



Different transition paths to low-carbon power: Germany, the UK and the EU

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1. Foundation and early implementation of transition policies at the national level

1.1 Germany: 2000-2009

The Danish encouragement of wind power, renewed domestic strife over nuclear power after the Chernobyl accident, and rising concern over climate change inspired the German parliament to pass, furthered by a strong movement in civil society in open revolt against the government, a first and modest law enabling everyone (physical persons and companies) except electric utilities to feed in electricity from renewable sources into the public grid and be compensated at set rates. This was expected to encourage new entrants, a principle dear to ordoliberalism and the social market economy then still dominant in Germany. Utilities were expected to invest in renewable power without such support, but instead, they chose not to invest in renewable power themselves. They ended up challenging feed-in tariffs head-on in the courts without success (e.g. as expropriation and illegal state aid).

In 2000 a coalition of Social Democratic and Green MPs – against the preferences of the Ministry in charge (Economic Affairs) – voted in favour of the much more ambitious Renewable Energy Act (EEG). This Act gave priority grid access to renewable power, imposed on electric utilities an unlimited obligation to accept and compensate such electricity according to technology-specific feed-in tariff (FIT) rates set by law for 20 years, declining with each year's new vintage of installations. Nuclear and fossil-based power were to provide the "residual load" as long as needed. FITs were supposed to cover the full cost of a well-run installation plus a modest return (around 6% per annum, well below utility profit rates). All

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technologies were supported simultaneously (solar PV only after 2003). The intention was to induce a steady flow of investment in renewables by limiting investor risk for a broad public, as well as to stimulate the rise of a national supply chain (wind turbines, solar panels etc.). This was expected to reduce, by steady innovations, the cost of renewable power below that of conventional power within two to three decades. Most of the (Conservative-Liberal) opposition opposed this Act, but support for it broadened under a Conservative-Social Democratic coalition (2005-8) due to its successes: swift deployment and targets regularly surpassed; the rise of a big, successful supply chain industry; nearly unanimous public support; the pouring in of investments from citizens and farmers (about 50% in 2010) with most of the rest coming from non-utility companies (industry, project developers, banks); and comparatively low costs (Lauber and Jacobsson 2015).

1.2 United Kingdom 2000-2008

Britain never experienced a paradigmatic shift comparable to Germany's EEG 2000 (full transition to renewables), despite its extraordinary endowment with wind and marine resources. The British government in the 1970s granted R&D support for renewable power as did other countries, but there was little willingness to support new technologies beyond this phase. The Non-Fossil Fuel Obligation (NFFO) – the first support scheme, in place from 1990 to 1998 – was originally set up to discreetly subsidize unprofitable nuclear power plants and became a renewables support scheme by accident. It consisted of tender rounds designed by neo-liberal, “Thatcherite” economists from the Treasury to create a highly competitive bidding system to quickly bring down renewable power prices. They did achieve declining prices in a series of tenders, but failed to attract investor interest when prices came down. NFFO created a strong anti-wind movement that haunts onshore wind deployment up to this day, while the risks and complexities of its bidding process also eliminated small firms from building renewable power installations.

The same concern to drive down prices by competition also pervaded the Renewables Obligation (RO), designed by DTI (which had an outlook similar to that of the Treasury). Utilities had to either generate a slowly rising percentage of renewable power themselves or to buy certificates of such generation from others – or else buy out of the obligation. Its uniform price for renewable energy certificates meant that the cheapest technologies (combustion of organic waste, sewage and landfill gas) were deployed first – in other words, the market “picked the winners.” This ignored the time horizon (decades, not years) of medium-to-long term technological learning required for innovation and price reductions. It also disappointed official expectations. First, it produced not declining, but some of the highest prices for wind power in Europe, despite abundant and high-quality wind resources. Second, it produced one of the highest profit rates for wind power investments, undertaken almost exclusively by a few electricity oligopolists; one EU report put them at ten times the profit rates in Germany. Third, its single price created high windfall profits for the cheaper, mature technologies (exactly as in Italy, Belgium, Poland and Sweden which used similar support schemes) but did little for less mature technologies (such as wind power, PV and marine energies) and thereby failed to create a local renewable power industry. Fourth, it led to a very slow rate of deployment until about 2010 as incumbents optimized compliance (at about 66% of the target) for maximizing income. Fifth, the uncertainties surrounding certificate prices practically excluded small investors – so important for Germany's *Energiewende* – from entering this market. The incumbents showed little dynamism just as in Germany but were able to keep the field to themselves (Stenzel and Frenzel 2008; Woodman and Mitchell 2011; Lauber 2012).

