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Agenda

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Price versus volume: decarbonising the electricity industry

Tim Tutton, of the Exeter University Energy Policy Group, examines aspects of the government's December 2010 consultation on electricity market reform—notably, its proposals to achieve decarbonisation of the electricity industry through long-term feed-in tariff contracts for low-carbon power. He argues that government-run price subsidies (whether determined administratively or by auctions) will be less efficient than putting an emissions reduction obligation on electricity suppliers

In December 2010, the UK Department of Energy and Climate Change (DECC) published a consultation document on electricity market reform (EMR).[1] Against the background of the government's objectives (decarbonisation, security of supply, affordability), the four main proposals were:

- support for the carbon price through a new tax on fossil-fuel supplies used in electricity generation;
- extra financial support, through some form of feed-in tariff (FIT), for new low-carbon power;
- a 'targeted' capacity mechanism aimed at securing the required amount of firm and flexible generation to sit alongside the increased amounts of intermittent and inflexible plant brought forward by the above two elements;
- a 'back-stop' Emissions Performance Standard, the main aim of which, at least in the short term, is to prevent the building of new unabated coal-fired generation.

This article is not a response to all aspects of the proposals—at the time of writing, there has been no shortage of these. Rather, the objective is to focus on two fault lines which run through the proposals. These are:

- an inability to choose whether to rely on price-based or quantity-based mechanisms to deliver the government's *decarbonisation* objective;
- a degree of confusion, as well as a degree of obscurity, as to the roles to be played in the new energy world, on the one hand by central planning and/or central power purchasing, and on the other by markets.

The article suggests that:

- the core mechanism(s) for delivering the government's emissions and generating capacity targets should start from the required *volumes*, rather than from a government-determined set of *prices* (resulting from FITs or from an underpinned carbon price);
- a volume mechanism such as that described in the EMR consultation—a centrally run auction—would be unlikely to lead to an efficient outcome, for a variety of reasons. These include the deterrent effect of auctions on investors, and the lack of expertise of, and appropriate incentives on, the people running the auctions;
- the appropriate form of volume mechanism would be an obligation on suppliers—who would have the incentives and knowledge that a central mechanism would lack—in respect of the carbon content of their purchased wholesale electricity;
- standard criticisms of the supplier obligation approach—embedding the dominant position of the existing vertically integrated (VI) companies, and those companies' lack of financial capacity to undertake the required volume of investment—are misplaced.

Notable obscurities and uncertainties in the proposals

The EMR consultation document is intended to be a high-level consultation paper, rather than something

The views expressed in this article are those of the author.

more detailed and ready for implementation. Nevertheless, there are still features of the paper which make it difficult to evaluate even on its own terms. Two such features are:

- the mechanism(s) for deciding what types of generating plant will be built to deliver the desired level of decarbonisation and, in particular, whether the mechanism should be price-based or volume-based;
- the counterparty (or counterparties) to the proposed contracts.

On the first point, Chapter 3 of the consultation seems to suggest a process whereby a central body—by implication, government itself or a government agency—would set the *prices* or FITs for low-carbon plant (or, in one variant of the proposal, the 'premium FIT' would set the premium paid over the wholesale market price). The volume of new low-carbon plant would then be whatever it would be as a result of these prices and other market conditions. However, Chapter 6 of the consultation states that: 'The Government is attracted to a greater use of auctioning as a mechanism to set the level of feed-in tariff support'.[2] In other words, a central body would set the required *volumes* of different types of low-carbon power, and would run auctions, in principle, to minimise the subsidy paid.

In either event, it is not clear who would be the counterparty to the FIT contracts—for example, whether a central agency would be the principal, or would be an agent acting on behalf of suppliers. In other words, it is not clear how far the existing electricity market is being supplemented or, in effect, replaced.

Why a volume-based mechanism is likely to be preferable to a price-based one

A key choice for DECC is whether its chosen mechanisms for delivering its decarbonisation and security of supply objectives start from:

- required volumes (either of MW per se or low-carbon MW), and accept whatever price the wholesale electricity market produces to deliver those volumes;

or

- (government-stipulated) prices, and let the market decide on the volumes which it is prepared to deliver at those prices.

As already noted, the EMR consultation document is somewhat unclear on this issue. Its proposed ('targeted') capacity mechanism starts from volume, but the paper either leans towards a price-based mechanism or a volume-based mechanism for FITs, depending on whether one reads Chapter 3 or Chapter 6.

Any analysis of this issue needs to start with the government's objectives and, in particular, a confirmation of whether the government is choosing to specify the cost of decarbonisation (and accept the volume of decarbonisation which that cost will achieve), or a volume objective (and then accept the cost implications of that volume). It is fairly clear from various government publications, not to mention the UK's EU obligations in this area, that the government's primary objective is a volume one, with the secondary objective being the achievement of the volume objectives at least cost.

