

The end of the electric market, Alex Henney¹

Abstract

One of the objectives in privatising the industry and introducing competition was get it away from government and all the resulting inefficient influences. This was achieved for seven years with beneficial results and radically improved performance. With the election of New Labour and Tony Blair as Prime Minister in 1997 political interference returned with ever increasing enthusiasm and ever decreasing competence. The New Electricity Trading Arrangements for England & Wales was an ill-judged and superficial change which did not reduce prices nor achieve the majority of its clearly stated objectives. Next Blair wished to save the planet. The Renewable Obligation Scheme, which was the subsidy support for major renewables, pointlessly piled risk on risk on risk, thus increasing the cost of capital. In 2007 Blair signed up for the UK to achieve 15% consumption of *all* energy from renewables by 2020, which was converted into achieving 30% renewables in the electric industry.

The Coalition government of 2010 kept to the same ends but altered the subsidies with its Electric Market Reform Project. We are subsidising:-

- The most expensive nuclear plant in the world
- Expensive - and for offshore, very expensive - wind including planning consent for the largest and most expensive offshore wind farm in the world. Yet does not mitigate CO2 as claimed on the tin
- The largest and most expensive scheme in the world to burn wood chips from new cut trees which actually *increases* CO2 emissions
- The most expensive research in the western world into carbon capture and sequestration
- Very expensive residential solar panels in our gloomy climate

We are running an auction to procure capacity set by the government. All this is not Market Reform but Market Replacement.

¹ I was on the board of London Electricity 1981-84. My report "Privatise Power" published by the Centre for Policy Studies in February 1987 was the first to propose a competitive restructuring of the electric industry with a pool. After the election in June I was involved with Rt. Hon. Cecil Parkinson and officials in the early days of restructuring, and wrote a paper "The operation of a power market" which had an influence on the course of events. Subsequently I have advised on electric markets from Norway to New Zealand. Much of the factual material of the first three sections is taken from my book "The British electricity industry 1990 - 2010: the rise and demise of competition", and some from "The expensive and ineffective shambles of Electric Market Reform", a submission to the Energy & Climate Change Committee considering Electricity Market Reform, October 2014.

I suggest we forget a market and accept that the government will determine the generation mix. If we wish to keep the industry in private ownership we could set up a central buying authority that would plan the system, select plants by auction, and ensure that they receive a regulated rate of return as they do in some US states where there is no wholesale market.

Freeing the industry in 1990

After WW2 the British electric industry was taken into public ownership by the government, and so not surprisingly it was politicised and manipulated to help the British plant manufacturing industry, British deep coal mining and British nuclear ambitions.

In my mind, and those of many others involved at the end of the 1980s, privatising the industry and introducing competition would subject it to the discipline of the capital markets, and get it away from government and all the resulting inefficient influences. In April 1990 the electric industry in England & Wales was restructured to create a duopoly of fossil fuel generators, National Power and PowerGen and a nuclear company British Energy which remained in public ownership until 1995; twelve regional distributors; and a separate transmission system operator, National Grid. The centre piece of the restructuring was a Pool based on generators making daily offers, and a set of contracts between generators and suppliers.

The aim of distancing the industry from the government was achieved for seven years from 1990 during which the high cost of nuclear power was revealed; the programme to build more nuclear power stations was stopped; and British Energy radically improved its performance. The National Grid and the two big generators National Power and PowerGen downsized by more than 50%. There was a significant programme of building combined cycle gas turbines (CCGTs) which displaced coal. The Department of Energy was shut, and most officials with industry knowledge left the civil service.

New Labour reverses policy

With the election of New Labour and Tony Blair as Prime Minister in 1997, political interference returned with ever increasing enthusiasm and ever decreasing competence. First came an ineffective gesture to halt licensing of CCGTs to protect coal and hence coal miners, who were part of Labour's political constituency. Next came the ill-judged restructuring of the Pool, which had its faults but not the one which it was blamed for. It did not as claimed by the government and the regulator facilitate the exercise of market power - that was due to the control of pricing by the duopoly (subsequently joined by Eastern Electricity, which became TXU Europe). The New

Electricity Trading Arrangements (NETA)², was an ill-judged and superficial change. Contrary to its billing, NETA did not reduce prices - they reduced six months *before* NETA was introduced because of a combination of overbuilding of CCGTs in response to the triopoly keeping prices up, and of the fragmentation of ownership following the part-forced and part voluntary divestment of 13GW of plant by National Power and PowerGen.

