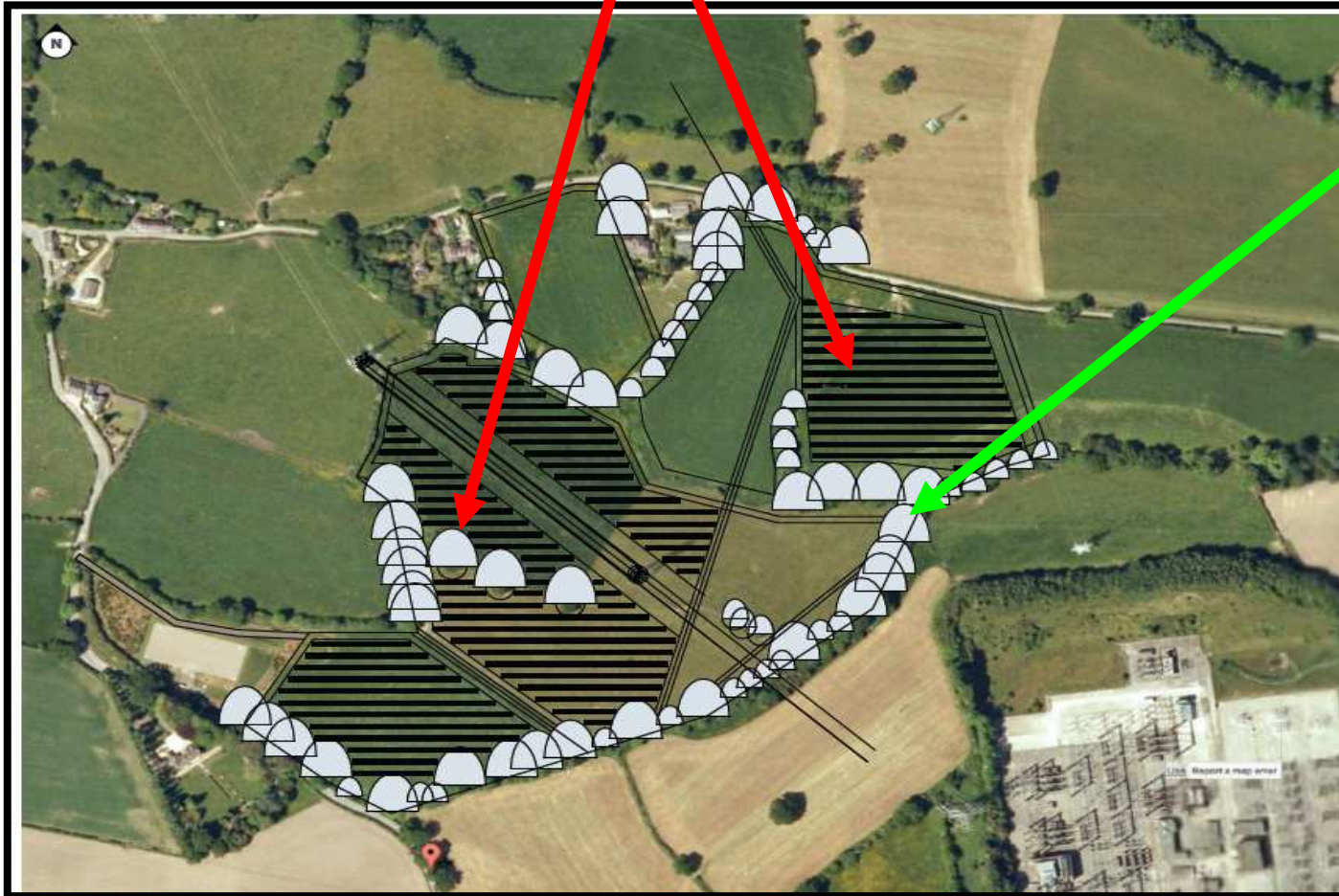
- Prior to work commencing on site a number of processes needed to be completed, these included:
 - Obtaining grid connection agreement with Scottish Power
 - Commission the indicative Design and layout of site to support planning application
 - Establish a procurement framework to appoint contractor
 - Planning application was required. The following main assessments and studies were included in the planning application process:
 - Ecological study
 - Landscape and visual assessment
 - Transport management plan

