



The Energy Union and the Energiewende

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Three case studies

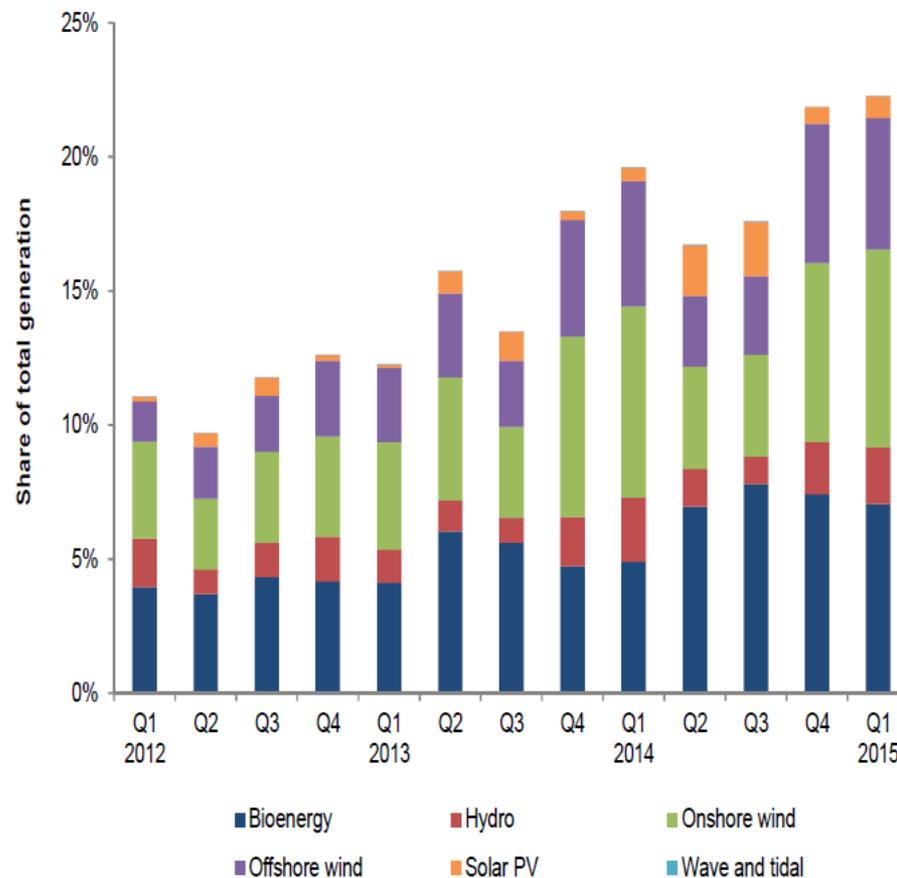
- Consider:
 - **Germany**: where renewable capacity has already been added in great quantities and the system is coping with a high share of renewables.
 - **The UK**: represents an actual market redesign, which has been enacted ahead of a major addition of renewable capacity.
 - **New York**: still under discussion but with a different market redesign to those exhibit in the first two cases.
- Common driver: the desire to decarbonise the electricity sector and promote renewable electricity.
- A game changing set of policies is necessary to do this.

Germany's Energy Transition (*Energiewende*)

- Germany seen as a “unique experience” due the rapid addition of DG (EPRI, 2014):
 - Not a success: worse security, worse environment and higher prices!
 - Interconnected to other grids
 - 68GW of distributed PV and wind (80 GW peak) by 2014.
 - No consideration of integration costs, which were all socialised.
 - Now learning, the hard way.
- Some pleasant surprises:
 - Outturn quality of service does not appear to have got worse
 - Wind and solar complementing each other
 - May be some strategic effect on Russia and Saudi Arabia (?)

UK Electricity System is also in Transition...