The next step in ending the market followed Blair's wish to save the planet which developed over the years from 2002 when he published "The Energy Review". Concurrently the government introduced the Renewable Obligation (RO) Scheme, which required suppliers (i.e. retailers) to have a proportion of Renewable Obligation Certificates which were bought and sold at the margin in an ersatz market arrangement. The scheme suffered from "naïve marketism" - an ideological belief in the efficiency of "markets" regardless of practicality. The objective of increasing the contribution of non-market viable renewables generation is a public policy objective, not an economic objective. *Thus its financing should not be impacted by the volatility of any market, let alone of three markets - the energy market; the European Union CO2 market; the RO "market".* The main facility being built - windmills - are very capital intensive, and their output is not correlated with the driver of the basic market, the price of gas. The consequence of these uncertainties piled artificially contrived bureaucratic risks upon the politically contrived risk of the EU CO2 market, and both upon a genuine (but irrelevant) market risk. These risks not only unnecessarily increased the cost of capital, but also made it difficult for new entrants to develop project financed schemes (as they have done in Germany). In consequence only companies with large balance sheets could join the game. In contrast, a feed-in tariff meets the low-risk financing requirement that is appropriate for a scheme based on public policy; provides the basis for project finance; is simple; and is cheaper - the German feed-in tariff scheme was about 15% cheaper. The government fiddled with the scheme making seven changes over the period to 2010 and replacing it in 2016.

Along with renewables, led by Blair, the government reversed policy on nuclear and in the May 2007 White Paper on Energy proclaimed that it "believes that new nuclear power stations could make a significant contribution to tackling climate change."

In 2007 at the Spring European Council, and against advice, Blair signed up for the UK to achieve 15% consumption of *all* energy from renewables by 2020, which was the most demanding target of any member state and required the UK to spend about a quarter of the total cost of the EU meeting the 2020 objective for carbon reduction. The 15% target was subsequently converted into achieving

² Subsequently extended to Scotland and named the British Electric Trading and Transmission Arrangements.

30% renewables in the electric industry, *which is the driver of the British renewable effort*. This could only be achieved with a great deal of wind, some pseudo biomass (namely new cut woodchips from the US which under many circumstances *increases* CO2), and token PV in our gloomy climate.

The Coalition gets serious about wasting money and destabilising the electric market

The election of 2010 gave no party an overall majority, and a Coalition was formed between the Conservative and Liberal Democrat parties. The Coalition continued with the same “green” policy objectives as New Labour but decided to discontinue the ROC scheme and replace it with contracts for differences which would also be used for nuclear. It also introduced a capacity auction to provide financial support for the *dispatchable* thermal plants needed to provide backup when the wind does not blow and the sun does not shine. The Coalition called the project “Electric Market Reform”, but in reality it was “Electric Market Replacement”.

The consequences of the policies are that we are:-

- **Building the most expensive nuclear plant in the world** costing £16bn (or £24bn including interest during construction) for 3200MW, throwing very generous profits at EDF
- **Subsidising expensive (£95/MWh) - and for offshore, very expensive (£155/MWh) - wind** including planning consent for the largest and most expensive wind farm in the world (Forewind) that is estimated to cost £6-8bn. Onshore/offshore costs respectively two and three times the current wholesale price of electricity, and sending vast sums of money overseas. A blog “The UK Offshore Wind Industry”³ analysed Renewable UK’s report “Offshore Wind Project Timelines”, which calculates the subsidies payable to wind farms already operating or which will commence operation under the RO regime, and those under construction and likely completed by 2022. “With output of 62TWH p.a. gives an annual subsidy of £6 billion...and all guaranteed for 15 years...The share of UK companies Centrica and SSE only amounts to 17%, meaning that the vast bulk of subsidy will be sent abroad...The wind industry creates very little added value, while Siemens and Vestas dominate the manufacture of turbines.” When the “market” income from the subsidy is added to the subsidy we get to a total of £10bn p.a., which the author opines “the UK simply cannot afford.”⁴ Energy Secretary of State Davey likes to publicise how much “investment” his policies have attracted, and claimed “The UK is the best place in the world for doing business in offshore wind”, and we are “leading the world.” We are definitely leading the world in subsidies. But we are in a one horse race - other countries are not so unwise as to follow our expensive example. The author regards all of this as “the economics of the mad house”
- **Throwing subsidies at the largest and most expensive scheme in the world to burn wood chips from new cut trees in the US** which actually increases CO2 emissions and destroys the environment⁵. Journalist David Rose went to North Carolina to see the operation by

³ NOT A LOT OF PEOPLE KNOW THAT, 5/1/15.