Site Map

Proposed areas for development:
Location of panels

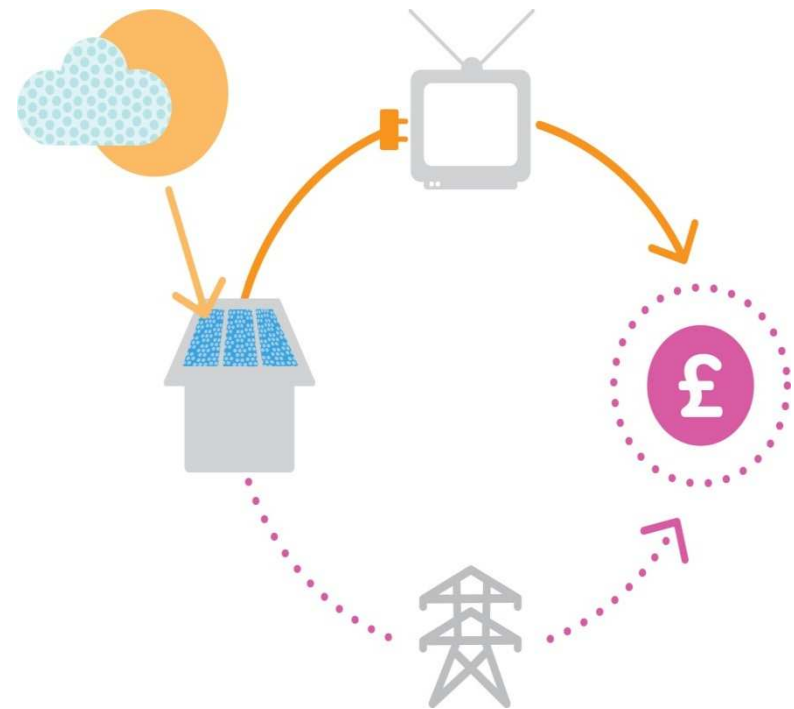
Half moon sections,
indicate areas of potential
shading due to
hedgerows and
trees

Direction
of Solar
Panels



Developing a Solar Farm

- Tenders were issued out before planning permission was granted;
- LPA/Planning Committee postponed the decision and requested site visit;
- Once planning application granted the contract was awarded to British Gas
- Work commenced on site in January 2015
- Scottish Power witness tested the scheme on the 14th May



Lessons Learnt

- Construct a solar farm during the summer months to ensure that poor weather conditions do not affect the deadlines for the scheme
- Start early discussions with the DNO and LPA
- Apply for connection at the early stage
- Sign PPA agreement before you commence construction phase
- Ensure that the grid connection points are on land owned by the local authority and not in third party ownership
- Make sure Community Benefits are agreed before project is approved
- Project/Contract management is a full time job!

Lessons Learnt

- Project/Contract management is a full time job!
- Planning and connection offer to be incorporated into the contract
- Make sure all demands from the DNO are met/agreed with the contractor at the beginning of the contract
- Create OFGEM application early and keep chasing them
- When the construction phase starts approach MOP and Electricity Supplier so you can get meters installed in advance of the system energisation
- Keep chasing legal: wayleaves, easements and internal legal department
- Follow up changes with project Manager, Planning and DNO

Opening the Solar Farm

- The Legacy Solar farm was officially opened by Wrexham Councils Mayoress on the 17th June 2015
- The scheme will provide the Council with an income stream (£2.5M) for the next 25 years and is projected to generate over 57m kWh green electricity





Welcome to the Wrexham Legacy Solar Farm

This farm generates clean electricity which feeds into the National Grid to power the equivalent of 700 homes.

System size:	2.64MWp
No. of solar panels:	8,880
Elec. Generation/year:	2,342 MWh
CO ₂ emission/year savings:	1,272 tonnes

It started to generate green electricity in May 2015. It is the first solar farm owned by Wrexham County Borough Council and the first in Wales to be owned and operated by a local authority.

The farm was installed by British Gas

Croeso i Wrecsam Etifeddiaeth Solar Fferm

Mae'r fferm yn cynhyrchu trydan glân sy'n bwydo i mewn Grid Cenedlaethol i bweru gyfwerth â 700 o gartrefi.

Maint y system:	2.64MWp
Nifer y paneli solar:	8,880
Trydan canhedlaeth / bliwyddyn:	2,342 MWh
Arbedion CO ₂ :	1,272 tunelli

Mae wedi dechrau i gynhyrchu trydan gwyrdd Mai 2015 ac roedd y fferm solar cyntaf eiddo ac a weithredir gan Awdurdod Lleol yng Nghymru.

Mae'r fferm solar yn eiddo ac a weithredir gan Wrecsam Roedd Cyngor Bwrdeistref Sirol a'u gosod gan Nwy Prydain.