Chart 6.1 Renewables' share of electricity generation

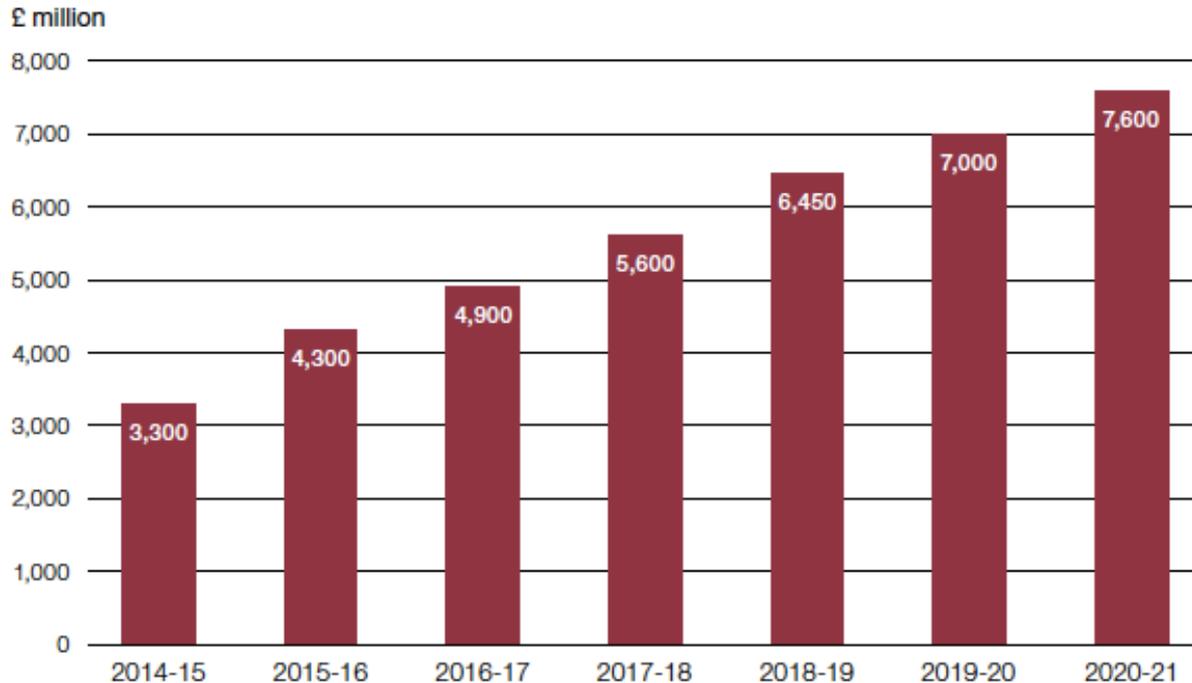


Source: Energy Trends June 2015, p.43.

The transition is costly...

Figure 3

Levy Control Framework caps for electricity policies rise to 2020-21



Total annual expenditure on Electricity is c.£33bn.

Included:
FIT, ROCs, CfDs,
Warm Homes Discount.

Main demand measures
Excluded.

Notes

- 1 The Department has published Framework caps to 2020-21 in 2011-12 prices.
- 2 The Department publishes Framework caps in nominal terms at the time of the relevant spending review or spending round. It has, however, estimated that the cap in 2020-21 will be £9.8 billion in nominal terms (i.e. 2020-21 prices).

Source: Department of Energy & Climate Change

July 2015 OBR
projections suggest
Overspend of £1500m
in 2020-21.

Exceeding cap in 2014-15 but below 20% headroom.
Source: The Levy Control Framework, NAO 2013, p.16.

The UK's Electricity Market Reform (EMR)

- The aim of the EMR is to promote the near complete decarbonisation of the electricity sector by 2030.
- It is expected a reduction of CO2 emissions by 90% of its 2010 level by 2030.
- The EMR is composed of four elements:
 - Contract for difference (CfD) for low carbon generation
 - Carbon price floor (CPF)
 - Capacity market
 - Emission performance standard (EPS)

We focus on the CfD element...