If, indeed, the government's central objective is to find the cheapest way of delivering specified volumes then it is likely that this will be best achieved by adopting mechanisms based on volume. This is for a number of reasons.

- Because of the asymmetric costs and benefits associated with over-supply relative to power cuts, policy-makers concerned with ensuring *security of supply* will rationally err on the side of prudence if setting prices to achieve a given volume objective, as well as being rationally prudent as to what the target volume should be.

- Policy-makers trying to hit *low-carbon energy targets* have an inclination towards impatience, especially when the country in question (the UK, for example) is embarrassingly far down the international league of low-carbon energy producers.

- Especially with power plants such as nuclear and onshore wind, there are substantial non-price reasons why it may take some time for plans to be turned into commissioned plant—which scratches the itch of policy-makers' impatience and makes them more likely to increase the prices on offer.

- Driving capacity mechanisms from price, rather than required volume, will more generally increase the exposure of policy-makers to rent-seeking procrastination by developers—for example, threats to delay or not go ahead with projects unless the subsidy is increased.

The result of all of this is that price-based mechanisms will have a systematic tendency to err on the side of over-generosity, leading to the sort of debates which have been held in various European countries (Spain, Germany and Ireland being examples) about whether success in achieving volumes of MW per se or MW of low-carbon generation has been achieved at too high a

cost. Driving a mechanism from required volumes and letting competition determine the prices would be more likely to produce better value for money.

Why that volume mechanism should be run by suppliers, rather than by a central agency

However, even if a volume-based mechanism is likely, in general, to lead to more economic delivery of decarbonisation, this does not necessarily entail such a mechanism taking the form of auctions run by some central body, whether government itself or an agency acting on a government's behalf—which is actually the option which seems to be envisaged by the EMR consultation. Centrally run auctions would have significant disadvantages, including:

- the lack of relevant information and expertise possessed by central bodies, relative to that possessed more generally in the market;[3]
- the costs involved in, and the deterrent effect on putative developers of, the sort of auction mechanisms run by central bodies—which tend to require large amounts of information to compensate for the ignorance of central decision-makers, and so that eventual decisions can be made relatively mechanistically and can be defended as 'objective';
- the lack of financial incentives on the central body to make 'good' (ex ante) decisions.

It would therefore make sense for any volume-based mechanism for achieving decarbonisation objectives to be implemented by suppliers, for the following reasons.

- They are the existing market-based purchasers of wholesale electricity.
- They have strong financial incentives to make efficient decisions.
- In the context of those incentives—and within the existing statutory framework for procurement—they can decide themselves just how elaborate and costly their procurement processes should be.

What the nature of the obligation on suppliers should be

Achieving the government's decarbonisation target involves a large number of 'levels' of decision-making, including:

- the top-level decarbonisation objective itself (to the extent that this has not already been decided by supranational agreements/requirements);
- the balance between supply and demand options for achieving that top-level objective;
- the composition of the respective supply and demand actions—for example, the split between new nuclear and renewable generating capacity and the split between different types of renewable power.

In general, and maybe leaving aside government investment in research and development for immature low-carbon technologies, direct government involvement should be kept at as high a level as possible. The starting position for achieving decarbonisation targets should therefore be that suppliers have a low-carbon obligation analogous to, but wider than, the current Renewables Obligation (RO). Ideally, that low-carbon obligation would be targeted on the (percentage) carbon content of their purchased wholesale electricity, thus encouraging, for example, efficient substitution of unabated gas-fired power for unabated coal-fired power.

Why some of the criticisms of the supplier obligation approach are misplaced

Various criticisms can be made of the supplier obligation approach, including that:

- the VI players, by themselves, have insufficient balance-sheet capacity to undertake the volume of investment required;
- such an approach would further embed the collectively dominant market position of the existing six VI suppliers;
- the existing RO on suppliers has failed.

The balance-sheet capacity of the VI suppliers

The first argument is that the existing VI suppliers do not have sufficient balance-sheet capacity to undertake the amount of investment in generating plant which is thought necessary to meet both longer-term decarbonisation, and security of supply objectives. It is not obvious why the issues of supplier obligation and suppliers' balance-sheet capacity should be linked in this way. Suppliers will presumably continue, as now, to source their wholesale electricity from plants that they own themselves and from those that they do not. To the extent that they need to offer long-term power purchase contracts to persuade non-VI generators to invest in new plant, this is presumably what they will do—and in these cases, it will be the balance sheets of the non-VI players that will be relevant, rather than those of the VI suppliers.