Energy and Climate Change Select Committee – Inquiry into future of the UK’s low carbon electricity network infrastructure

British Gas response

November 2015

Executive Summary

Over recent years there has been a series of upgrades to our electricity networks. British Gas believes that we are now in a position where the country's electricity infrastructure is largely well equipped to meet the demands of today's energy system.

We are concerned about the rising impact of network costs on customer bills. Network costs typically account for £270 of a £1,150 dual fuel residential bill (£134 for electricity network costs), and have risen by around 30% over the last 4 years¹. British Gas, alongside other interested parties such as Citizens' Advice², has been keen to ensure that value is delivered for customers.

Long term network demand is uncertain

We recognise that GB's energy landscape will change as more low carbon and renewable generation sources connect to the grid, and progress is made towards the electrification of transport. It is, however, uncertain what direct impact this will have on electricity networks, especially over the long term.

National Grid's 'Future Energy Scenarios' report³ shows that across all 4 of its planning scenarios, total annual electricity demand is predicted to fall between 2014 and 2020. In 3 of the 4 scenarios demand continues to fall or remain broadly flat out to 2030 (relative to 2014 levels), while in the remaining stretch ('Gone Green') scenario, demand increases by ~ 7%.

British Gas considers that increasing energy efficiency, combined with developments such as demand side response, district heating and distributed energy and power will play an important role in helping to offset underlying drivers of demand, alleviating pressure on the centralised grid networks.

We believe that a key focus for policy makers should be based on delivering any new investment at least cost to customers by reducing the need for grid reinforcement. This can be achieved both through the successful deployment of new technologies and smarter optimisation of the networks.

¹ British Gas billing data, based on a 2014 electricity bill

² Citizens Advice, *Many Happy Returns? The Consumer Impact of Price Controls in Regulated Networks*, 2015, [https://www.citizensadvice.org.uk/Global/CitizensAdvice/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20\(2\).pdf](https://www.citizensadvice.org.uk/Global/CitizensAdvice/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20(2).pdf)

³ National Grid, *Future Energy Scenarios*, July 2015

Evolving technologies stand to reduce the burden on electricity networks

Our parent company Centrica published its strategic review earlier this year.⁴ As part of that review both Centrica and British Gas committed to prioritise investment in distributed energy and heating systems.

Distributed energy brings together flexible, local generation, storage and energy efficiency measures. That includes demand side response, enabled by smart metering, as well as battery storage. These schemes are managed by smart energy control centres to ensure costs and emissions are kept as low as possible.

As distributed energy and heating schemes deliver power and heat locally, very close to sources of demand, they will often use less of the centralised network infrastructure, and will help improve energy productivity by reducing losses.⁵ They can also help reduce or avoid demand at peak times, reducing network charges for those using the schemes and reducing the need for additional investment in network infrastructure itself and centralised generation. When pricing signals, such as network charges, are cost-reflective this should all allow energy to be delivered to customers at least-cost.

Certainty over the policy framework and the future roles of DNOs

The incentives for communities and businesses to invest in district heating and distributed energy schemes is based across a range of policies, many of which are currently under review (i.e. FiTs, RHI, energy efficiency, business energy efficiency taxation and planning policy). In order to ensure the long-term development of this nascent market, and the cost benefits which can be brought to the electricity network, we believe that greater policy and regulatory certainty is required.

We also consider suppliers and community generators will be the prime route through which distributed energy and district heating schemes are delivered. We believe both National Grid and network operators should retain independence, so as not to foreclose the market to suppliers and other investors. We also believe that the development of customer facing functions across network operators would increase DNO operating costs unnecessarily, and is unlikely to deliver best value for customers.

⁴ Centrica Strategic Review, July 2015, <https://www.centrica.com/news/interim-results-2015-and-outcome-strategic-review>

⁵ 54% of energy used in generation is currently lost in the network. DECC, 2015, Digest of United Kingdom Energy Statistics, Chapters 5 and 7.

Question1 - What are the limitations of today's electricity infrastructure and how can these limitations be addressed?

Over recent years, there have been a series of upgrades to the electricity networks. British Gas believes that we are now in a position where our electricity infrastructure is well-equipped to meet the demands of today's energy system.

National Grid's 'Future Energy Scenarios', and DECC's 2050 Pathways Analysis both set out a range of different scenarios for the deployment of new technologies, such as renewable electricity generation, electric heat pumps, electric vehicles and micro-generation.

The extent to which these technologies are deployed, and the manner in which they are deployed (i.e. as part of a distributed energy or district heating network) will have a bearing on what levels of additional investment may, or may not, be required in the electricity networks.

