

National Assembly for Wales
Environment and Sustainability Committee

A Smarter Energy Future for Wales

March 2016

Cynulliad
Cenedlaethol
Cymru

National
Assembly for
Wales



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

Tel: 0300 200 6565
Email: SeneddEnv@assembly.wales
Twitter: [@SeneddEnv](https://twitter.com/SeneddEnv)

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Environment and Sustainability Committee

The Committee was established on 22 June 2011 with a remit to examine legislation and hold the Welsh Government to account by scrutinising expenditure, administration and policy matters encompassing: the maintenance, development and planning of Wales's natural environment and energy resources.

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Plaid Cymru
Arfon



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Welsh Labour
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What Wales must do

1. Establish a clear vision for its future energy policy, including a central role for local energy.
2. Set annual targets to reduce demand for energy and help people to use it more efficiently.
3. Aim to meet all of its energy needs from renewable sources and, in the context of the need to reduce carbon emissions by at least 80% by 2050, set a target date for achieving this.
4. Ensure that national carbon emissions and demand reduction targets become local duties. They should be delivered through the framework set by the Well-being of Future Generations Act.
5. Urgently revise Building Regulations to ensure that all new houses are built to 'near zero' energy standards.
6. On completion of a successful trial of SOLCER type homes at scale, move to extending its energy efficiency requirements for new homes beyond 'near zero' carbon to a level of efficiency where surplus energy is produced.
7. Upscale and extend the Welsh Government's existing retrofitting schemes – NEST and Arbed, adopting a 'warm zones' model to ensure a joined-up approach to delivery in areas where badly insulated housing, fuel poverty and poor health coincide.
8. Explore linking the cost of stamp duty land tax to the energy performance of a house to start to increase the value of energy efficient homes.
9. Set up an 'umbrella' not-for-profit energy service company. Under this umbrella local authorities, city regions or communities can offer energy supply locally.

10. Urge the UK Government to enable Ofgem to allow prioritisation of local supply to local users in Wales
11. Have a much greater say over how the grid, Distribution Network Operators and energy companies operate.
12. Provide, attract and facilitate financial, technical and research support for energy storage, as part of the wider priority to be given to local energy supply.
13. Amend planning policy so that it prioritises local and community renewable energy projects and requires the carbon impact of new developments to be a key factor in planning decisions.
14. Deliver our previous recommendations about streamlining planning and permitting processes in full.
15. Establish a loan scheme, similar to the CARES loan scheme in Scotland. Welsh Government should work with Community Energy Wales to deliver the scheme.
16. Maximise all sources of funding. This includes making the best use of European funding.
17. Provide ‘hand holding’ support and advice for local and community projects to secure the necessary funding for local and community energy developments, alongside wider project development support.
18. Provide policy certainty as this will create skilled jobs and increase training opportunities. This certainty will increase confidence in industry and the skills providers that investing in training will pay off.
19. Develop local supply chains to support renewable energy technologies and energy efficiency measures.

Foreword

Limiting future climate change by radically reducing the amount of carbon released into the atmosphere is one of the greatest challenges faced globally and yet addressing this challenge also presents opportunities to significantly enhance the well-being of current and future generations.

Underpinning the moral case for reducing Wales's carbon emissions are international and domestic commitments to limiting average global temperature rises. In Wales we have taken a further step by establishing a legally-binding emissions reduction target.

Wales's only chance of meeting this target is to transform the way we all think about energy; its generation, distribution, storage and conservation.

Contributing to this target is important, but such a transformation offers much more besides.

That is why we devoted our first and last years of this Assembly to finding a way to a smarter and more secure energy future for Wales.

When faced with such a challenge, it is easy to assume that such a level of change is impossible, that the obstacles to such a transformation are insurmountable. Germany offers us an example of how this challenge can be met and overcome.

Last April, we visited communities and policy makers in South-West Germany to see how the energy transformation - the Energiewende - had taken hold. What we saw in Germany reinforced the case for change and showed us what was possible if the right mix of leadership, policy and regulation is applied. We saw many inspirational examples of what could be achieved if policy makers are brave enough to take hard decisions and when communities start to control the shape of their future.

Much of what we learned in Germany can be applied to Wales, but it is clear that significant advances can be made towards a smarter energy future with brave and ambitious standards that must be met if Wales is to succeed. Such ambition must be supported by government. In the devolved context, there is always a question of powers. Further powers for Wales will need to be considered in order to deliver the vision we set out in this report, but there is much that can be done now within the existing devolution settlement that could lead Wales towards a lower carbon energy future.

What must be done to deliver this transformation?

It starts with leadership. A clear and stable policy direction is essential. Citizens, business and the public sector need to know what is expected of them and to have confidence that this expectation will be consistently applied.

This policy must lead Wales to a decarbonised energy system, with domestic energy needs being met from renewable sources. Evidence suggests that Wales can go further and become a net exporter of green energy too; enhancing its contribution to UK, EU and global emission reduction targets.

After the landmark deal on climate change in Paris last December, reducing carbon emissions through local energy supply to local markets must be the foundation of this new policy.

Whilst larger-scale inward investment projects will continue to play their part, they must not divert resources away from nurturing diffused local solutions.

The ownership and regulation of generation, transmission, distribution and supply infrastructure must be flexible enough to allow this level of innovation.

The conservation of energy must be addressed; both in terms of new buildings and our existing stock.

