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Agenda

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Electricity sector reform: is the system operator always the answer?

Reforms to the UK electricity sector are currently being discussed. Tim Tutton, Adjunct Professor in the Energy Futures Lab at Imperial College, looks at why the role of the system operator is apparently so important for reform in the sector in the UK—in respect of not only the wholesale electricity market but also electricity networks—and considers some of the issues arising from this expanded role

In the UK, as in much of the rest of the world, the model for organising an electricity supply industry used to be via a vertically integrated monopoly, at least for generation and transmission. In England and Wales, this model became the Central Electricity Generating Board (CEGB) and lasted until electricity privatisation in 1990.[1] The model had several things going for it.

- In principle, it allowed one body to simultaneously optimise the operation and development of generation and transmission—ie, taking full account of incremental transmission costs when evaluating the case for new power stations.

- It gave politicians comfort about security of supply by allowing that one body to target a capacity margin that was sufficient to keep the risk of major power cuts under a certain level, which might well be below the risk acceptable to competitive generator-suppliers looking to skimp on that margin to secure a cost advantage over their rivals.

- It provided government with a relatively straightforward lever for achieving multiple policy objectives, whether relating to 'energy policy' or to broader economic and social goals. Thus, for example, a domestic coal industry was protected by ensuring that the bulk of its output was purchased by the CEGB, despite that coal costing significantly more than internationally traded coal (and even though, at least in the latter years of the CEGB, gas-fired generation looked increasingly attractive relative to coal-fired plant).

Many factors lay behind the rejection of this model at the time of electricity privatisation, including:

- the fact that, although a vertically integrated monopoly gave the *opportunity* to optimise the development and operation of the industry in a reasonably straightforward way, it offered very little *incentive* for this to happen;

- that the government of the day saw energy policy as being about little more than facilitating competitive outcomes in the energy sector—a philosophy summed up in a much-quoted statement from Nigel Lawson, Secretary of State for Energy in the early 1980s:[2]

> I do not see the government's task as being to try to plan the future shape of energy production and consumption. It is not even primarily to try to balance UK demand and supply for energy. Our task is rather to set a framework which will ensure that the market operates in the energy sector with a minimum of distortion and energy is produced and consumed efficiently.

However, since that time, things have moved on. Energy policy has returned with a vengeance—with government now wanting to prescribe the amount of generation needed to meet expected demand, and, at least to some extent, the mix of technologies used to generate power. This has been partly about meeting decarbonisation targets, driven by broader environmental concerns, and partly about addressing security of supply concerns. In turn, the latter have been partly driven by worries about increased dependence on imported energy (associated with the decline of the North Sea reserves and the planned closure of most of the UK's existing nuclear power stations), and partly by the issues posed by running a power system with a high degree of penetration by intermittent wind generation.

The problem for government is that, once it starts taking away certain decisions (such as the mix of

generating plant) from the market, it is not clear what should be put in their place. For example, should the government itself get into the business of planning a power system and contracting for wholesale electricity? In brief, the answer that the government has currently reached is that it should delegate much of these responsibilities to the system operator (SO), National Grid.[3]

However, this answer raises questions of its own, not least in relation to conflicts of interest to which the SO's expanded role may give rise. This article looks at why the SO is the government's chosen instrument for pushing through change in the electricity sector—in electricity transmission, as well as in the wholesale electricity market—and some of the issues this gives rise to. It covers in turn:

- the government's choice of the SO to 'deliver' electricity market reform (EMR) in the wholesale market;
- the evolution of the government's view of the role of the SO in developing offshore transmission from a 'minimalist' one (focused mainly on providing information to market participants who would use this information to make the key decisions on the development of an offshore transmission network) to something closer to a conventional planner of a transmission network;
- why the SO tends to be the chosen answer to rather a lot of questions that the government is currently asking about how to develop the electricity sector;
- issues of conflict of interest arising from the expansion of the SO's role.

The role of the SO in delivering EMR

Over the next few years, a substantial amount of existing GB generation is expected to close (around 25% of existing capacity, according to the Department of Energy and Climate Change[4]). In addition, the UK is committed to meeting targets for reducing its carbon emissions and to doing this, in large part, through the substitution of low-carbon generation for fossil-fuelled power. In principle, this transition could have been achieved through methods which largely worked with the grain of the existing market—for example, through carbon pricing, carbon taxation, or requiring electricity suppliers to reduce the carbon content of their electricity supplies (and leaving them to decide how to achieve this at least cost).