Embedding of the dominance of the existing VI suppliers

Both the government and Ofgem have been much preoccupied with the lack of effective competition in electricity supply. The latest manifestation of this preoccupation is Ofgem's Retail Market Review.[4] However, to reject the supplier obligation approach

on the grounds that it would be detrimental to electricity supply competition would seem to ignore the following.

- With six competitors of more or less comparable size, the GB electricity supply market looks relatively competitive by most normal benchmarks. Even if it does not produce some of the outcomes that the regulator (or the government) wishes, that does not, by itself, demonstrate a lack of effective competition.

- The fact that many consumers choose not to switch suppliers when it is fairly easy to do so—and that they may well pay a price penalty as a result of not switching—should be respected as evidence of rational choice, rather than something which needs regulators to do anything beyond imposing requirements to make suppliers' offerings reasonably comprehensible to those consumers.

Vertical integration, which Ofgem is prone to see as a barrier to entry, is an efficient way of organising an industry which invests in long-lived specialised assets—a point persuasively argued by Joskow and Schmalensee back in the 1980s.[5] The VI suppliers may well, as noted above, have to buy some of their future wholesale electricity under long-term contracts with others, but that power will probably end up being purchased less efficiently than that which is sourced from plant owned by the suppliers themselves, not least because of the inevitable inefficiencies associated with long-term contracts.

If, in spite of everything, the regulator wants to try to boost entry into electricity supply by non-VI suppliers—for example, by requiring the VI suppliers to make some proportion of their power available for others to buy—then that is an option, regardless of whether the supplier obligation approach to decarbonisation is followed.

The failings of the RO

The RO could be criticised on at least two levels: that it has not produced enough renewable generating capacity, and that what is has produced has cost too much. On the first point, it is arguable that the growth of renewable generation has been due far more to issues other than the RO—planning requirements in particular—than to the RO itself. The fact that the power which has been produced may have ended up being more expensive than it needed to be may have something to do with the RO being exactly the sort of centrally determined price-based mechanism which has been argued above to be likely to lead to unnecessary expense. As the EMR consultation acknowledges, the RO can be seen as a variation of the 'premium FIT' mechanism, which is one of the options that the government is currently considering. The supplier obligation approach, on the other hand, leaves it up to suppliers to determine what they will pay for low-carbon power, subject to some back-stop buy-out price, as well as leaving suppliers the options to choose between nuclear and renewable, and to substitute gas-fired for coal-fired generation.

In sum

None of the above should be seen as demonstrating that the supplier obligation approach is without its problems (even at the level of high principle discussed in this article). As Ofgem concluded in its Project Discovery report,[6] the approach would be less certain to deliver particular volume objectives than, for example, a single-buyer model in which the single buyer pays whatever it takes to deliver those objectives. This is not least because the supplier obligation approach would, as with the RO, have a price at which a supplier could choose to buy itself out of its obligations. However, in the normal world of downward-sloping demand curves—rather than in the central planning world of fixed physical objectives—this would not obviously be a bad thing.

Summary of conclusions

In conclusion, and in contrast with what is proposed in the government's EMR consultation, an efficient mechanism for achieving decarbonisation of the electricity sector is likely to be one which is based directly on the target volume of carbon emissions and takes the form of an obligation on electricity suppliers to achieve that target.

Tim Tutton

[1] Department of Energy and Climate Change (2010), 'Electricity Market Reform: Consultation Document', December.
[2] Ibid., para 6.9, p. 115.
[3] It is interesting to note the slow progress and current state of the attempts of DECC and Ofgem (the energy regulator for Great Britain) to centrally procure investment in new offshore transmission capacity—contracting for which should, in principle, be considerably simpler than contracting for, say, the building of a nuclear power station. After years of effort to secure a regime in which Ofgem would procure an independent transmission operator to build the new transmission capacity, the currently proposed 'enduring arrangements' for offshore transmission allow for a 'generator build' option. In other words, generators can themselves arrange for the new transmission to be built, and only once it is built will it be tendered for independent operation. It would be consistent with the thesis of this article if most projects (especially for generator-developers who are themselves major companies) opt for the generator build option—ie, for the VI option for the building of the new capacity. For the current state of play on the arrangements for offshore transmission, see Ofgem E-Serve/DECC (2010), 'Government Response to Consultations on Offshore Electricity Transmission', December.
[4] Ofgem (2011), 'The Retail Market Review – Findings and Initial Proposals', March.
[5] Joskow, P.L. and Schmalensee, R. (1983), *Markets for Power*, MIT Press.
[6] Ofgem (2010), 'Project Discovery – Options for Delivering Secure and Sustainable Energy Supplies', February.