

An '*Energiewende*' for Wales

- a scoping document

Preamble

The initiative currently being taken by the Environment and Sustainability Committee could become the most important 'transformational' event in a lifetime. Committee deliberations about energy policy, their associated public consultations and the Committee's study tour of Germany, all start from a recognition that today's big 'energy' issues are much more about strategy than technology.

Without waiting for permission, the same technologies that transformed the telecommunications industry are in the process of transforming energy. A sector whose structural thinking barely changed over a century faces upheavals that will transform it within a decade. This will require an equally profound change in the way we think about energy; its generation, management, distribution, ownership and storage.

Tomorrow's energy systems will be smarter, faster, lighter and more interactive than the one we have today. They will expect to deliver more, but consume less; take 'clean' before 'dirty'; sell non-consumption as readily as new consumption; involve new patterns of community ownership; presume a local right of 'first use' of clean energy; develop new models for storing/sharing generated energy; and set the foundations upon which a new approach to low-carbon economics will deliver prosperity, opportunity, inclusion and security.

Those who grasp this will become the leaders in the energy transformation. Those who do not will be left behind. Wales has the opportunity to put itself at the forefront of this process.

Some of the analysis that follows is intentionally discursive. It will outline key issues and strategic choices that the Committee will need to address. It also offers some thoughts on the main elements to be incorporated in any 'Transformation delivery programme'. It will be for the Assembly to determine the mix that works best for Wales.

An *Energiewende* overview

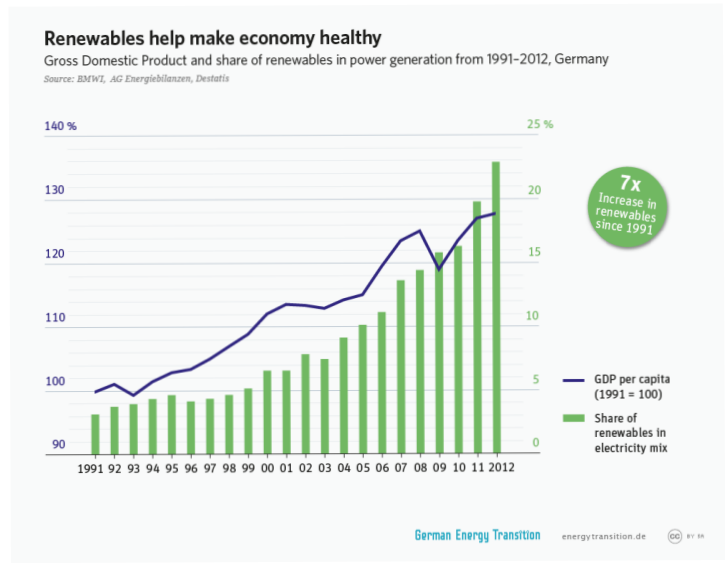
Contrary to UK press mythology, Germany's '*Energiewende*' programme is a key indicator of their economic well-being rather than their weakness.

Germans would be the first to admit to the lessons they have had to learn in delivering their '*Energy Transformation*' programme. Others joining in now reap the benefits of the mass market for clean technologies that Germany has helped create, the change in thinking about 'energy systems' Germany is driving, and the demonstrable economic 'gains' that come as part of this journey.

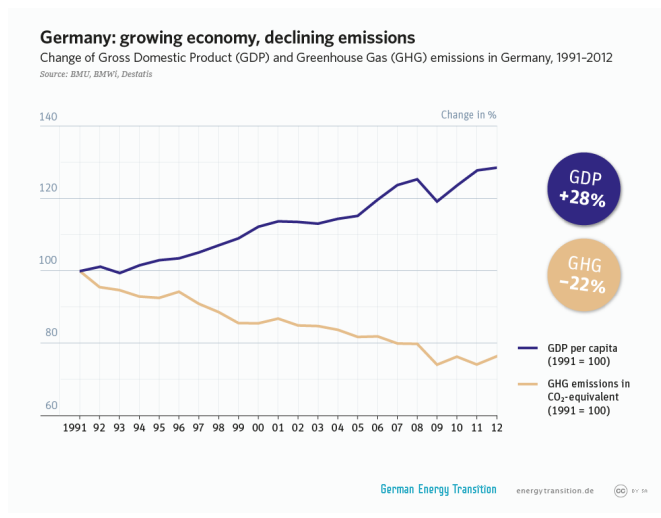
Far from being an economic impediment, the German energy transformation has been a key to rising prosperity, job creation and energy security.