To date we have not seen sufficient growth in this sector to warrant substantial upgrades to electricity infrastructure. If, in the future, changes are needed to ensure the networks can meet shifting demands, this must be done cost effectively. Government and the Select Committee should consider how our networks can evolve, without the need for costly upgrades, which ultimately add costs to consumer bills.

British Gas believes there are a number of alternative ways to meet new stresses placed on the electricity system. These are more cost-effective than would be possible through traditional methods of grid reinforcement.

We believe that distributed energy, district heating schemes, smart grids and low-carbon gas-based technologies (such as gas absorption heat pumps) have an important role to play in helping reduce or slow the need for electricity infrastructure upgrades.

Distributed energy brings together flexible, local generation, storage and energy efficiency measures. These schemes are managed by smart energy control centres to ensure costs and emissions are kept as low as possible.

As distributed energy and heating schemes deliver power and heat locally, very close to sources of demand, they will often use less of the network infrastructure. They can also help reduce or avoid demand at peak times, reducing network charges for those using the schemes and reducing the need for additional investment in network infrastructure itself and

centralised generation. When pricing signals, such as network charges, are cost-reflective this should allow energy to be delivered to customers at least cost. This makes it important that network charges should therefore seek to reflect accurately the costs of network reinforcement to customers.

In addition, low-carbon gas-based technologies and heat networks also have the ability to reduce the need to make changes to the electricity infrastructure. Emerging technologies, such as microCHP, are not intermittent and generate most of their electricity at peak generation times, thereby reducing pressure on the grid. Heat networks also create new infrastructure, which can be used with different technologies as new, lower-carbon technologies emerge.

Question 2 - What will a low carbon network look like, what are the challenges for Government and other bodies in achieving it, and what benefits (environmental, financial or otherwise) will it bring to the UK?

British Gas recognises the potential benefits that a low-carbon network can deliver for customers across the UK.

The UK is expected to see an increase in the use of electricity as a source of heat and transport in the coming years, changing demands on existing infrastructure. At the same time, new smart technologies are expected to lead to the emergence of self-balancing homes, businesses, communities and micro-grids.

Taken together, these innovations and developments fundamentally change the relationship between the customer and the supplier, turning consumers into 'prosumers' (customers who both produce and consume energy). These changes have the potential to mean the low-carbon network will essentially become a back-up or insurance system – as opposed to the extensive smart infrastructure network that has previously been anticipated.

Much of the innovation described above is dependent on a range of Government policy and regulation. Feed in Tariffs (FiTs), the Renewable Heat Incentive (RHI), planning policy, tax incentives⁶ and energy efficiency policy (ECO) all send market signals to investors looking to

⁶ We note that HM Treasury is currently consulting on additional incentives which could increase the uptake of business energy efficiency. We believe Government should consider incentivising measures such as battery storage and solar as part of this, to increase adoption of distributed energy solutions. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/464304/PU1853_business_energy.pdf

develop district heating and/or distributed energy projects. In light of recent changes to FITs and wider policy, such as Zero Carbon Homes, we believe Government needs to clearly articulate the future trajectory of these policies, to provide the certainty investors require.

More fundamentally we note that the existing network pricing framework (i.e. STOR, Triads etc) is driven by physical grid considerations. As we transition into a shared services environment where suppliers and commercial businesses play an increasing role, thought will need to be given to how the pricing system can evolve.

Finally, we also note that some elements of the existing framework for setting transmission network charges also act as a disincentive to storage units seeking to export power to the grid. Storage units are effectively charged twice as transmission network charges impose charges when energy is imported from and exported to the grid, unlike generation only assets which only pay grid charges once. We believe this discrepancy should be addressed as part of wider preparations for an energy future which includes more battery storage.

Question 3 - How can we ensure that a low carbon network is designed and operated fairly and in a way that helps to minimise customer bills?

British Gas has taken a close interest in network costs as they have risen over recent years.

In the previous Parliament, we provided evidence to the predecessor ECC Committee that network companies are making returns consistently above the allowed cost of equity and that they should be subject to the same external scrutiny as other parts of the energy supply value chain⁷. The Committee recommended that network regulation be subject to an independent audit and, since then, Citizens' Advice has also called for referral to the National Audit Office⁸.

Related concerns led us to appeal the electricity distribution price controls of five of the six main Distribution Network Operators to the CMA for investigation.