Welsh Ministers have the power to ensure that every new house that is built meets the highest energy efficiency standards. Affordable and scalable models for this type of housing have been developed in Wales. With unprecedented levels of new housing planned in the coming decade, how can we in Wales in all conscience allow energy inefficiency to be locked in for future-generations to deal with? Such is the expected level of development that there is an opportunity to design smarter places that integrate transport, energy and communications infrastructure in a way that enhances the well-being of its eventual inhabitants whilst contributing to emissions reduction targets.

Making this happen is the responsible thing to do. The task of improving Wales's existing housing stock is substantial, and government cannot add to this by avoiding the difficult decision to raise the bar for new builds as soon as possible. If this is not addressed, the needs of future generations will be compromised in meeting the needs of current generations.

Taking a lead in this area can bring first-mover benefits as 'Made in Wales' solutions could become exportable; providing much needed growth and jobs.

Such a bold step will pose challenges to the construction sector. We want these challenges to be met by the sector so that the opportunities opened in meeting these challenges are realised. If there is an unwillingness to meet the aspirations that we have for our future, then the German experience shows us that new supply chains and partnerships will emerge to fill any gap that is left. Under either scenario, the opportunity for the Welsh economy is substantial.

Emerging storage technologies, both for heat and electricity, must be supported and developed, as integrating storage into this transformation offers some exciting possibilities. For example, making the link between storage and sustainable modes of transport (public and private) can have a multiplying effect on carbon reduction.

What are the benefits of transforming Wales's approach to energy?

We have predicated this approach on the overarching societal benefit of reducing carbon emissions. But we know that the single biggest motivator for change will be demonstrating the potential for cost reductions to household energy bills.

A reduced need for energy and more local supply would lead to lower bills and greater energy security in the long term. This, in turn, will reduce fuel inequality.

New high-quality jobs will be created to develop and service new energy systems (for the delivery of heat and electricity) and build smart communities throughout Wales. If communities and citizens can be empowered to control their energy future, they will derive real and lasting benefits from this change.

The responsibility to ensure a smarter energy future is shared by every one of us in Wales. We must each play our part if we are to meet the challenges we face and take the opportunities presented to us. For everyone to have the opportunity to play their part, the next Welsh Government must provide the necessary leadership to set the vision and framework for this change.

Wales must seize opportunities to transform its approach to energy now.

Wales must:

- Establish a clear vision for its future energy policy, including a central role for local energy.
- Set annual targets to reduce demand for energy and help people to use it more efficiently.
- Aim to meet all of its energy needs from renewable sources and, in the context of the need to reduce carbon emissions by at least 80% by 2050, set a target date for achieving this.
- Ensure that national carbon emissions and demand reduction targets become local duties. They should be delivered through the framework set by the Well-being of Future Generations Act.



01.A vision for a smarter energy future.

The need for clarity in energy policy

1. There is widespread support for smarter energy in Wales. However there are concerns about a lack of joined up, strategic vision with some conflicting messages about future priorities. We are calling for a holistic approach to energy policy, with energy taken into consideration across all policy developments. The Well-being of Future Generations (Wales) Act 2015 (the Future Generations Act) and the Environment (Wales) Bill should be used to set the framework for this policy.

“In terms of the overall vision for energy in Wales, there is a need to develop a stronger, more cohesive vision for energy policy overall in our country and that that vision needs to play an integral part in motivating people across our society and in mobilising resources across our society for transition to a low carbon, sustainable Wales”. – Dr Malcolm Eames, Cardiff University

2. Across the UK, innovative smarter energy projects are being developed and are thriving, including Smart Cities, local energy supply and new ways of storing energy. Wales must actively engage with public and private partners to grasp opportunities for similar developments, sharing best practice and learning from experiences elsewhere.

“It’s a whole-system view of the energy system of the country—the existing assets that you’ve got, the connectivity between those assets and how you optimise that to provide the energy for the local people”. – Paul Brodrick, Siemens

3. There are tough decisions to be made about the balance between large and small scale, indigenous and foreign energy investment in Wales. The vision for smarter energy should have the confidence to prioritise the development of local energy supply systems to benefit local communities, as set out in the 2015 Green Growth: Local Energy document.
4. Wales does not need to wait for more powers from Westminster to achieve the majority of our smarter energy vision; we can start now.

Where additional powers are needed, Wales must make a clear and convincing case for their devolution to Wales.

Targets to drive progress

5. We know that greenhouse gas emissions are contributing to global warming. In order to reduce these emissions carbon budgets will be set by the government to limit the amount of greenhouse gases that we are allowed to emit over a specified time. The energy sector has a key contribution to make towards reducing emissions. Wales must:
 - Set annual targets to reduce demand for energy and help people to use it more efficiently
 - set targets to increase the production of renewable energy in Wales
 - in the context of the need to meet reduce carbon emissions by at least 80% by 2050, Wales should set a target date for energy self-sufficiency
 - disaggregate carbon emissions and demand reduction targets to a sub-national level.

6. Reducing demand for energy is the most important part of moving to a smarter energy future. Reducing the amount of energy used will make a significant contribution to addressing security of supply, energy affordability and sustainability.

National targets, local duties

7. Wales' national carbon budgets should be disaggregated to a subnational level. The Future Generations Act provides a mechanism for setting targets and reporting progress against indicators. The Public Service Boards have a significant role to play in carbon reduction and in supporting local community renewable energy projects. Carbon reduction should be a key consideration for the Boards when setting their priorities. Through its well-being goals, the Act should set a clear agenda for sustainable development and illustrate the desired direction of travel for the future.