Some of these gains are easier to convey graphically than verbally -

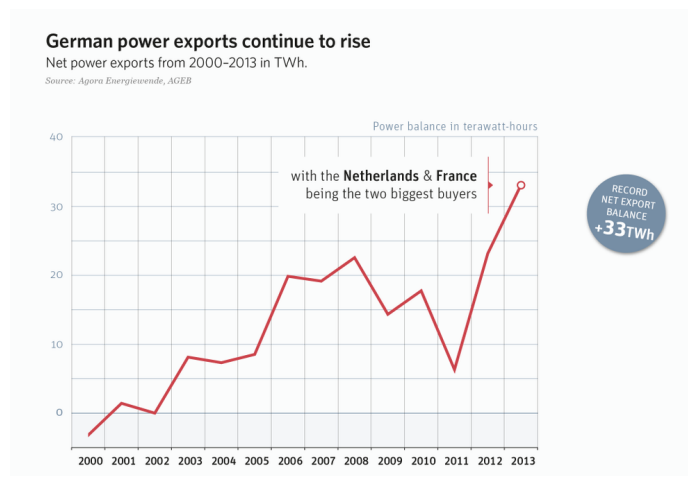
Renewables help to build the economy, not destroy it.



Prosperity and carbon reduction are allies, not enemies



...and do not increase dependency on energy imports



Closer to home

The UK has the advantage of a genuinely ground-breaking **Climate Change Act**, (and reflected in **Part 2 of the Environment (Wales) Bill**) but Britain is not a leader in anything else remotely sustainable. Wales, however, has the opportunity to do so; drawing on lessons already learnt elsewhere - particularly in Germany, Denmark and the USA.

This should allow the Assembly to focus on a package of measures most accurately corresponding to the resources Wales can bring to the table, and to the limitations/constraints it currently faces. At some point, the Assembly will also need a strategy for removing some of these constraints; including the legal limits on intervention powers it currently has.

However, the balance that will have to be struck between ambition and reality in any Welsh '*Energiewende*' is probably best illustrated by reference to the Transformation programmes in Germany and, more recently, in the State of California.

When Germany took the decision to accelerate its exit from nuclear power, and its shift into renewable energy and demand reduction, the Bundestag passed 11 separate pieces of legislation in a single session of Parliament. This month, in the USA, California lawmakers passed a dozen ambitious environmental and energy bills; setting high goals for reducing greenhouse gas emissions and petroleum use, and creating new standards for energy efficiency.

Dubbed the '**50-50-50 Agenda**', California now mandates a 50% reduction in petroleum use by vehicles by 2030 (the equivalent of removing 36m cars and trucks from the road), requires 50% of the State's electricity supply to be derived from renewable resources by that date, and a 50% improvement of energy efficiency in their buildings, through retrofits and upgrades.

Wales does not have the same legal powers as Germany or the State of California. It does, however, need to develop a negotiating strategy that will permit the delivery of an equally transformational programme.

Negotiations with the Westminster parliament need to cover many of the points I will try to set out (below) under separate headings. These are not separated in any hierarchy of importance. I put them in separate sections simply because Members, Officers and the public might find it easier to look at the component parts before coming back to the whole.

1. The Grid

Ofgem may be conducting its own examination of 'unconventional markets' and the Competition and Markets Authority may be looking into restrictive practices in the energy market, but neither seem to address the situation in Wales. Nor do they engage with the biggest constraints Wales faces, namely -

- a) Wales may be an exporter of electricity to England but it is unclear how much of this is returned (in kind) to enhance energy inclusion in Wales.
- b) Despite this, renewable energy generators continue to be told the Welsh Grid is heavily congested and that they face 6 year delays (and six figure sums) to secure Grid connection.

