

Reforming Competitive Electricity Markets to Meet Environmental Targets

EPRG Working Paper 1126

Cambridge Working Paper in Economics 1154

David Newbery

The Electricity Market Reform (EMR) set out in the latest UK Energy White Paper of 12 July 2011 is the third major reform since 1989 and the fourth Energy White Paper since 2003. It was a response to a combination of factors, all suggesting that the current market design would not deliver secure, sustainable and affordable energy while meeting the UK's legally binding carbon and renewables targets. The EU Emissions Trading System has failed to give a stable, credible and adequate carbon price to guide investments in low-carbon generation. UK's renewable electricity has lagged far behind Germany and Spain - wind capacity is only 19% of Germany's, despite having a better wind resource. Only if Britain matched Germany's rate achieved over the past decade could she reach her target of 27 GW wind by 2020. Finally, increasingly tight air pollution limits through the Large Combustion Plant Directive require major refits or massive plant closure before 2016. The White Paper notes that one quarter of generation capacity will need to be replaced by 2020. Despite the need for new investment, uncertainty over future energy policy has delayed new build, raising concerns over security of supply.

The estimated electricity investment needed to 2020 is £120 billion, three times recent rates and more than the Big Six can finance, so new finance must be tapped. The high capital cost of most low-carbon options requires de-risking investment to lower the cost of capital, which would lower electricity costs and prices appreciably.

EMR includes a Carbon Price Floor (CPF) to underwrite the commercial viability of nuclear power, starting at £16/tonne in 2013, rising to £30/tonne in 2020, and to rise to £70/tonne by 2030 (2009 prices). But a carbon tax that might adversely impact British competitiveness would not be credible, as it could be reversed in any Budget. Hence the central element is long-term contracts for low-carbon generation. These are bolstered by an

Emissions Performance Standard to limit emissions from new power stations to 450gm/kWh at base load, intended to rule out any new unabated coal-fired station (with exemptions for demonstration Carbon Capture and Storage stations).

The final component of the EMR is a Capacity Mechanism to encourage adequate investment in flexible peaking plant to ensure security of supply. This plant might run a modest and rather variable number of hours per year, for prices that would be hard to predict, making them risky, but the White Paper could not reach a decision on how this reserve capacity should be procured and has left it for a “technical update” at the end of 2011.

Although the CPF should make nuclear and on-shore wind economic, it is hardly bankable. The solution is long-term contracts that remove electricity market price risk, and are legally enforceable and hence credible in a way that the CPF is not. The White Paper’s preferred option is for a Feed-in Tariff with Contracts-for-Difference. The CPF is then seen as an important counter-part that ensures that over the life of (most?) contracts they are “in-the-money” and hence avoid subsidizing nuclear power and represent good value for consumers (at least, relative to the counterfactual of having the CPF and not having the contracts).

This raises several points, such as how the contracts are to be designed and financed. The need for a suitable institution to design, negotiate, finance and settle the contracts was not recognized in the original consultation, but was emphasized by the Parliamentary Select Committee and other respondents. In response, chapter 4 of the White Paper recognizes this need and lays down criteria such an institution should satisfy, leaving the details for further consultation and 2013 legislation.

While these contracts address some market and political failures, they risk removing large fractions of supply from market forces, apparently undermining the UK’s commitment to liberalized electricity markets. While this is not necessarily so, it will require further reforms to the electricity market, curiously the one aspect that the EMR, despite its title, does not address. Efficient operation and investment decisions need efficient short and long-run locational price signals, which the current market design notably fails to deliver. Efficient dispatch requires a liquid intra-day and balancing market, again lacking in Britain. There are models that might work considerably better than GB’s market design, discussed in the paper.



**UNIVERSITY OF
CAMBRIDGE**

**Electricity Policy
Research Group**

In conclusion, the EMR White Paper was correct in confirming that the present GB electricity market design will not deliver secure and sustainable (low-carbon) electricity at an affordable price, and has put in place solutions, notably contracts, that should reduce political uncertainty and market risk. However, it fails to make the more fundamental market reforms that would allow a liberalized market to deliver these objectives at least cost.

Contact
Publication
Financial Support

dmgn@cam.ac.uk
August 2011
ESRC RES-189-25-0155