Energy Champions at all levels of government

8. As well as the Public Service Boards, some stakeholders suggested a stronger role for the Welsh Government Strategic Energy Delivery Group in setting a clearer strategic direction. There was enthusiasm for the appointment of Energy Champions to support the delivery of this vision at local and national government level.
9. They would also be instrumental in delivering a programme to raise awareness of how communities can benefit from local energy supply systems.

Renewable energy targets for Wales

10. Setting targets for increasing the amount of local renewable energy produced in Wales will help us reach self-sufficiency sooner. We know that there is no shortage of capacity and enthusiasm for starting community renewable energy schemes. However, there are a significant number of barriers - such as getting finance, planning, permitting, advice and support - which are making it harder for the schemes to come on stream. We must ensure that community energy schemes have the necessary advice and support to be successful in increasing renewable energy production in Wales. The appetite to generate local electricity is there, Wales must provide a pathway to ensure it happens.

Understanding energy consumption and energy capacity in Wales

11. Having a better understanding of where and how energy is used in Wales will allow us to plan how we will meet that demand locally.
12. There is work to be done to draw up an 'energy atlas' for Wales. The 'State of Natural Resources Report' (SoNaRR) to be published by NRW in autumn 2016 and the statutory National Natural Resource Policy (NNRP) that will set out priorities in relation to the management of natural resources, should be used to give us a better picture of the potential for using these resources to produce renewable energy.

Smarter living

- 13.** Smarter living means that when development is being planned the building is linked with the development of infrastructure, including smart grid and broadband, to support and fully exploit it. This is heavily reliant on having the latest fibre optic cables in place to carry the data generated about where and how people use energy.
- 14.** We welcome the work undertaken in Wales to research what a smart living and smart grid enabled Wales might look like. We want to see real progress in delivering Smart Cities throughout Wales, including the City Regions, which can only happen with support from Government. This should be on the basis of local energy supply and make full use of the expertise in Wales' academic research base.

Wales must:

- Urgently revise Building Regulations to ensure that all new houses are built to 'near zero' energy standards.
- On completion of a successful trial of SOLCER type homes at scale, move to extending its energy efficiency requirements for new homes beyond 'near zero' carbon to a level of efficiency where surplus energy is produced.
- Upscale and extend the Welsh Government's existing retrofitting schemes – NEST and Arbed, adopting a 'warm zones' model to ensure a joined-up approach to delivery in areas where badly insulated housing, fuel poverty and poor health coincide.
- Explore linking the cost of stamp duty land tax to the energy performance of a house to start to increase the value of energy efficient homes.



02.Smarter housing for future generations

15. We have the necessary powers in Wales to make a real difference in this area. We don't need to, nor should we, wait any longer to raise building standards. We can set the standards for the rest of the UK.

A 'Made in Wales' housing solution

16. Households in the UK spend 80% of their energy costs in heating space and water in the home. We need to make sure that homes are as energy efficient as possible to retain that heat and reduce energy costs.
17. Under the EU's Energy Performance of Buildings Directive, all new buildings must be nearly zero energy buildings by the end of 2020 and public buildings must be built to this standard by the end of 2018. This means that buildings must be very energy efficient. The definition of 'nearly zero' is that the very low amount of energy required to run them should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

The EU Energy Efficiency Directive 2010/31 (Article 9)

"Member States shall ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings". Member States shall furthermore "draw up national plans for increasing the number of nearly zero-energy buildings".

And, under Article 7, sets targets for existing buildings, specifying

"That target shall be at least equivalent to achieving new savings each year from 1 January 2014 to 31 December 2020 of 1.5 % of the annual energy sales to final customers of all energy distributors or all retail energy sales companies by volume, averaged over the most recent three-year period prior to 1 January 2013."

18. In Wales we already have building regulations which set out the required energy efficiency for a house being built - Part L of Schedule 1 of the Building Regulations 2010 – Conservation of Fuel and Power. At the moment all houses need to meet energy performance standards that are 8% more efficient than the 2010 standard. These must be urgently revised to ensure that all new houses are built to near zero energy standards.
19. Achieving these standards needs to be an integral part of the planning process. Planning policies will need to be aligned with the new energy performance standards in the building regulations. We believe action should be taken on this as a matter of urgency. The scale of planned housing development, in South East Wales in particular, means we cannot afford to wait to ensure energy efficient homes. We do not want to lock in inefficiency for another generation. Building efficient homes now can save time-consuming and costly retro-fitting at a later date.

Having the confidence to set higher standards for future generations

20. We have committed to contributing to a 'low carbon society which recognises the limits of the global environment' in the Future Generations Act. We cannot, in light of this, build inefficient

houses which undermine this goal. The next Welsh Government must have the confidence to require near zero energy standards for housing.

21. We heard from the Home Builders Federation that building in Wales is not as profitable as in some other parts of the UK (due to land costs and final sale prices achieved) and that any build cost increases would limit that profit still further. However this needs to be measured against the **statement made** to us that expected returns on investment are substantially larger than most areas of business activity. Additionally, the example from Germany shows that the industry reacted well to the challenge set by increased standards. The requirements sparked innovation, increased demand for training and stimulated the jobs market in the sector.