- c) There is no 'merit order' system that allows Wales to require clean energy to be taken before dirty.
- d) The UK electricity market does not allow for the sort of decentralised generation, distribution and storage that has been critical to energy transformation programmes elsewhere.
- e) The Welsh government currently has no powers to require National Grid, or the DNO's, to facilitate a shift towards more open, local, sustainable and accountable energy markets, and
- f) No serious analysis has been undertaken (in conjunction with public authorities) of the contribution that local generation could make to alleviating pressure on the existing Grid.

As a result, the Committee may wish to look at the case for-

Devolved 'energy' powers. Considering whether the Assembly might require greater freedoms, allowing Wales to determine its own energy policies; including -

- ***the right of the Welsh Government to its own Ofgem,***
- ***a National Grid obligation to produce 'a Grid-plan for Wales',*** consistent with energy and climate priorities set by the Welsh government,
- the right to adopt a ***Merit Order approach to Grid access and connection*** in Wales, and to scrutinise grid access charging policies,
- ***a DNO duty to deliver sustainable energy networks,*** consistent with priorities set by the Assembly,
- a right for Wales to set its own ***'community ownership' conditions*** that would offer priority Grid access,
- a Welsh right to trial its own ***local energy markets,*** permitted to distribute, store and share locally generated renewable energy,
- ***the right to set demand-reduction/carbon-reduction targets for Grid operation in Wales,*** and
- ***the right to set UK climate and renewable energy targets as 'de minimus' obligations in Welsh policy making.***

2. Energy Mapping

At all levels of government, we currently know very little about our patterns of energy consumption. An important lead in rectifying this could be given by the Committee, following the presentation to it by Ofgem.

The Environment and Sustainability Committee will need to promote a much wider understanding of the operation of the electricity Grid in Wales,. This should include a separate consideration of constraints within the Welsh High Voltage (400kV) grid and in its (132kV and 11kV) Distribution Networks.

Ofgem's coming presentation to the Committee (18th June) offers an important starting point in this process. It should be the platform upon which the Committee is able to consider more detailed written and oral submissions from them (and the Welsh DNOs) on the operation of the Welsh Grid.

Such a follow up should include details of the Grid's 'pinch points', DNO infrastructure investment programmes, and the most effective pathways into tomorrow's Smart Grids.

The Committee may wish to consider expanding this into a series of 'area specific' briefings by DNO's on Grid resilience within Wales. By including local authorities, NGOs and local communities in such hearings, this could turn out to be as empowering it is informative.

An 'energy mapping' process of this sort would be a 'first' in UK energy politics.

It would lead the way for other areas of Britain to follow suit.

3. Storage

Last year Germany installed some 15,000 electrical energy storage systems. Worldwide, this is one of the fastest growing 'technology spaces' that will shape the new energy economy. The UK, however, has been slow to engage with it. At the moment there are just 2 UK areas involved in European 'energy storage' partnerships: neither are in Wales.

Manchester is to install a series of hydrogen fuel cells that will connect to a network of local clean energy generating systems. Initially, anything from 50-500 generating units could be part of this, but there is no upper limit. It is part of a movement towards energy independent cities.

In Nottingham, the inner city Meadows area is the UK part of a European pilot programme looking at community-based energy storage. The project is trialling domestic battery storage systems, exploring the extent to which communities can develop a degree of energy resilience of their own.

In each Programme, participating areas had to show they could deliver a strong locality lead, a defined technology partner (Siemens, in both areas), and a rigorous/university monitoring base within the programme .

Wales needs to develop a toehold of its own in the piloting and research into energy storage systems.

Critical to this process is an early discussion about how this might be both financed and structured. To begin this, however,

A Task Force/Working Group would quickly need to identify

- ***initial target areas (towns, cities, estates, off-grid villages and/or grid-congested areas)***
- ***Grid/infrastructure/planning implications***
- ***Political leadership and community engagement***
- ***Clean generation resources, and***
- ***Key technology and university partners.***

The Committee is invited to consider whether this should form part of its inquiry, and/or whether this is an area to explore with a view to making recommendations to Welsh Government.

4. Planning

What the German experience tells you is that planning is just as important as technology in their *Energiewende* programme. By law, German solar roofs have 'deemed' planning approval, clean energy is given priority Grid access, and national targets become local duties. In the different parts of Germany, arguments then tend to be about the technology choices/combinations that best deliver sustainability targets.