⁷ Written evidence submitted by British Gas (NTC0030)
<http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/energy-and-climate-change-committee/network-costs/written/8309.html>

⁸ Citizens Advice, *Many Happy Returns? The Consumer Impact of Price Controls in Regulated Networks*, 2015, [https://www.citizensadvice.org.uk/Global/CitizensAdvice/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20\(2\).pdf](https://www.citizensadvice.org.uk/Global/CitizensAdvice/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20(2).pdf)

In its response to this appeal, the CMA decided a reduction in revenues of £105m across all 10 slow-track networks between 2015 and 2023 be made to the £28.7bn revenue allowances granted to the relevant networks over this eight year period.⁹

We believe that another, important outcome of our CMA appeal is that the CMA has been able to identify a number of areas where network regulation can be improved, particularly with regard to transparency and third-party engagement. As these are acted upon, we expect the improved regulatory practice should be beneficial for all parties – customers' interests will be further protected through enabling more informed engagement; networks will benefit from the increased certainty a more rigorous process brings. The National Audit Office could play a valuable role in assisting the regulator as it seeks to learn the lessons from the CMA's conclusions.

Finally we believe that a key way to manage costs that are passed on to customers' bills is likely to be to reduce the need for grid reinforcement and on-going maintenance charges. This is exactly the opportunity that is presented by the development of distributed energy and district heating schemes.

Question 4 – How can we ensure that grid connections are readily accessible across the country and that costs are fair?

We think that network costs should be charged on a cost-reflective basis as this would ensure value-for-money for customers by encouraging the most economic solutions.

Previous debates on transmission network charging have raised the question of socialising/smearing the costs of transmission nationally, i.e. all generators (and all demand users) would face a uniform unit rate irrespective of their geographical location. 'Project TransmiT', Ofgem's last review of transmission network charging, rightly rejected socialisation because of its economic inefficiency. We agree that socialisation would distort efficient locational signals as it would lead to network users ignoring the costs they avoid/create by locating on particular parts of the network. It is therefore essential that cost-reflective locational signals remain a core part of transmission charging arrangements going forward, as this will lead to lower overall costs in the long run.

⁹ Competition and Markets Authority, *British Gas Trading Limited v The Gas and Electricity Markets Authority: Final Determination*, September 2015, https://assets.digital.cabinet-office.gov.uk/media/5609588440f0b6036a00001f/BGT_final_determination.pdf

Question 5 - What are the key technologies available today and how effectively do Government and Ofgem incentivise innovation and development of the grid and grid technologies?

Key technologies available today include:

- Smart Metering & Consumer Access Devices
- Smart Appliances
- Storage (including battery storage)
- Electric Vehicles
- Heat Pumps (including Gas Absorption Heat Pumps)
- Thermal Storage
- Solar Photovoltaic (PV)

In addition, increasingly sophisticated and open connectivity and communications technologies are being developed which allow automatic demand response to be enabled from existing and new assets.

Government and Ofgem currently incentivise innovation of the grid and grid technologies through funds for demonstration of near-to-market technologies, and earlier-stage R&D investment.

For example, The Low Carbon Networks Fund (LCNF) was set up in 2010 by Ofgem to provide up to £500 million in support over five years to trial new technologies through projects sponsored by the DNOs.¹⁰ The LCNF has committed over £250million to a range of projects that demonstrate storage, EV charging, demand response, distributed generation, and advanced monitoring and control technologies. European funding, via Horizon 2020, also exists to run similar trials.

British Gas has been involved in three LCNF projects where we trialled a variety of demand side management propositions for customers. Our involvement in these trials presented compelling results around the impact of customer Time of Use tariffs (ToU), which resulted in a reduction in peak consumption for customers which persisted throughout the trial. In addition, the majority of customers participating in the trial saved money, and 95% of customers said they would chose a multi-rate tariff compared to a standard rate tariff.

¹⁰ Ofgem, *Electricity Distribution Price Control Review Final Proposals - Incentives and Obligations*, 2009, https://www.ofgem.gov.uk/sites/default/files/docs/2009/12/fp_2_incentives-and-obligations-final_0.pdf

Going forward, we suggest there is a need to focus available funding on more commercial trials and better enabling routes to market. We would also like to see funding via different routes (not necessarily the DNOs) and the possible introduction of longer term tax-based incentives, for technologies, such as battery storage, which are close to market and will have a significant positive impact on our ability to balance and manage pressure on the grid at peak times.

We would also be interested in trialling the integration of different technologies within a local energy system at a large scale, to understand the impact of grid technologies when they work together.