Progress with CfDs – Administrative Strike Prices

Table 2: Strike Prices

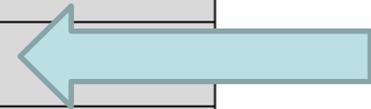
Technology	CFD Strike Prices (£/MWh, 2012 prices)				
	2014/15	2015/16	2016/17	2017/18	2018/19
Advanced Conversion Technologies (with or without CHP)	155	155	150	140	140
Anaerobic Digestion (with or without CHP) (>5MW)	150	150	150	140	140
Biomass Conversion	105	105	105	105	105
Dedicated Biomass (with CHP)	125	125	125	125	125
Energy from Waste (with CHP)	80	80	80	80	80
Geothermal (with or without CHP)	145	145	145	140	140
Hydro (>5 MW and <50MW)	100	100	100	100	100
Landfill Gas	55	55	55	55	55
Sewage Gas	75	75	75	75	75
Offshore Wind	155	155	150	140	140
Onshore Wind (>5 MW)	95	95	95	90	90
Solar Photo-Voltaic (>5MW)	120	120	115	110	100
Tidal Stream	305	305	305	305	305
Wave	305	305	305	305	305



Source: DECC Budget Notice 2014

1st CfD Auction results Feb 2015

Technology		2015/16	2016/17	2017/18	2018/19	Total Capacity (MW)
Advanced Conversion Technologies	£/MWh			119.89	114.39	
	MW			36	26	62
Energy from Waste with Combined Heat and Power	£/MWh				80	
	MW				94.75	94.75
Offshore wind	£/MWh			119.89	114.39	
	MW			714	448	1162
Onshore wind	£/MWh		79.23	79.99	82.5	
	MW		45	77.5	626.05	748.55
Solar PV	£/MWh	50	79.23			
	MW	32.88	38.67			71.55



Source: DECC

The State of New York's Reforming the Energy Vision (REV)

- New York State regulator launches Reforming the Energy Vision (REV) initiative 22 August 2014.
- The 6 state utilities are to become 'distribution system platform providers' (DSPs):

'The DSP operates an intelligent network platform that will provide safe, reliable and efficient electric services by integrating diverse resources to meet customers' and society's evolving needs. The DSP fosters broad market activity by enabling active customer and third party engagement that is aligned with the wholesale market and bulk power system.'

(State of NY Dept. of Public Service, 2014)

The State of New York's Reforming the Energy Vision (REV)

- What the project hopes to achieve:
 - Identification of projects which will use distributed energy resources to reduce costs.
 - Use of DSM projects to serve needs of distribution system.
 - Support development of distributed energy resources (DERs), such as via ESCos.
 - DSP should be widely available, even though provided by incumbent monopolies.
 - Creation of level playing field for new entrants.

Source: Jeff St.John, posted 12 Sept, 2014 <http://theenergycollective.com/jeffstjohn/494781/5-key-proposals-new-yorks-grid-transformation>

Questions

- How to coordinate **generation investment** decisions across countries?
- Can **network planning** and operation remain largely national?
- What role for European **innovation policy**?
- Is the **European emission trading system** worth defending?
- To which degree, Germany could and should compromise on its Energiewende, to be able to export it?

The market or market mechanisms is the best answer to most energy questions

- This is especially true at the EU level, where the general equilibrium effects are important.
- We don't need to co-ordinate generation investment at the EU level if we have proper carbon target.
- We might see co-ordination of capacity markets and renewable support schemes.
- Innovation funds should be competitively awarded, in line with best practice innovation procurement.

Is the European emission trading system worth defending?

- YES. This is the only one of the 2030 targets worth defending...
- The EU ETS is Europe's gift to the world on how to solve the climate problem.
- It is worth extending and strengthening.
- It is because it is the only mechanism that could be guaranteed to actually work that so much effort goes in to preventing its extension.

Is the Energiewende exportable?

- NO.
 - too expensive for the rest
 - no, export advantages for most
 - lacks political support outside Germany
- However it is an interesting experiment which the rest of us can learn from – thank you.
- There is going to be operational learning from a system with high penetration of renewables.
- There is also some positive externality in terms of cost reduction of wind and solar.

Some final thoughts

- The future is uncertain for energy production and end-use technologies, massive changes are possible.
- These could happen quickly, with electrical storage and electric vehicles.
- Markets and market mechanisms needed.
- Cost matters, in the end the carbon transition will be expensive, even for Germany.
- The EU ETS remains the supremely exportable aspect energy and climate policy globally.

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