Germany has streamlined both its planning and financial support systems, in favour of rapid transformation. Tough conditions are attached to both, but the presumption is that ***all levels of governance*** must be the drivers of sustainable change, not obstacles to it.

For a Welsh 'Energiewende' to succeed, climate change obligations and clean energy targets must be embedded within the Planning framework set by the Assembly.

There could be distinct advantages for Wales to be first-movers in a process that put energy and climate at the centre of its economic and environmental planning. It is easy to list some of the elements that might figure in such a reconfigured planning perspective -

- ***setting passive-haus or energy-plus standards for new housing developments***
- ***requiring new developments to deliver their share of Welsh clean-energy/carbon reduction undertakings***
- ***introducing a licensing system for rented property, requiring Band B standards to be met within 3 years***
- ***defining a set of 'community ownership' conditions that would have priority in any clean-energy planning/development applications***
- ***making 'Energiewende implications' a formal requirement in local authority Planning Committee reporting, and***
- ***inviting trans-sectoral solutions to be part of development planning (ie the use of solar car parks to promote a shift towards electric vehicles, or local storage systems to 'pool' electricity usage).***

5. Finance

The G7 may now be making some serious climate change pledges but a UK government, whose key priority is deficit reduction, will require a good deal of innovative thinking about how Britain would finance them. This is a challenge, not an obstacle.

A Welsh *Energiewende* would need to explore some of the following ideas -

- ***seeking a dedicated apportionment of Green Investment Bank (GIB) funding, specifically for Wales***
- ***looking for European funding (and partners) for the most adventurous ideas***
- ***developing new 'community ownership' models of financing a multiplicity of localised projects***

- ***pressing for a Welsh right to sell its own 'clean energy' to its own citizens, in local energy markets***
- ***creating new arms-length partnerships that can, more easily, navigate around OJEU 'public procurement' requirements,***
- ***look at ways of socialising some of the costs associated with an energy transformation programme (ie insurance underwriting, GIB provision of low interest loans, the creation of ethical/Energiewende bonds to finance developments), and***
- ***issuing Transformation ('Future Generations') Bonds that might finance tomorrow's clean energy/energy savings infrastructures.***

6. Technology

It is important that the Assembly does not get bogged down in arguments about the merits/demerits of particular technologies. This is a rapidly changing part of the energy transformation process. Nevertheless the Welsh Government ought to take a lead in setting up an advisory framework that can monitor and evaluate the various claims from technology/commercial interests in the sector. There is already enough University/CAT expertise in Wales to be able to provide the Welsh Government, the Assembly, local authorities and local communities with all the information they need to make positive choices within this change process.

The Committee should look into the merits of setting up its own Technology Advisory Panel; drawing on expertise already available in Wales in order to assist and inform transformation planning in Wales. Such expertise could then also be made available to local authorities and local communities engaged in the change process.

The Committee may also wish to look at the case for a separate 'new energy infrastructures' Panel, able to draw on technology sectors with current experience of delivering sustainable towns/cities and Smart Grids.

7. Solar and the 'change' momentum

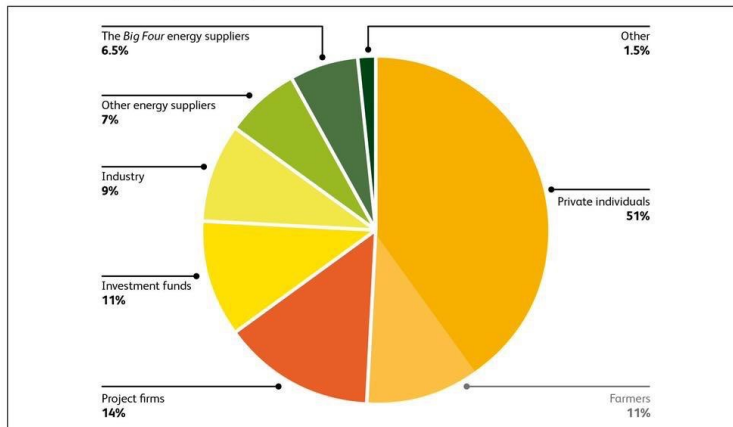
One of the most valuable lessons to be drawn from the German experience is the role the public have played in driving the change process. Addressing a meeting in the UK Parliament, Rainer Baake (now State Secretary at the Federal Ministry for Economic Affairs and Energy) was unambiguous about where to start another *Energiewende* -

"Put solar panels on every south facing roof you have".