2. Adjusting transition policies up to 2015

2.1 Germany 2010-2015

EEG 2008 consecrated the triumph of the FIT system. But the Conservative-Liberal government of 2009-2013 redefined energy transition as a burden which threatened to upset the competitiveness of German industry. After Fukushima, it reasserted its desirability but emphasized the need to contain costs by “moderating” deployment via flexible caps for PV (which had surged beyond expectations in 2010-2012) and strongly reduced tariffs. At the same time, it shifted an increasing share of the “extra cost” of EEG to small consumers (households, small and medium sized enterprises or SMEs) by quadrupling exemptions for big energy-intensive industries (to €4bn) and by allowing incumbents to withhold merit order savings from renewable power deployment from those customers.³ As a result, big industries buying electricity directly on the exchange became net beneficiaries of EEG, while costs for small customers about doubled. At the same time, the government blamed the deployment of photovoltaics for the cost increase, despite rapid cost decreases, and it warned of future costs due to the need for new North-South power lines for transporting renewable power – which in fact serve new onshore coal plants (Kemfert 2013).

The current Conservative-Social Democratic government (since 2013) went even further in its efforts to slow down deployment. It set flexible caps also for onshore wind and biomass power and reduced ambitions for offshore wind, to achieve stable growth (not accelerating, as before) of renewable power: 15 additional percentage points every decade, 80% by 2050 (in sum, this was a lower ambition than in 2010). In a second step, it plans to shift, in 2017, to a tendering system for wind projects over 5MW and PV projects over 1MW – stricter even than European Commission (2014) guidelines, which set the threshold for onshore wind at 6MW. This is supposed to bring down costs by professionalizing and concentrating new renewable build. It likely will reduce competition by excluding “citizen” projects whose promoters are motivated but poorly equipped for competing in tenders, and will also restrain pressure on incumbents from such investors and from innovative plans for distribution of locally generated renewable power by non-utilities. All this runs under the heading of reducing costs, disregarding (1) the need for more power lines under a model of centralized generation, rather than under a distributed generation model, and (2) official government estimates for external costs which make coal plants the most expensive form of generation by far, and onshore wind and solar the cheapest. Still, the public continues to support “citizen *Energiewende*” with huge majorities.

2.2 Britain 2008-2015

The Renewables Obligation met with growing criticism around 2005; a rethinking process set in. Supporting domestic manufacturing as a source of employment reemerged on the political agenda. Some parliamentary committees supported the introduction of FIT, despite government and incumbent resistance at first. Another approach was to “band” the Renewables Obligation, i.e. to differentiate between technologies according to their maturity and to allocate more (offshore wind; wave and tidal power) or less than one certificate (landfill gas) per kWh. In the end the government reverted to “picking winners” after all. The risk of collapsing RE

³ Merit order: the electricity exchange accepts offers from generators in the order of their operating costs. PV and wind power with almost zero operating costs displace more expensive fossil fuel generation, thus reducing wholesale prices (probably by several billion Euros annually). Reduced wholesale prices increase the “extra cost” of renewable power, calculated as the difference between spot market prices and feed-in tariffs. If the reduction in wholesale prices is not passed on to consumers, the system makes them pay more as a result of merit order induced savings.

certificate prices by over-fulfillment of RO targets was reduced by allocating “headroom” and by strongly increasing deployment targets – first to 15%, then to 30% by 2020 – in response to EU requirements. Many institutions participated in this new start, especially the Crown Estate in charge of leasing offshore wind sites (Kern et al. 2014).

The Energy Bill of 2008 authorized RO banding (introduced in 2009), and also FITs for installations up to 5MW (introduced in 2010). Britain seemed to become serious about developing a renewable power equipment industry (“supply chain”); for offshore wind it was (and still is) a pioneer worldwide. After sluggish growth from 2000 to 2010, renewable power output now almost tripled within just four years to reach about 20% in 2014. The most dynamic beneficiary of the new, banded RO was offshore wind, though its capital cost doubled 2004-2009, making it the most expensive form of renewable power; the chief beneficiary of FITs was photovoltaics. A future with renewables as the dominant source of power seemed conceivable.

But the Cameron government already prepared a different course with the Electricity Market Reform of the 2010s. It developed FITs not primarily for renewables growth but for propping up all “low carbon” technologies – including new nuclear (and CCS-fossil) build by combining them with contracts for difference (CfD), a new support mechanism introduced in 2014. CfDs will enhance investor security by auctioning 15 year contracts for support whose total volume is allocated by the government, and via “bespoke” (custom-made) CfDs for nuclear and CCS plants. The first prominent application was a very lucrative, highly controversial subsidy offer for construction and 35 years of operation of new nuclear power plant Hinkley Point C (now challenged before the European Court). The banded RO will expire in 2016, and FITs without CfDs (as for onshore wind, biomass and PV) might be abolished by the same date, supposedly because they are not needed and are costly to consumers – or was it that their success annoyed incumbents? Prominent critics argued that disguising support for nuclear as the outcome of a technology neutral process was the main purpose of the current Electricity Market Reform and CfDs (Mitchell and Woodman 2012; Toke 2011). Around 2013-15, the UK government – together with Shell – also pushed successfully for unambitious and non-binding EU renewable energy targets for 2030 (Guardian 2015), favoring other “low-carbon” technologies (nuclear, gas), in line with big energy incumbent preferences.