Question 6 - What impact will changes to the electricity system – including distributed energy generation/storage, demand response and interconnection – have on the role of National Grid and the Distribution Network Operators? (e.g. in terms of ownership structures, responsibility for system balancing and system security)

At this stage, the impact of decentralised generation is unknown, although a number of industry analysts, including PwC, indicate that distributed energy stands to play a ‘key transformative role’ in the sector, challenging the traditional model of centralised generation.¹¹

To ensure innovation and value for money for customers, we believe the DNOs’ role should be to facilitate an open and transparent market place, where competition exists between different market players, such as aggregators, suppliers and energy services companies.

Given the monopoly status of the DNOs and the current price settlement mechanism, any significant change in the role of the DNOs would result in increases in consumer bills, and could have potentially detrimental impacts on competition. DNOs do not have the capability or infrastructure to engage directly with customers, so suppliers and independent generators will need to retain their interface with customers.

Distributed generation may also have an impact on National Grid, as it will need to deal with more intermittency on the grid from renewables. To combat this, we believe it will be necessary to develop more sophisticated products and services for flexibility and ancillary services.

¹¹ PwC, 14th PwC Global Power and Utilities Survey, May 2015

Question 7 - What lessons can be learnt from low carbon electricity grids from other countries?

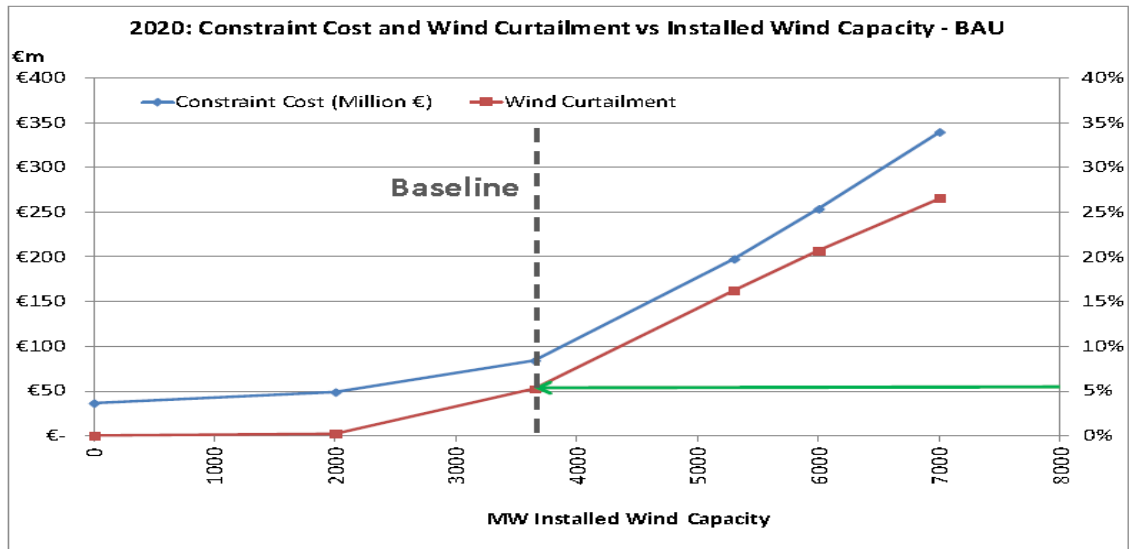
As well as supplying energy to British homes and business through British Gas, the Centrica group also includes Bord Gáis Energy – which supplies over 750,000 customers with energy in Ireland.

Experience from the system in Ireland shows that moving towards a low carbon grid is as much about changing the operation of the existing grid and enhancing the services provided to the grid as developing the infrastructure. Facing operational problems related to changing power flows, system stability and resource variability in a system with over 40% renewable wind generation; the Irish industry began a process to enhance the services available to and on the grid.

This programme – the ‘DS3 Programme’ – is currently in progress and is focusing on developing market signals for new investment in flexible services (including generation, storage and demand), implementing new performance systems and processes and developing new tools to enable the system operators to operate and manage the system with increasing levels of variable generation and demand.

With reference to Figure 1 below, the studies by the Irish system operators showed that without the required support services to facilitate the rising level of variable renewable generation, system operators would have to curtail renewable generation to maintain the system within its frequency and voltage standards. It was estimated that this would increase system constraint costs by a factor of 5 and would prevent Ireland from achieving its renewable targets and low carbon ambitions.

Figure 1: EirGrid Study Analysing the impact of rising renewable generation levels on curtailment and system constraint costs



In focusing on system services as much as system infrastructure the aim of the DS3 programme is to ensure that the benefits of a low carbon economy are delivered to customers in practical terms and at minimum cost by optimising the existing infrastructure.