His reasoning was simple: solar is the quickest, most non-disruptive, clean technology to install; it delivers immediate social engagement, at a multiplicity of levels; it allows you to create an employment infrastructure that produces, installs, services and upgrades your clean energy infrastructure; and it is a key element in creating a new energy democracy.

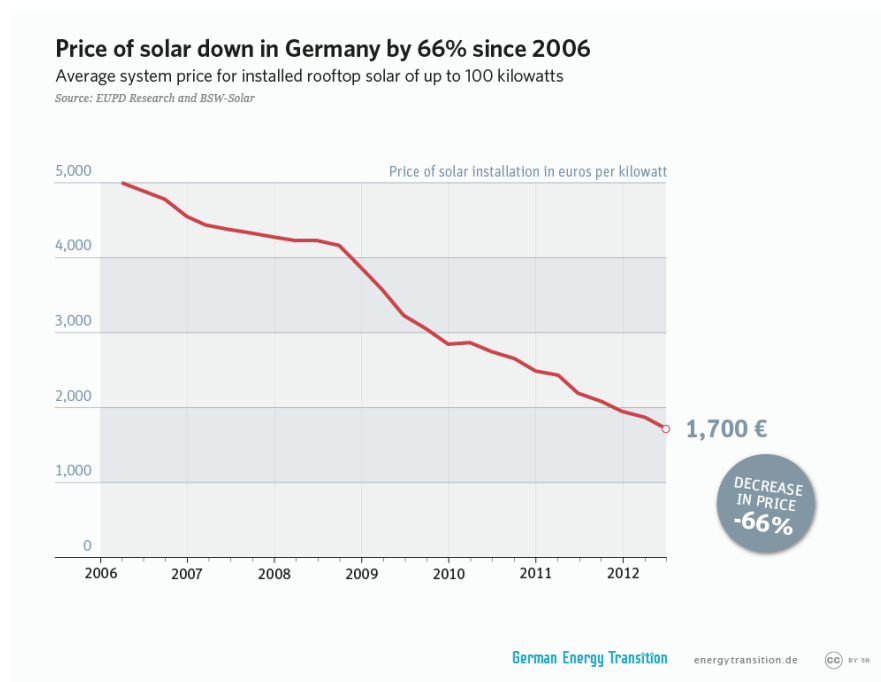
The ownership pattern of Germany's 80+GW of installed energy infrastructure graphically illustrates this -

German renewable energy ownership.



Craig Morris, 'Citizens own half of German renewable energy', Energy Transition website, 29th October 2013, <http://energytransition.de/2013/10/citizens-own-half-of-german-renewables/>

This ownership is across all clean technologies. But a different picture illustrates the role solar can play in creating a mass market that is rapidly driving down unit prices -



Two further benefits flow from this. The first is that solar has been at the heart of the burgeoning (1000+) **Energy Cooperatives** movement in Germany. It is a technology you can install on schools as easily as in homes. In the UK, schools energy cooperatives are already beginning to flourish. The NGO '**10:10**' is running a big national programme promoting them. **The Schools Energy Cooperative** is also attempting to simplify the legal and administrative processes that can allow schools to get on with the work of promoting their own local work. Bristol is inviting community energy groups to apply for the use of a range of council owned buildings to deliver the benefits of community energy to local residents. It is an area of considerable innovative change that Wales too needs to harness.

The second benefit is that as soon as communities become energy producers they also engage with wider questions about energy saving, energy storage, distribution and security. This is what lies behind **the 180 or more local authorities in Germany who are currently taking their local electricity Grids back into social ownership.**

The Committee may wish to identify ways in which the growth of community energy cooperatives across Wales can be actively promoted.

8. Local supply

One specific obstacle in existing UK energy market rules is the requirement to supply into a national market. It is a requirement designed to specifically favour the big utilities.