3. European Union policy towards renewable power

EU policy on sustainable power is embodied primarily in directives, state aid guidelines and Court decisions addressing targets and support schemes. Until about 2010, the EU Commission stressed European leadership in renewable energy. After 2010 it discovered the risks to industrial competitiveness and it slowed deployment. Now Europe is falling behind many other world regions in the speed of deployment.

3.1 Renewable Energy Directive 2001

In the late 1990s, Energy Commissioner Papoutsis pursued a neo-liberal approach and wanted to impose a quota and certificates system similar to the later RO (“drive down prices by competition”). The Commission also sent out emissaries to member state governments to argue its case, and proclaimed that German FITs (as in EEG 2000) were incompatible with EU principles (state aid, internal market). Papoutsis was supported by EURELECTRIC (utilities association) but met with fierce resistance from German and Spanish renewable energy stakeholders, governments (Germany and Spain) invoking the subsidiarity principle, and the European Parliament. His successor Loyola de Palacio – 1999-2004 – submitted a pragmatic bill that let member states choose their support systems if they respected state aid and internal market provisions (still an unsettled legal issue with German FITs). This resulted in Renewable

Energy Directive 77/EC/2001. In the meantime, the Court in *PreussenElektra vs. Schlesweg* held that German FITs were not state aid and did not violate internal market rules (for further elaboration, see Lauber and Schenner 2011).

3.2 Renewable Energy Directive 2009

By 2005, a Commission (COM) staff report showed that quota and tradable green certificate (TGC) schemes exhibited lower deployment and higher prices than FITs. Later reports confirmed this, moving energy commissioner Piebalgs – 2005-2009 – to propose leaving the support principles unchanged. Around 2007, some member states began to worry about meeting binding renewable power targets (rejected by Britain). COM emission trading experts supported by EURELECTRIC and the UK proposed to enable member states to buy renewable energy certificates from other member states and count them towards their target. When it emerged that such a trading mechanism could destroy FIT schemes, national opt-outs were added to the proposal, which sunk when legal experts declared that the Court would have to annul such opt-outs. Piebalgs then accepted a Parliament-Council compromise which created a – little used – system of “non-trading flexibility” for renewable energy directive 2009/28/EC (Lauber and Schenner 2011).

3.3 Commission guidelines on state aid to energy 2014

Energy commissioner Oettinger – 2010-2014 – was a skeptic regarding renewable energy deployment. To him, “Europe alone cannot save the world from climate change” and “renewable energy growth endangers Europe’s industrial competitiveness.” Supported by UK (plus Poland and the Czech Republic) but criticized by Germany, he proposed unambitious, non-binding renewable energy targets for 2030 (27%, after 20% in 2020) and supported a third Commission attempt to ban FITs. During his tenure, the European Commission (2014) prepared new guidelines for state aid to “energy” (not including nuclear) spelling out Commission requirements for future support frameworks. Bidding schemes – deterring motivated citizen investors – will be the rule by 2017, TGC schemes will be accepted, but not FITs except for very small installations (1 MW for PV, 6 MW for wind). Adaptation pressure on conventional (fossil/nuclear) generators will be reduced, these might even regain control over the transition. External costs are largely ignored.

In legal theory, these guidelines are not in themselves law but only list the principles guiding the Commission when accepting/rejecting new national support schemes. However, they have a very real impact (e.g. in deterring FITs). Some governments, such as Germany’s, have already incorporated them in legislation. A European Court of Justice challenge by the European Renewable Energy Foundation – claiming violation of the current renewable energy directive 28/EC/2009 which is set to last until 2020 – is under way.

3.4 Europe falling behind?

Until the early 2010s Europe’s renewable power industry thrived under favorable regulation. Since then, most fossil and nuclear incumbents, claiming excessive costs of RP and deindustrialization risks resulting therefrom, have been able to influence national and EU policies in their own favor. This may help them in the short term. In the long run slowing the transition seems an anti-climate, “no future”, expensive policy that may not even secure the incumbents’ survival. In the meantime, developing countries are catching up fast (REN 21, 2015 status report).

References* and abbreviations

*Additional sources are cited in the accompanying set of PowerPoint slides.

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EEG - Erneuerbare Energien Gesetz (Germany's Renewable Energy Act)

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