From an infrastructure point of view, the Irish experience also points to the need to develop and roll out a practical, simple and engaging stakeholder engagement strategy as part of any large infrastructure strategy.



Community Housing Cymru supplementary written evidence

CHC mentioned the “Our Power” energy supply model in Scotland when giving oral evidence to the Environment and Sustainability Committees inquiry into a smarter energy future for Wales and were asked to provide further written evidence on this model. Please see several links with information below, including a link to their website, a presentation that Our Power has been delivering at events and a press release:

<http://our-power.co.uk/>

http://chcymru.org.uk/uploads/events_attachments/Ein_Pwer_presentation_Sept_15_.pdf

<http://news.scotland.gov.uk/News/Power-to-the-people-1b3b.aspx>

We would be happy to discuss this model and other models further. Please see some supplementary evidence below which relates to some of the points that CHC raised in the oral evidence session.

1. Retrofitting existing homes should be the main focus. The longevity of *homes* means that around *two-thirds* of the *homes* that will be standing in 2050 had already been built before 2005. RSLs are a key part of the solution to delivering economic, social and environmental benefits i.e. tackling fuel poverty, creating jobs and decreasing carbon emissions. We need long-term partnerships with Welsh Government, Ofgem, Distribution Network Operators and other partners and when considering the supply of new homes, long-term partnerships with builders, colleges and other partners. Our vision is one which encourages local ownership and supply of renewable energy generation. We need a renewable energy vision and strategy. There is a need to be smart by reducing energy demand via behaviour change, insulation, innovative electronic control systems, etc. We need to be Smart by reducing energy demand first and then follow up with whole house retrofit packages (insulation mainly) and when you have achieved a good SAP rating, consider renewables but only when energy generated via renewables isn't lost because previous measures such as insulation stop energy leaking out of the home.
2. Any energy that is supplied should be supplied sustainably and this transition to a low carbon energy future must be socially just e.g. energy efficiency schemes should not be regressive in nature. CHC would like to see funding ring-fenced for non profit bodies who are supporting low income households etc and are able to tackle fuel poverty more directly. Why can't Distribution Network Operators prioritise non profit local organisations who support people in fuel poverty.
3. We can't just wait for powers to be devolved. We have to act now and have a bigger voice/influence at a UK Government level and more encouragement for e.g. local energy



supply. Welsh Government can have a significant influence on electricity consumption by households. RSLs are ideally placed for driving behaviour change. If we were to call for powers in one area, Welsh Government needs to seek additional or separate powers in relation to Energy Companies, the Energy Company Obligation etc. Whilst these areas are solely controlled by Central Government, Wales will continue to be in the position of responding to changes rather than driving them e.g. feed in tariffs. CHC welcomes the devolution of powers over all aspects of energy, including consumer matters, so that we can legislate, for example, to put an end to companies' powers to disconnect any home from gas or electricity and therefore putting energy companies on the same footing as water companies. There are many ways that the market could be regulated to better protect people in Wales, for example putting energy companies on the same footing as water companies so that they're forbidden from disconnecting customers, regulations over social tariffs and the requirement for companies to offer these to vulnerable people and extending regulations against miss-selling of tariffs to online forms of marketing. We also need to address energy company misbehaviour over direct debit tariffs.

4. CHC welcomes Welsh Governments reference in its consultation on an energy efficiency strategy to rural proofing and rural screening tools as part of good policy making. We know that poor energy infrastructure means that many homes in Wales are off grid (almost 20%) and therefore will typically pay more for their energy. There is no regulator for off-grid fuels, which is a key issue that needs to be addressed. Rural poverty in itself is very often well hidden and isolated in pockets, and this means that it may not be recognised by measures such as the Welsh Index of Multiple Deprivation. Furthermore, with Digital Exclusion typically being higher in rural parts of Wales, Digital exclusion means that many households don't have access to the best tariffs, which more often than not are available online only. We cannot properly protect Welsh consumers from price rises without obtaining further energy powers and the ability to regulate the energy market. In Wales, we pay an average of between 5 per cent and 10 per cent more for our energy than elsewhere. This is due largely to poor energy infrastructure for rural and post-industrial areas, the failure of competition to work in the market; and poor digital infrastructure. Off-the-gas households pay the most to heat their homes and due to their geographic isolation, they are the most hard to reach households in Wales. Grant support for energy efficiency projects in these communities is essential if we are to target households that are likely to be experiencing 'extreme fuel poverty', living with inadequate heating regimes, affecting their health and likely the fabric of their properties. The physical nature of fuel poor households (e.g. low income families living in solid wall and off-gas properties) highlights the need for schemes to move beyond lower cost measures (often as a single measure) and instead deliver packages of measures that will sufficiently raise household energy efficiency ratings. A minimum standard for energy efficiency could buffer low-income households from the impacts of future fuel prices. Welsh Government in its Warm Homes programme have rightly tried to focus on homes