In the event, the government decided that it would choose the mix of low-carbon generating plant to meet its climate objectives and would, in addition, put in place a new mechanism to ensure enough total generation to deliver security of supply, not least because increased reliance on wind generation will weaken the economics of the fossil-fuel generating plant needed to provide back-up when the wind is not blowing.[5]

The two core features of EMR are thus:

- the award of long-term contract-for-difference feed-in-tariffs (CfD FiTs) to chosen low-carbon generating plant;
- a 'capacity market' which would pay generators explicitly for being *available* to generate.

Both these features embody a shift from competition *within* the market (dominated by six vertically integrated generator-suppliers) to competition *for* the market. In other words, once a low-carbon generator is awarded its CfD FiT, it essentially competes against that contract, rather than against other generators.

However, a competition-for-the-market model requires an entity (or entities) to run it—in this case, to award the FiTs and the capacity contracts. Although the Department of Energy and Climate Change (DECC) has made it clear that it will take all the high-level decisions (on CfD strike prices and volumes, and capacity market volumes), the 'delivery body' (which will both advise the government on its high-level decisions and run auctions for the capacity market and allocate CfDs) will be the SO, National Grid.

Why the SO? DECC has suggested several reasons, including the following:

> 'strong synergies with the current role of the System Operator and delivery of both the FiT CfD and the Capacity Market';[6]
>
> 'the System Operator already has the technical expertise, and commercial and financial skills necessary to deliver the FiT CfD and the Capacity Market'.[7]

The role of the SO in developing the offshore transmission system

Just as the government is trying to reform the wholesale electricity market through EMR, it has also, for some years now, been trying to reform how networks operate, not least through establishing a competitive tendering process for operating offshore transmission infrastructure (as well as through related plans to introduce competitive tendering for major onshore transmission projects). However, unlike with delivering EMR, it is not obvious why the fact that the

SO is playing a role in planning offshore transmission should be contentious (apart from the issue of conflicts of interest, which is dealt with in the penultimate section of this article). Even in disaggregated electricity industries, this is what SOs often do—ie, plan transmission systems.

However, this is not what the government and Ofgem had in mind when they initially set out their views on how offshore transmission (quite an important component in government plans for decarbonising the electricity sector) should be developed. Rather, the model was one in which transmission development would be driven in a fairly straightforward and unmediated way by (would-be) offshore generators. At the risk of oversimplification, the proposed process had only two elements: first, a would-be offshore generator would request (from the SO) a connection to the onshore transmission network; and, second, Ofgem would run a competitive tender process to appoint an offshore transmission operator (OFTO) to finance, build, own and operate the required offshore transmission infrastructure.[8]

In this initial version of the process—described in consultation papers and policy statements between 2005 and 2008—there was no significant role for the SO other than to make the commercial offer of a connection and take on board the implications of the connection for the onshore transmission system. The implicit (and sometimes explicit) assumption was that, if there was a benefit to one or more offshore generators in coordinating their transmission plans, this would be achieved by agreements between the generators themselves.[9] Put another way, the offshore transmission system would be 'planned' by the individual generators, with no central intervention.

Partly, this position reflected the economics of the earliest offshore wind farms—these were close to shore and looking only for a simple point-to-point connection to the onshore transmission system. However, in part, there seems to have also been a rather Coasian[10] belief that if there were potential market failures in the process (for example, due to an individual generator not considering the implications of its plans for those of other generators), these would be resolved by voluntary commercial negotiation between generators.

Notwithstanding the intention, this position has evolved in the intervening years. In the early stages, this mainly took the form of statements about the need for 'co-ordination' of offshore transmission development, and also involved a new licence obligation on the SO to provide more information to generators on the potential development of the offshore transmission system, in the form of an Offshore Development Information Statement. In other words, the SO should do more to make it easier for generators to co-ordinate with each other (or, in Coasian terms, the SO should do more to reduce the transaction costs which might prevent generators sorting things out for themselves).