⁴ The Economist of 10/1/15 carried an article “Britain’s biggest export: wealth” which pointed out that because overseas returns have reduced “net investment income has fallen from a peak of 3% of GDP in the second quarter of 2005 to minus 2.8% today. That has caused the current account deficit to swell to 6% of GDP even as the trade balance has improved...This has worrying implications for the sustainability of Britain’s recovery.”

⁵ DECC produced a report “Life Cycle Impacts of Biomass Electricity in 2020”, July 2014, which went in great detail into the CO2 consequences of many variants of wood residue/chips of which the higher volume variants, such as cutting down

Enviva cutting down mostly hardwood trees to make into more than a million tons annually of pellets that are transported 3800 miles to Drax in Yorkshire to generate £62M in subsidy in 2013. Drax's head of environment admits the wood fuel produces 3% *more* CO₂ than coal and twice as much as gas⁶? DECC falsely claimed to Rose that Drax only uses wood "unsuitable for sawmilling because of small size, disease or other defects"

- **Spending more than any other country in the western world researching the unproven prospects of Carbon Capture and Sequestration (CCS)**, which is a saga that started in 2003. Recently E.ON in the Netherlands pulled out of developing perhaps the most favourable project of installing a post-combustion system of 250MW on a new coal plant it is building at Maasvlakte; after a decade Vattenfall is reported as stopping research on CCS; the costs of renovating and installing CCS to the 30 year old Boundary Dam power plant in Saskatchewan is very high, and incurs a parasitic loss of about 32% of the plant's power and there is a thermal efficiency loss of at least 25%
- **Subsidising at significant cost residential solar panels** in our gloomy climate with subsidies which make nuclear look cheap

One of the notable features of the wind effort is that it does not achieve what it claims on the tin by way of mitigation of CO₂. As the wind output goes up and down so the plants balancing and offsetting the wind must go down and up. If the plants are not controllable hydro, but are (mostly) thermal as in Britain, their thermal efficiency will reduce and their output of CO₂ will increase beyond their normal level. This is shown for Ireland and the US in an article I wrote with Dutch physicist Fred Udo⁷.

The financial effects of a *significant* level of subsidised renewables on thermal plant are to:-

- Reduce the running hours of thermal plant
- Increase wear and tear from frequent stops and starts of the plant that balances the variability of wind⁸
- Reduce the level of the market price - the German Ministry of Energy estimated a reduction of €9/MWh in 2012. One of the consequences of subsidising the output of windmills is to

intensively managed plantations, do not reduce CO₂ emissions when account is taken of sequestration from cutting and regrowing the forest. But it carefully did not point out that the CO₂ mitigation from the expensive subsidy paid to Drax is negligible. Perhaps all the cases were included to obfuscate the basic issue.

⁶ The bonfire of insanity, Mail on Sunday, 16/3/14.

⁷ "Wind - Whitehall's pointless profligacy", New Power, Issue 45, October 2012.

⁸ Power Plant Cycling Costs, by N. Kumar et al for the US National Renewable Energy Laboratory, April 2012. The study provides estimates of cycling costs - operations and maintenance, start-up costs, next rate costs - and the impact on forced outage rates for various types of plants for hot starts, warm starts, and cold starts. The report comments of older combined cycle units that "when operated in Cycling Mode they can have a higher cycling cost compared to a unit specifically designed for cycling." Mr. Kumar added "Depending on the vintage, operating regime, etc. and importantly design features a plant would have anywhere from 110% to 300% increased cycling related cost compared to a baseload unit. This means that a typical plant that may spend about \$1-1.5M on annual baseload "wear and tear costs", if cycled heavily (say daily) could spend almost \$3-5M just to maintain current reliability (again, this is wear and tear costs, not total maintenance cost). If this is not spent the plant will face significant life shortening and/or will be unavailable due to increased forced outages."

create negative prices (64 times in Germany in v2014) - the higher the subsidy the lower the price will go - which are not beneficial to thermal plants

These changes caused financial distress to owners of thermal plant as shown by Sorgenia in Italy (5GW), which went into administration, and RWE in Germany which lost money in 2013 for the first time since the war and E.On. In recent years the share prices of both companies have performed poorly compared with the German Stock index DAX.