“We have [...] existing powers and I would say that we need to be very ambitious in how we implement them and set strong goals for zero carbon housing and then help our own building sector to innovate and to win business on the basis of that because those are skills and products that we can potentially export. – Dr David Clubb, Renewable UK Cymru

Pilot a large-scale development of energy generating homes

22. The SOLCER house project, led by Cardiff University, shows that the cost of building an efficient, energy-positive house is similar to the existing cost of market and social housing. We are also aware of other timber-framed low energy housing in Wales which merits further investigation.
23. We are calling for a pilot of a large-scale development of SOLCER-type housing development in Wales. This will act as a demonstrator and a test for the technology. Once the model is proven to work at scale it will act as a launch pad for major developers. Once the benefits are demonstrated we believe that social housing grants should be conditional on moving towards SOLCER house standards for the housing stock being built. Once proven, we believe that these higher standards should apply to all new housing.

Improving the existing housing stock

24. Making homes more energy efficient will not just save money for the people living in them, it will also help us reduce the demand for energy in Wales. This is why it is so important to retrofit existing houses with energy efficiency measures.
25. New build houses are a relatively small part of the total housing stock in Wales. We can make significant gains in upscaling and extending the well regarded Welsh Government retrofitting schemes – NEST and Arbed, adopting a ‘warm zones’ model to ensure a joined-up approach to delivery in areas where badly insulated housing, fuel poverty and poor health coincide. We are calling for a kite mark, a quality assurance method of ensuring that the work is done to a high quality standard.
26. We need a better picture of the housing stock in Wales. The last ‘Living in Wales’ housing survey took place in 2008. An up to date housing survey would give us an idea of the costs involved in bringing up the standards of homes, enabling better planning.
27. SAIL is a world-class, anonymous data linkage system, based at Swansea University, which securely brings together a wide array of routinely-collected data for research, development and evaluation. This data, along with an up to date housing survey, could help us better understand the relationship between health, fuel poverty and energy efficiency in homes.

Making homes warmer and cheaper helps to reduce fuel poverty and illnesses caused by poor housing conditions.

28. We have heard some innovative suggestions from the think tank Res Publica. Res Publica have suggested a 'Help to Improve' scheme which would allow the Government to underwrite loans for households to improve the energy efficiency of their homes. They have also suggested a reduction in Stamp duty Land Tax for more energy efficient homes. Wales should explore this further as linking the cost of stamp duty to the energy performance of a house would be likely to start to increase the value of energy efficient homes.

The private rented sector

29. Wales should have the powers to set more ambitious minimum standards for energy efficiency as a precondition for letting homes in the private rented sector.

Public buildings

30. In order to comply with the EU Directive, public sector buildings in Europe will have to be built to near zero energy standards by the end of 2018. This standard should be applied in Wales immediately. The public sector should lead by example. For instance the 21st Century Schools initiative, a major, long-term and strategic capital investment programme, should have sustainability as an integral requirement of all new buildings.

Wales must:

- Set up an 'umbrella' not-for-profit energy service company. Under this umbrella local authorities, city regions or communities can offer energy supply locally.
- Urge the UK Government to enable Ofgem to allow prioritisation of local supply to local users in Wales



03. A new energy model for Wales

A not-for-profit energy company for Wales

31. People are tired of ever increasing utility bills and a lack of choice of energy providers. There are alternatives to the 'big six' energy companies which dominate the market. Across England local authorities are setting up not-for-profit energy supply companies. In Wales we have experience of a highly successful not-for-profit utility company - Dwr Cymru. Let's build on this success.
32. The Committee heard how some English local authorities, including Bristol and Nottingham, are able to target fuel poverty by supplying energy to households in their area at a reduced rate. In Nottingham, Robin Hood Energy has a tariff exclusively for the residents of Nottingham City and can specify lower rates in areas where fuel poverty is concentrated. In Bridgend, the Council is providing local heat networks and in Wrexham the Council has delivered the largest solar energy scheme in the UK.
33. There are a number of risks and challenges in setting up an energy company. We believe that the most suitable approach for Wales is to set up an umbrella energy service company for Wales. Under this umbrella local authorities, city regions or communities can offer 'white label' energy supply locally. White label supply means the authority does not hold a supply licence, but instead works in partnership with the licensed umbrella 'partner supplier' to offer local tariffs under their own branding. Robin Hood Energy is pursuing this model with other local councils and housing associations. Such a not-for-profit energy service company would ultimately aim to source all its energy from renewable sources in Wales.

Working together to facilitate a new energy model

34. We were encouraged to hear that Ofgem is enthusiastic towards this policy and would welcome local energy service companies in Wales. We asked them directly when they came to speak to us for their view on a proposal to set up a public not-for-profit energy company for Wales. **Ofgem's** response was extremely positive, they said 'it would be a very welcome proposal, yes'.

"If you set up a Welsh supply company, there should be no regulatory barrier at all, whether that is a Welsh entire company or small city, like Cardiff, supply company, purchasing local generation and using it and supplying it to local businesses and households. There's no reason why a city, a local authority or an entirely separate entity couldn't set up as a supply business in Wales" - Dr Jill Caine - Electricity Storage Network.

35. The licensing process is time-consuming, expensive and complex. Wales needs to play a more active role in working with the Department of Energy and Climate Change (DECC) and Ofgem to simplify this process. At the moment there is a requirement for all energy companies to supply a tariff to the whole of the UK. This should be removed to enable a Wales-only supply model. Key to this agenda is a stronger voice for Wales within Ofgem.
36. There is also no right to access a local energy supply. We want DECC to provide a clear steer to Ofgem on how we can prioritise local supply to local users in Wales.

- 37.** We support the general power of competence for local authorities, as proposed in the Draft Local Government Bill, as this would make it easier for them to establish local not-for-profit energy service companies.