More recently, however, the government and Ofgem have inched towards a more assertive role for the SO in shaping the development of an offshore transmission network. This was not least on the back of its 'Offshore Transmission Coordination Project', which concluded that more proactive coordination of offshore transmission investment could deliver savings of around 8–15%, but that this would require more investment to be undertaken in anticipation of future requirements (unlike in the basic model, where investment is triggered only by a current requirement, as expressed in a generator's request for a connection).[11]

In Ofgem's latest published thinking, it is acknowledged that 'feedback generally agreed that the [SO] should take a greater role in system planning, with recognition that the [SO] has already been identifying where Coordination would be beneficial when making connection offers'—and Ofgem has invited views on whether the SO could have a role in identifying and undertaking pre-construction work (such as surveys, obtaining of consents, and network design).[12]

In short, and maybe in spite of its institutional instincts, Ofgem cannot see a way towards optimal development of the offshore transmission network without the SO playing a central role.

Why is the SO central to electricity sector reform?

As far as EMR is concerned, one could take at face value the government's stated reasons for giving the delivery role to the SO. These, as quoted above, include synergies with the SO's existing duties (which are particularly obvious with the planned capacity mechanism) and the expertise that the SO possesses.

In the case of offshore transmission, an increased role for the SO is based on the same sorts of market failure that have previously led to central planning of transmission systems—not least, the fact that individual generators will be motivated primarily by their own requirements, rather than those of other (and future) generators. In other words, the SO can potentially internalise concerns that are external to an individual generator. In addition—and this is clearly not the biggest concern of either DECC or Ofgem—there is the background fact that the UK is, at least formally, committed to cooperating with other countries bordering the North Sea on developing a North Sea transmission network[13]—and those other countries are rather less squeamish about the central planning of transmission infrastructure.

However, leaving aside the more technical issues, at least two factors seem to be involved that are critical to electricity reform (both of them more important for DECC than for Ofgem).

- First, and specifically since this concerns the electricity industry, there is the desire to have some of the benefits of a vertically integrated monopoly in the absence of a vertically integrated monopolist—ie, resolution of intra-industry externalities; giving some level of administrative assurance about security of supply; and having an instrument for achieving broader energy policy objectives.

- Second, there is the persistent and more general desire of government to have somebody to go to in order to sort out problems, especially politically sensitive problems, rather than leaving them to some abstract entity such as 'the market'. The government could have chosen to achieve decarbonisation of the electricity industry through market mechanisms (for example, a carbon tax), but it chose the route of having a body putting in place contracts for the mix of generating plant that the government thinks is required. In his book, *The Company of Strangers*, Paul Seabright tells of a conversation, shortly after the break-up of the Soviet Union, with a senior Russian official whose job it was to direct the production of bread in St Petersburg:[14]

> 'Please understand that we are keen to move towards a market system,' he told me. 'But we need to understand the fundamental details of how such a system works. Tell me, for example, who is in charge of the supply of bread to the population of London?'

In an industry of such political sensitivity as electricity, this desire to have someone to go to in order to sort it all out is not confined to countries just getting to grips with a market economy—and, with a non-vertically integrated electricity industry, the obvious body to go to is the SO.

Is the SO too subject to conflicts of interest to be the answer?

Not surprisingly, the SO's planned role in EMR, and its evolving role in the development of offshore transmission, are not without their critics. For example, in its pre-legislative scrutiny of the new Energy Bill, the House of Commons Energy and Climate Change Committee concluded that:

> We do not believe that it is appropriate for a private company—which is ultimately motivated by profit making—to act as the EMR delivery body. DECC's proposals for the System Operator to take on this role will result in considerable conflicts of interest for National Grid and could result in unnecessary additional costs to consumers. We recommend that National Grid should be removed from this role and replaced by establishing a new independent, not for profit company.[15]

The argument for a non-profit-making EMR delivery body as a way of reducing costs is an interesting one and not obviously borne out by the costs (or, indeed, effectiveness) associated with other non-profit-making public bodies. It is also, at this stage, unclear what profit, if any, the SO will be allowed to make from its EMR activities. However, the issue of conflicts of interest is a real one, in relation to both EMR and offshore transmission. Having said this, there is a question as to how material these conflicts of interest are likely to be and whether they can be dealt with by conventional regulatory responses.