at the greatest risk of fuel poverty and sought improvements which can be made at the lowest cost to the taxpayer. More support and investment is needed generally, but particularly so for rural households. Housing Associations have significant numbers of low performing and hard to treat properties which house many vulnerable/low income families and require more expensive energy efficiency measures.

5. Housing and health- Fuel poverty is responsible for a number of excess deaths. In England and Wales there were 18,200 estimated excess winter deaths (EWDs) in 2013/14 representing 11.6% more deaths in the winter period, compared with the non-winter period. A report by Age UK claims that illness related to living in a cold home costs the NHS £1.36bn every year. Wales should be exploring the potential for “Boiler Prescription Scheme” projects that we have seen in England. Another good practice example includes the warm homes healthy people fund which was actually established by the Department of Health in the UK Government. These are funds for local initiatives that demonstrate how local authorities will reduce deaths over the winter months. It provides funding to deliver energy efficiency and heating improvements to the most vulnerable people, provides residents with benefits advice, ensures better public awareness of the impacts of cold weather and provides staff and volunteers with fuel poverty/cold weather awareness training. More funding like this should be made available for organizations in Wales, including RSLs and Care & Repair Agencies.
6. Investment- CHC would like to understand whether the Green Investment Bank, for example, could be a useful avenue for funding energy efficiency and renewable energy projects in Wales. The KfW bank in Germany, for example, has provided significant investment into energy efficiency, corporate environmental protection and renewable energies. The German development bank KfW borrows freely and is transforming the energy efficiency of the nation's homes. KfW is owned by the German state. There is potential within Wales to replicate projects such as the Energiesprong project in the Netherlands. See here for the Energiesprong website <http://www.energiesprong.eu/>
7. CREW Regeneration Wales’ research into the Low carbon skills requirements for the regeneration and built environment professional services sector in Wales, clearly illustrated that energy efficiency supply chain skills are not limited to the trade level of skills development, but identifies critical skill gaps in the professional services sector in key provision including planners, architects, engineers, road designers and landscape architects¹. As well as up-skilling installers, there is a need to introduce training and apprenticeship schemes to make sure installation skills are not lost to the industry. This includes improving links to schools/education, educational programs at all levels (including professional training and development), improvements to education and training throughout the industry in order to replicate the design and construction skills,

¹ <http://regenwales.org/upload/pdf/110612105831Low%20Carbon%20Skills%20Research%20-%20Full%20Report.pdf>



knowledge and experience gained through experimental retrofit projects, the increased presence of skills on the government agenda, more education around fabric first, more retrofit related CPD, etc

8. Consumer demand for energy efficient homes and whole house retrofit is a big issue. There is a need for far greater levels of public engagement and appetite for low carbon technologies. Lack of information, consumer awareness, interest, and understanding are all still barriers, as well as awareness of the measures, solutions and technologies available. There is a lack of a coordinated marketing approach and independent and consistent advice. Easy access to clear and relevant information on energy issues and the support available is a critical element of tackling fuel poverty in Wales. This advice needs to reflect consumer needs and circumstances. There is currently a range of organisations that provide advice to consumers on energy issues. To avoid confusion the system needs to be simplified and better co-ordination is needed between these services. All avenues and incentives need to be explored for people to take up energy efficiency measures e.g. perhaps there should be a council tax incentive if people carried out energy efficiency works
9. CHC outlined a range of clear messages around innovation and energy storage and other technologies in our original written submission to the committee and we would welcome on-going dialogue with the committee regarding how we can tackle these challenges and opportunities together in the future. CHC feels that its Registered Social Landlord members can play a significant role in partnership with others to lead the development of local and community based Smart Living energy demonstrator projects.
10. Future Generations Act-There is potential within the FG Act to address some of the issues raised in the committee inquiry. One of the indicators mentioned for example in the FG Act indicators is a minimum SAP rating. There is also issues such as embodied energy which is the energy used in manufacture and movement of materials – there is a need to reduce carbon impacts from the manufacture and supply of construction materials, space and water heating, power for appliances and lighting, water and sewage treatment, and transport.

Agenda Item 7

Document is Restricted