Private wire distribution

- 38.** There are other ways in which electricity can be supplied without having to be part of the generating grid. A local generating facility can already supply directly to local businesses or households without requiring a licence. If the supply operates over a 'private wire' network then the supplier does not need a relationship with a network operator to distribute their power over the public network. To progress the development of local energy schemes in Wales, there should be support for a series of pilot 'private wire' projects. This will demonstrate how well local energy production can meet the needs of local customers without relying on the wider network to balance peaks and troughs in demand.



Wales must:

- Have a much greater say over how the grid, Distribution Network Operators and energy companies operate.
- Provide, attract and facilitate financial, technical and research support for energy storage, as part of the wider priority to be given to local energy supply.



04.Smarter energy distribution and storage

The way we regulate the supply of energy needs to change

- 39. Ofgem regulates electricity and gas markets in the UK.
- 40. We acknowledge that increasing the supply of renewable energy can mean more intermittent supply. There will be a need to balance the supply to meet demand. We currently rely on the National Grid to carry out this balancing for Welsh customers. In future Wales will need to have a much greater say over how the grid, Distribution Network Operators and energy companies operate. We need to have a greater say in decision-making, to deliver our future energy policy.

Powers over the grid

- 41. At the moment we have energy supplied to us in a one-way system from two Distribution Network Operators (DNOs) - Scottish Power Energy Networks and Western Power Distribution - to our homes and businesses. In future, when local and community renewable energy projects are more abundant, the DNOs will have to manage a two-way delivery of energy and become Distribution System Operators (DSOs). As DNOs move to DSOs and expand their role, under the guidance of Ofgem, Wales needs a stronger say over the work of the DNOs to make sure our interests are taken into account.
- 42. We are calling for more powers for Wales to have control of the network. Executive and legislative powers are needed to allow us greater control over local distribution networks and the grid in Wales. This would give us the power to grant consent to grid enhancements and the power to place obligations on DNOs and DSOs to reduce carbon emissions.

Creatively managing capacity

- 43. We heard that a lack of capacity on the grid in Wales is a significant barrier to the development of local energy generation. As well as a lack of total grid capacity in some parts of Wales, the way the grid is currently organised around centralised generation is not capable of dealing with the connection demands of dispersed generators. The network operators will need to respond to this rise in dispersed energy production as part of managing energy demand and supply locally. One way of doing this is to find creative ways to extract more capacity from their existing networks. For instance, the DNOs must accelerate work to actively manage connection offers to release capacity. This means that when a company is offered a grid connection, milestones are included in the offer and if these are not met then the company loses its allocation.

Demand reduction mitigates supply and storage constraints

- 44. Wales needs access to better data on who is using energy and where it be being used. This information can be used to better balance the supply of energy and ease the strain on the grid. We heard evidence that smart metering (coupled with local supply and intelligent local tariffs) can contribute to behaviour change, resulting in a reduction in demand on the system. Wales must insist that smart meters are used to the benefit of customers as well as energy providers. Care must be taken to address potential risks of voluntary 'self-disconnection' caused by increased visibility of energy usage.

Smarter storage

- 45. In future, energy production will be far less centralised. Storing renewable energy is the most important part of the new pattern of generation and supply, and will help address issues of

intermittency associated with renewable generation. We also want to mitigate the 10% of energy which is lost via the National Grid lines. We need flexible storage to cope with the move from supply based on large, centralised generation to more dispersed generation at lower levels.

“Electricity storage is a technology that can be applied across the power system, at all levels including the UK consumer level (domestic, industrial and commercial), and the distribution and transmission system, and to generation.” – Electricity Storage Network

46. For instance, if we have solar panels fitted onto school roofs we know the energy will be used during term time. Setting up storage units will capture the electricity produced during the summer holidays to help provide a continuous supply during the winter.
47. When planning for much more energy being generated and consumed through electricity rather than fossil fuels, we need much greater flexibility in the way we store it.
48. The Committee heard that storage is a rapidly growing area of technology and is already being used successfully in local energy systems in other parts of the world. We know that there are regulatory and commercial barriers to creating the network scale of storage we need in Wales. For instance, current regulation treats storage as an electricity ‘end user’ leading to a situation of ‘double charging’. Wales needs to work with Ofgem to redefine storage to avoid this situation. The Committee was pleased to hear support for this suggestion from Ofgem when they attended our meeting.
49. Regulatory barriers still need to be overcome but in the meantime, given that costs are reducing, we are calling for financial, technical and research support for energy storage, as part of the wider priority to be given to local energy supply.
50. Transport presents further opportunities for storage, with electric cars and trams providing the means to store energy for future use.



Wales must:

- Amend planning policy so that it prioritises local and community renewable energy projects and requires the carbon impact of new developments to be a key factor in planning decisions.
- Deliver our previous recommendations about streamlining planning and permitting processes in full.



05.Smarter planning

Planning policy and decision-making need to be aligned with our vision for future energy policy. A clear policy direction will give investors, planners and communities the confidence to develop projects in Wales.

Defining the energy mix

51. National and local planning policy in Wales needs to actively encourage a reduction in carbon emissions in order to meet the requirement in the Environment (Wales) Bill to reduce carbon emissions by at least 80% by 2050. Difficult decisions about the scale and type of renewable energy infrastructure in Wales should be guided by robust planning policy which prioritises local and community renewable energy projects.