So, most of the UK's community wind and solar co-ops are still largely investor co-ops; denied the right to supply electricity to their local communities at discounted rates. Moreover, co-ops like Bro Dyfi are also facing new threats from both the FCA (the Financial Conduct Authority) and HM Treasury over their legal existence as co-operatives. A sector that drives the German energy transformation, finds itself increasingly constrained in the UK.

Wales needs the freedom to promote the growth of its cooperative energy sector in ways that promote tomorrow's more open and sustainable energy markets.

The re-emerging tranche of local authority 'energy companies', trying to deliver benefits of local generation to local communities, is also having to resort to 'benefits in kind' rather than direct electricity price reductions. It is an absurd constraint imposed by outdated energy thinking.

The Committee might consider pressing for the right of local energy companies to supply clean electricity into local markets, and at prices that share the benefits of such clean energy generation.

Up until 1947, local authorities derived some 50% of their income from the supply of local services in gas, water and electricity. Today, an array of cleaner, smarter technologies are already driving energy thinking in the same direction; but in the form of 'smarter' towns and cities. The cities that go down this path will do so in ways that increase their energy security, reduce demands on the National Grid and develop economic models that deliver more but consume less. Wales should put itself at the forefront of this process.

9. Heat

Heat is the Cinderella in the energy transformation agenda. Heating is responsible for 50% of UK carbon emissions, and an even greater proportion of domestic energy bills. The advantage is that there is no regulatory framework that prevents you from developing local (renewable) heat networks. We just haven't been very good at delivering them.

Much of the original work focussed on district heating schemes; though most of these are based around an outdated reliance on incineration of waste, and on expensive capital infrastructure programmes, to deliver the heat. Europe has been better in developing more localised 'heat' schemes, for clusters of properties or estates with common heating systems. Germany, in particular, now has some remarkably innovative 'renewable heat' schemes using solar thermal technologies, bio-gas from waste and/or heat pumps and storage.

The development of biomethane-to-Grid (BtG) schemes in the UK is also in its infancy. Some years ago, National Grid estimated that biomethane from waste could deliver up to 50% of UK domestic gas needs. Others were less optimistic, suggesting that 20% was a

more realistic target. But very little has been done. The UK still lags a long way behind its European counterparts in delivering Green Gas solutions to local gas needs.

For Wales, with a number of off-Grid communities and a growing set of waste disposal issues to address, this has to be an area of huge potential in the development of renewable heat solutions. Funding, under the UK's 'Renewable Heat Incentive' programme, is still available. What is missing are the bigger picture ideas of turning one set of waste problems into another set of (renewable) heat solutions.

As part of its Inquiry, the Committee might want to look at the potential for renewable heat (and renewable gas) solutions to fuel poverty, carbon reduction and energy security in Wales.

10. *Energiewende*: a creative working link.

For several years, German academics, politicians and clean energy campaigners have tried to develop *strategic* links with the UK in respect of energy transformation thinking. The disappointing truth is that the UK has remained wedded to a closed market of old energy thinking, old energy subsidies and high energy prices.

Germany already has a partnership programme with the USA - *the Transatlantic Bridge* - that pairs German cities with American ones; pooling their learning and thinking about driving the transformation process. The recent visit of the Environment and Sustainability Committee to Baden-Württemberg opens up the possibility of a similar link with Wales.

In fact, Germany would probably welcome something that developed a more European dimension of energy transformation thinking. The requirements, though, are likely to be no less stringent than the transatlantic ones, including

- **a defined and ambitious framework**
- **strong political leadership (at both a Member and Officer level)**
- **a component that specifically binds in engineering and technology skills**
- **a university monitoring and evaluation base, and**
- **annual exchanges, in each country, to underpin the respective programmes.**

My belief is that if Wales made this offer and undertaking, the Germans would enthusiastically agree. I suggest the Committee considers the case for -

a 'Wales-Germany Energiewende Partnership', initiated as part of this Inquiry.

This might involve (in each country) 2 cities, 2 towns and 1 rural area; the aim being to deliver radical energy transformation policies which draw on lessons already learnt in Germany and exploring new possibilities in Wales. This would be a ground-breaking initiative, guaranteed to excite as much as it would transform. A Welsh 'energy transformation' would be underway and unstoppable.

Carpe diem.

**Alan Simpson
June 2015**