With offshore transmission, there is a clear potential conflict of interest between National Grid's role as the SO and the arm of National Grid that bids to be an OFTO, not least in relation to information passing from one to the other. In addition, the SO could, in principle, favour connections to the onshore transmission system which suited National Grid's onshore commercial interests. To date, such issues have been dealt with by:

- Ofgem, as the body that runs the competitive tenders to be an OFTO; and

- new licence restrictions on National Grid, designed to ensure regulatory separation between National Grid Electricity Transmission (the regulated transmission licensee which includes the SO) and National Grid's offshore interests.[16]

As far as EMR is concerned, conflicts of interest would again include the SO giving preference to projects (for award of CfD FiTs, for example) which favoured other National Grid commercial interests. However, there is likely to be a very high degree of transparency around the award of contracts (which should inhibit such behaviour) and, if thought to be required, there is always the option of imposing regulatory or even legal separation between the SO and other parts of National Grid, alongside the sort of licence restrictions that have been introduced in relation to offshore activities.

Conclusions

To sum up.

- Reasons in the past for favouring integrated electricity industries included a) the internalisation of what would otherwise have been externalities; and b) the comfort that governments gained from having an instrument for achieving both energy policy and broader objectives.

- With a non-integrated industry, the SO is the obvious body to go to—in terms of both expertise and synergy with existing activities—to realise such objectives (which are now much more in vogue than they were when the industry was taken apart and privatised in 1990). That is the underlying reason why the SO is so often seen as the solution to the sort of energy/climate change problems with which the government is currently grappling in the electricity industry.

- Giving the SO the sort of broader remit that is proposed for EMR, and which is being inched towards on offshore transmission, will give rise to conflicts of interest, albeit probably not of the same magnitude as those that arise when transmission and generation exist within the same corporate entity.

- There is no obvious reason why those conflicts cannot be managed by transparency and/or the sort of licence obligations and regulatory separations that are already in place for offshore transmission, and which have been used elsewhere for GB privatised utilities with similar conflicts.

Tim Tutton

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[1] In Scotland, vertical integration also embraced the distribution and supply functions that were carried out by Area Boards in England and Wales.
[2] Quoted in, for example, Helm, D. (2003), *Energy, the State, and the Market, British Energy Policy since 1979*, Oxford University Press, pp. 57–8.
[3] Department of Energy and Climate Change (2011), 'Planning our Electric Future: Technical Update', December.
[4] Department of Energy and Climate Change (2010), 'Electricity Market Reform Consultation Document', December.
[5] Department of Energy and Climate Change (2011), 'Planning our Electric Future: a White Paper for Secure, Affordable and Low-Carbon Electricity', July.
[6] Department of Energy and Climate Change (2011), 'Planning our Electric Future: Technical Update', December, para 70.
[7] Ibid.
[8] In the current model, there is also the option for the offshore generator to build its own transmission infrastructure (the 'generator build' option) and Ofgem to then run a competitive tender for an OFTO to own and operate the assets.
[9] 'In general cables are expected to be dedicated to individual wind farms or shared between two sites located within close proximity of each other. Arrangements where two independent ventures share the use of an asset can be dealt with by normal commercial arrangements and would appear not to create a significant barrier to a competitive process.' Department of Trade and Industry (2005), 'Regulation of Offshore Electricity Transmission', July 27th, para 4.8.
[10] Coase, R.H. (1960), 'The Problem of Social Cost', *Journal of Law and Economics*, October. In his article, Coase argued that, *in the absence of transaction costs,* parties affected by 'externalities' (for example, Party A causing a problem for other parties without Party A bearing any cost of doing this) would negotiate an economically efficient outcome without the need for government intervention to correct the sort of market failure often associated with the existence of externalities.
[11] Ofgem E-Serve and Department of Energy and Climate Change (2012), 'Offshore Transmission Coordination Project: Conclusion Report', March 1st.
[12] Ofgem E-Serve (2012), 'Open Letter: Offshore Transmission – Update on Coordination Policy Developments', July 26th.
[13] The North Seas Countries' Offshore Grid Initiative (NSCOGI).
[14] Seabright, P. (2004), *The Company of Strangers: A Natural History of Economic Life*, Princeton University Press, p. 15.
[15] House of Commons Energy and Climate Change Committee (2012), 'Draft Energy Bill: Pre-legislative Scrutiny', Volume 1, July 23rd, para 198.
[16] See 'The Electricity Act 1989: Modification Pursuant to Section 11 and Notice of Reasons for Modification Pursuant to Section 49A. The Transmission Licence of National Grid Electricity Transmission Plc', available at www.ofgem.gov.uk.