At the beginning of 2008 the German DAX stock index peaked at 7949 then, following the financial crisis of the autumn, it more than halved to 3710 at the beginning of March 2009, to recover to 9870 at the beginning of 2015. Over the period the DAX increased by 24%. Between the beginning of 2008 and 2015 the share price of both RWE and E.On reduced by about 70% and by about 75% relative to the DAX.

While the massive loss of value is due to several factors - highly priced gas contracts, the government's decision to close nuclear plants, and reduction in consumption - part is due to the effect of renewables.

The "Levy Control" - a subsidy limit - for 2020 is budgeted at £7.6bn (2011/12 prices) most of which is for electricity decarbonisation measures which DECC estimates⁹ will add an average £92 (2014 prices) on household energy bills by 2020 of which about 4/5 will be on electricity. DECC's Impact Assessment for 29% renewable electricity assessed the present value of its cost up to 2030 as £39bn offset by carbon savings valued at £6bn leaving a net cost of £33bn"¹⁰, which does not seem a good deal. Now with Davey's ill-founded story that since oil and gas prices were ever going up, hence renewables and nuclear would be cheap, has been shown to be unfounded¹¹, we should surely reconsider our generation policies.

The demise of the market and what should be done with it?

We have reached the situation where DECC determines the type and volume of new plant that will be built and much or even most of the income that renewables and nuclear plant will receive. An auction is run where it determines the volume of other plant required, which determines the plant retired and new (generally gas) plant built. Then at the retail level the suppliers have to a degree

⁹ Estimated impacts of energy and climate change policies on energy prices and bills, DECC, November 2014.

¹⁰ Impact Assessment of proposals for a UK Renewable Energy Strategy - Renewable Electricity, DECC, URN 09D/686, 10 July 2009, http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/renewable%20energy%20strategy/1_20090715120351_e_@@_ukrenewableenergystrategy2009iaforrenewablecentralisedelectricitysectorurn09d686.pdf.

¹¹ Anyone with any knowledge of the history of oil prices and of the number of misforecasts would know that such forecasts are a mug's game. But then DECC with its ever charming staff, let alone Mr. Davey, has virtually no corporate memory of either the oil and gas markets or the electric industry.

been turned into welfare organisations, with social tariffs and energy efficiency initiatives and the (ineffectual) green deal, and are regularly berated.

After oil and gas prices reduced in the latter part of 2014, in January 2015 a Treasury spokesman was quoted that “The government is conducting studies of the industry”, and the Labour Party wrote to Chancellor Osborne claiming that the government consistently refused to act on evidence that consumers were being ripped off. Labour had an Opposition Day Motion on 14 January proposing that Ofgem be given the power to cut prices. Step by step regulation by the back door has been ratcheted up both of generation and supply. While markets can accommodate normal commercial risk, they are not good at handling political risk and the effect on the share prices show investors can be hit hard. The story of the last nearly two decades is that British politicians cannot resist interfering with the electric industry, and have undermined the generation market.

I suggest we forget a market and accept that the government will determine the generation mix. If we wish to keep the industry in private ownership we could set up a central buying authority that would plan the system, select plants by auction, and ensure that they receive a regulated rate of return as they do in some US states where there is no wholesale market. The capital investment is remunerated with an allowed rate of return plus an opex cost for maintenance, and the payment for fuel is passed through. There could be a short-term energy ersatz price market at the margin to provide a scarcity signal for customers to respond to, and to provide a bonus to generators which out-perform at times of shortage. All of the costs for all of the plants would be “blended” to create a time-of-use Bulk Supply Tariff priced roughly on a marginal basis as the CEGB did. So we will have come full circle and the politicians can mess around without requiring expensive restructuring arrangements.