“There’s a need to start thinking about, where there are positive decisions towards large-scale energy infrastructure, what kind of space they leave for community initiatives, what kind of space they leave for more decentralised energy initiatives, in which issues of generation, demand management, and heat provision might be more closely linked together.” - Dr Richard Cowell, Cardiff University

52. Wales must decide on the right energy mix and align its planning policies to pursue that goal. Preparation of the new National Development Framework provides an opportunity to consider the type and scale of inward investment and local energy projects that are needed in future. This could mean that future Governments will have to balance investment and support for large scale projects against the need to channel more funding and support towards local scale schemes such as micro hydro, biomass, solar and wind projects. A clear policy direction will give investors, planners and communities the confidence to develop projects in Wales.

Embedding carbon reduction in the planning system

53. Implementing the Future Generations Act will require a review of national and local planning policies to ensure that carbon reduction is embedded into the planning system. A requirement to assess and report on the carbon impact of development proposals should emerge from this.
54. Smarter planning involves designing in energy demand reduction at all stages. Communities need to be built with energy saving, communications and active travel needs integrated from the beginning. We have not always made the most of new infrastructure in Wales. In contrast, we saw an example of a community heating scheme in Freiburg which showed biomass heating benefitting a whole district.
55. This review should ensure that greater priority is given to local and community energy projects. Permitted development rights should be extended to allow more of these energy projects to proceed.

Streamlining planning and permitting approval

56. Increasing the number of local and community energy projects is dependent on streamlining the planning and permitting application processes. If we are serious about generating more renewable energy from local and community projects then we have to make sure those who give the consents to build them are on board. It is recognised that the current Welsh Government has made some progress in this area, but the evidence we heard suggests that

more still needs to be done. The Committee's previous recommendations about streamlining these processes should be implemented in full. For example the introduction of a system that better integrates the planning and environmental permitting systems is clearly still needed. There is also still a case for a 'one-stop shop' for advice for people trying to navigate the renewable energy planning processes.

Natural Resources Wales needs greater capacity

- 57.** To upscale the amount of locally produced energy by the necessary amount, we need all those involved in the decision-making process to be able to meet the increased workload. We heard from community energy groups that the permits they were seeking from Natural Resources Wales (NRW) were being hampered by a lack of capacity. NRW resources need to keep pace with demand to enable our vision of a smarter energy future for Wales to go ahead.
- 58.** NRW cannot be expected to meet the increased demand for their expertise if they are not involved in developing national strategies at an early stage.



Wales must:

- Establish a loan scheme, similar to the CARES loan scheme in Scotland. Welsh Government should work with Community Energy Wales to deliver the scheme.
- Maximise all sources of funding. This includes making the best use of European funding.
- Provide 'hand holding' support and advice for local and community projects to secure the necessary funding for local and community energy developments, alongside wider project development support.

PROJECT

06. Smarter finance

Providing certainty of policy intention will attract much needed long-term investment in energy to Wales.

59. In order to meet our ambitions to generate more of our own clean energy we will need to greatly speed up the rate at which we switch from fossil fuels and develop cleaner alternatives. Moving to cleaner energy, no matter what scale the infrastructure, means investing in new technologies and equipment.

The value of political certainty

60. One of the most important ways in which new technologies can be supported is by increasing certainty in the market for renewable energy. For instance, we know that the recent changes in policy for feed-in-tariffs and other support for renewables has created uncertainty for investors. The Committee heard that the challenges in gaining planning permission faced by community owned projects posed the greatest risk to securing funding. Providing certainty of policy intentions in planning and support across the smarter energy agenda will attract much needed long-term investment to Wales.

Sustained support for small scale community energy projects

61. We know that access to funding and advice in the early stages of development is crucial to the success of small scale community energy projects. Constant changes to financial support arrangements can make it more difficult for these projects to get started. We welcome the announcement of the **Welsh Government Local Energy Support Service** which aims to assist 'communities and businesses throughout their projects' lifecycles from assessing financial viability to connecting projects with appropriate lenders in construction finance'.

"Our financing system of supporting renewable energy is so subject to peaks, troughs, cliff edges and short-term funding, which means that being held up six months in planning, it's not just being held up for six months in planning, but it's pushing you beyond the end of some financial provision, which you might have hoped would be designed in a more stable, long-termist kind of way." – Dr Richard Cowell, Cardiff University

62. The financial climate is even tougher now than when we first looked at this issue at the beginning of the Fourth Assembly. We are restating the recommendation from our previous inquiry into Energy Policy and Planning – that Wales should establish a similar loan scheme to the CARES loan scheme in Scotland and should work with Community Energy Wales to deliver the scheme.
63. All levels of government should play a key role in helping to access sources of finance by acting as a 'big friend' to small, community projects which are taking on a lot of financial risk, by underwriting loans to these projects.

Support and advice to secure finance

64. As well as establishing a loan scheme, Wales needs to provide 'hand holding' support and advice to help local and community projects secure the necessary funding for local and community energy developments, alongside wider project development support. We hope

that the Welsh Government's new Local Energy Support Service will be sufficiently resourced to take on this crucial role.

Indirect investment opportunities

- 65.** Instead of direct investment from the Government, they could make Government owned land available for small scale energy projects. For instance, by encouraging the development of energy parks or hydro schemes on land managed by Natural Resources Wales.

European funding opportunities

- 66.** Wales needs to maximise all sources of funding. This includes making the best use of European funding such as the European Regional Development Fund and the 80 billion Euros available from Horizon 2020 funding until 2017. There should be targets for Rural Development Programme funding to be used to support renewable energy developments or grid enhancements. We welcome the news that the Welsh Government has secured an additional £1.5 million from the European Investment Banks's ELENA programme to improve the energy performance of public bodies in Wales.

Creative funding solutions

- 67.** Local borrowing powers of local authorities are another important source of potential funding.
- 68.** Funding should facilitate innovation and increased market access for new providers. There is space in the market for creative solutions to funding new projects.
- 69.** We have mentioned already the suggestion of a 'Help to Improve' loan scheme. Wales should explore the potential for bringing in financial partners to provide low cost or zero interest loans for improving the energy efficiency of homes. We saw, first hand, the success of these schemes in powering the German energy transition.

The German Energiewende

The German energy transition, known as the Energiewende, is a long-term energy and climate strategy aimed at moving Germany towards a low carbon energy system based on renewable energy and improved energy efficiency.

In April 2015, we visited Germany to gain a better understanding of the Energiewende and whether it was applicable to Wales.

We conducted the following visits and meetings:

In Freiburg im Breisgau we:

- Met city officials for an introduction to the local Energiewende;
- Investigated the development of **Vauban** as an 'eco-district' of Freiburg;
- Received an in-depth view of the Energiewende from the **Öko-Institut**; and
- Heard about funding the transformation from the **GLS Bank**.

In the Black Forest we visited:

- **EWS Schönaue** to learn more about the creation of this successful community energy supply company;
- **Emmendingen** to see how renewable generation can be integrated into historic infrastructure; and
- **Freiamt** to understand how this small rural community manages to produce 200% of its electricity needs from renewable energy.

In Stuttgart

- The **Baden-Württemberg State Government** Ministry of the Environment, Climate Protection and the Energy Sector; and
- The **Baden-Württemberg Landtag** to meet members of the Committee on the Environment, Climate and Energy.



Wales must:

- Provide policy certainty as this will create skilled jobs and increase training opportunities. This certainty will increase confidence in industry and the skills providers that investing in training will pay off.
- Develop local supply chains to support renewable energy technologies and energy efficiency measures.



07.Smarter skills and research

Policy certainty will lead to the development of a strong skills base and a first mover advantage for Wales.

Investment in training is impossible without policy certainty

70. Greater policy certainty will create skilled jobs and increase training opportunities. In the past there have been stop-start initiatives in Wales which have not been conducive to longer term investment and sustainability in the workforce. Certainty is important for training providers.

“They need certainty, and that’s why a large, visible commitment from Government, going forward, which can give commitment to those SMEs, which are the backbone of Wales, will allow those businesses to continue, and to continue investing in the right training to make Wales stand out, ahead of the rest of the world.” - Duncan McCombie, Energy Savings Trust

71. There is a need to increase confidence in industry and the skills providers, including the further education sector, that investing in new training courses will pay off. The current situation needs to change so that smarter energy skills are no longer on the periphery of training programmes, and form part of mainstream trades. We expect the current review of apprenticeship frameworks by the Welsh Government and the Construction Industry Training Board to identify future trends and training needs.
72. In particular, Wales can develop a first mover advantage in the local energy and energy efficiency field, meaning that in the future Wales would be ahead of the game and be in a position to export skills and expertise to England and further afield.

Innovation and research is ahead of the curve

73. Wales has an extensive research and development base in renewable energy and smart energy solutions. Higher education in Wales is leading the way in developing innovative solutions to energy problems. For instance, SPECIFIC, Wales’ national Innovation and Knowledge Centre and the Low Carbon Research Institute are carrying out world-leading research and can play a central role in informing energy policy development in Wales. They are both working with industry to develop innovative products that will reduce dependence on carbon rich fuels and increase long-term economic growth and the creation of employment opportunities for Wales such as the SOLCER house.
74. The Welsh Government already works closely with the research and development base to ensure its work informs policy. We want to see this extended to develop local supply chains in renewable energy technologies and energy efficiency measures.

Next steps

75. This report sets out a clear vision and direction of travel towards a smarter energy future. Wales has most of the means to make the necessary changes now, although it also needs further powers in a few important areas. The legislative framework is already in place to make real progress on reducing our carbon emissions, encouraging local energy supply and achieving energy self-sufficiency from renewable sources. The Welsh Government must lead the way to secure the cleaner, cheaper, more secure energy future which Wales deserves.

Glossary

Arbed: Arbed is the strategic energy performance investment programme run by the Welsh Government as part of the commitments to reduce climate change, help eradicate fuel poverty, and boost economic development and regeneration in Wales. Currently in its second phase, the Arbed 2 ERDF scheme is a funded 3 year programme aiming to improve the energy efficiency of homes in specific areas across Wales as defined by the Welsh Government.

Carbon Budget: An amount of greenhouse gases that a country, company, or organization has agreed is the largest it will produce in a particular period of time. The UK is the first country to set legally binding **carbon budgets**, and carbon budgets will be introduced for Wales with the enactment of the Environment (Wales) Bill.

CARES loan scheme: The Community and Renewable Energy Scheme (CARES) loan fund was announced by the Scottish Government on 15th February 2011. It aims to provide loans towards the high risk, pre-planning consent stages of local and community renewable energy projects which have significant community engagement and benefit. The scheme is managed on behalf of Scottish Ministers by localenergyscotland.org.

Energiewende: The German *Energiewende* (translated as energy transition) is Germany's policy of transition towards low carbon, renewable energy and away from both fossil fuel and nuclear power. Energiewende gained new momentum following passage of the German Renewable Energy Act (2000) (known in Germany as the EEG). This Act built on the Feed-in Act (1991), to provide strong feed-in-tariffs for renewable energy technologies, to stimulate an increase in the installation of renewable energy capacity. Germany has set itself the following goals for energy transition and carbon emission reduction:

- 35% of electricity consumed to be generated by renewables by 2020;
- 18% of total energy to be provided by renewables by 2020;
- a 40% reduction in greenhouse gas emissions by 2020 and 80-95% by 2050;
- primary energy consumption to reduce by 20% from 2008 levels by 2020 and by 50% by 2050; and
- use of electricity to decline to 10% below 2008 levels by 2020 and to 25% below 2008 levels by 2050.

Energy Service Company (ESCO): A commercial or not-for-profit organisation, created to produce, supply, manage the delivery of energy at a local level.

Energy Storage: Energy storage technologies absorb energy and store it so it can be released when required. There are a number of types of electricity storage, varying in complexity and scale, including:

- Pumped hydroelectricity storage: where water is pumped to a reservoir then released through turbines when electricity is needed.
- Compressed air energy storage: air is stored at high pressure then used to generate electricity via a turbine.
- Pumped heat electricity storage: pumping heat away from a cold, gravel filled container into a hot one. Reversing this drives a pump which generates electricity.

- Liquid air energy storage: cooling air to very low temperatures until it turns into a liquid. When heat is reintroduced it gasifies, expands and turns a turbine.
- Battery storage: including lead-acid, lithium-ion and sodium sulphur. These can be used at home and utility/network scale.
- Hydrogen: stores energy that can be released through burning it or through a fuel cell chemical reaction.
- Heat storage: comprising sensible heat storage (where heat is stored in a solid or liquid state), latent heat storage (materials store energy as they undergo a change of state) and thermochemical heat storage (where heat is stored by bonding chemicals together which release heat when separated).

How the grid works: Infrastructure for electricity networks can be divided into two main elements.

- Transmission systems (the long distance transfer of electricity through 400kV and 275kV lines) and distribution systems (lower voltage lines from generating stations to transmission substations and on to the end user).
- Associated infrastructure e.g substations (the essential link between generation, transmission, and the distribution systems that also allow circuits to be switched or voltage transformed to a useable level for the consumer) and converter stations to convert DC power to AC power and vice versa.

Transmission is the responsibility of **National Grid** and distribution is the responsibility of local **Distribution Network Operators (DNOs)**. The DNOs in Wales are Western Power Distribution and Scottish Power Energy Networks. The activities of DNOs are regulated by **Ofgem**. The role of DNO is changing from a one-way delivery of electricity, to a more complex, whole system model that accounts for and manages multiple points of distribution and consumption. This more active role in managing networks is the key aspect of DNOs changing to become **Distribution System Operators (DSOs)**.

Public Services Boards (PSBs): The Well-being of Future Generations (Wales) Act 2015 establishes PSBs for each local authority area in Wales. The Boards will replace the current 22 Local Service Boards. They will consist of the local authority, the Local Health Board, the Welsh Fire and Rescue Authority and Natural Resources Wales. In addition, the Welsh Ministers, the local police Chief Constable, the Police and Crime Commissioner, certain probation services and voluntary organisations must be invited to participate. Each PSB must prepare and publish a local well-being plan, setting out its local well-being objectives and the steps it will take to meet them.

Near Zero Energy Buildings: A nearly zero-energy building is defined in Article 2 of the EU **Directive 2010/31/EU** (EPBD recast) as “*a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby*”.

NEST: Nest is a Welsh Government scheme working to make Welsh homes warmer and more energy-efficient places to live. It is open to home owners or tenants who live in a home that is energy inefficient (homes with an E, F or G efficiency rating) and where someone in the household is a recipient of a means tested benefit.

Permitted Development: Some types of development are defined by planning law as being ‘permitted’ and are therefore automatically granted permission. The types of development defined as

permitted in Wales are set out in the Town and Country Planning (General Permitted Development) Order 1995 (as amended). Schedule 2 of this order lists many separate classes of permitted development. These classes are collected into 43 parts ranging from part 1 (development within the curtilage⁶ of a dwelling house) to part 43 (installation of Non-Domestic Microgeneration equipment). There are some differences as to what is permitted development in Wales and in England. The most common permitted developments are extensions to dwelling houses, which are subject to various limits and restrictions including those on their height, size and location.

Private wire: localised electricity grids that although connected to the local distribution networks have privately owned central plant that produces electricity.

Smart Cities: There are many definitions of a smart city. Common themes running through the definitions include a city that provides its users and residents with a liveable, affordable, climate-friendly and engaging environment that supports the needs and interests of its users and is based on a sustainable economy. Energy plays a fundamental role in achieving this vision. A 'smart energy' city is highly energy and resource efficient, and is increasingly powered by renewable energy sources. It relies on integrated and resilient resource systems, as well as innovative approaches to planning. The application of information, communication and technology are common means to meet these objectives.

SOLCER House: The Welsh School of Architecture have designed and built Wales' first low cost energy smart house. The SOLCER (Smart Operation for a Low Carbon Energy Region) House is capable of exporting more energy to the national electricity grid than it uses, in an attempt to demonstrate how zero carbon housing targets could be met. Designed and constructed as part of the SOLCER project, the SOLCER House's unique design combines, for the first time, renewable energy supply, thermal and electrical energy storage and reduced energy demand, to create an energy positive house.