

Agenda

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Investment in energy networks: has Ofgem got it right?

The emphasis in GB energy network regulation has, at least to some extent, shifted from the extraction of operating costs to the securing of efficient network investment. Tim Tutton, Senior Adviser at Oxera, summarises the changes that have already taken place to encourage efficient investment in the networks, and analyses the areas most obviously in need of further change

For some time after the privatisation of the gas and electricity industries, the dominant focus of GB energy regulation was on getting energy prices down. However, starting with the fourth electricity distribution price control review (DPCR4), the emphasis shifted from reducing prices to facilitating increased investment in energy networks.

There is nothing mysterious about the reasons for this change. In particular:

- power cuts around the world in 2003, particularly the one which occurred in London, focused minds (not least, politicians' minds) on the potential consequences of ageing power networks for reliability of electricity supply and on the need for higher rates of asset replacement;¹
- the government's desire to meet targets for renewable electricity generation, combined with a concentration of renewable generation projects in the north of Scotland and offshore, imply the need for substantial extension and reinforcement of the GB electricity transmission system;
- any substantial expansion of distributed generation is likely to require investment in electricity distribution networks;
- an increased future reliance on imported gas supplies, including supplies that will respond opportunistically to short-term movements in UK wholesale gas prices relative to prices elsewhere in the world, implies the need for a more flexible gas transmission network than what has been adequate with a more stable geographic pattern of gas flows.

At the same time, the cornerstone of UK network regulation is an RPI – X framework, which rewards companies with higher profits, at least in the short term, for **not** spending money on their networks.

Ofgem, the energy regulator in Great Britain, is well aware of this conflict, and has spent a significant amount of time over the last few years refining its basic RPI – X model from one designed mainly to drive out costs to something more complex, through, for example:

- the use of the Information Quality Incentive (IQI), designed to improve the accuracy of companies' assessments of the relatively predictable parts of their capital expenditure (CAPEX) requirements (ie, the requirements not directly driven by network users);
- increased exposure of electricity distribution network operators (DNOs) to network 'outputs';
- the increased use, at least for transmission, of 'user commitment' and 'revenue drivers' to deal with the uncertainties associated with user-driven network investment.

Against this background, the question addressed in this article is whether Ofgem has succeeded in creating a framework which does indeed meet the regulator's own objective of encouraging efficient network investment. To this end, the article is structured as follows.

- First, a summary is provided of the array of mechanisms which now exist to both encourage and penalise investment by energy network businesses—and how each of these mechanisms can be expected to affect network investment.

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

- This analysis is then used to assess the overall impact on network investment of the existing regulatory regime.
- What Ofgem might do to improve the current framework is then considered.

Regulatory mechanisms encouraging (or deterring) investment

With the end of the gas distribution price control review (GDPCR), Ofgem has now completed its latest ‘cycle’ of price reviews. As a result, and although there are differences between the regulatory regimes that apply in each of the energy network sectors (gas transmission, gas distribution, electricity transmission and electricity distribution), there is now enough in common between the respective regimes to assess a generic framework of incentives to invest in networks. This framework has the following main elements:

- the extent (and sign) of any differential between a company’s actual cost of capital and the cost of capital assumed in setting the price control;
- processes and mechanisms for encouraging companies to make accurate bids for the amount of required CAPEX over the following price control period;
- the eventual allowances for CAPEX incorporated into price controls;
- the extent of the reward for spending less than the allowance, and the extent of the penalty for spending more than the allowance;
- incentives with respect to network ‘outputs’—for example, the incentives on DNOs as regards both the volume and duration of supply interruptions; the Network Reliability Incentive on National Grid Electricity Transmission (NGET); and the capacity buyback incentives on National Grid Gas Transmission (NGGT).

Below, each element is described, and its likely impact on efficient network investment is assessed.

Assumed and actual cost of capital

To the extent that a company’s actual cost of capital is less than that assumed by Ofgem in setting a price control, the company has an incentive to invest and to grow its regulatory asset base (RAB). However, it is also worth noting the following.

- Hypothetically setting the assumed cost of capital **equal** to a company’s actual cost of capital would mean no incentive to invest since, in principle, the

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value of future earnings from an investment would exactly equal the cost of the investment.

- Given that Ofgem is assuming a fixed cost of capital for a five-year period (and has thus far rejected indexation of part or all of the assumed cost of capital to measures of actual financing costs), it is effectively compelled by its own statutory obligations (with respect to the financeability of the licensed network businesses) to make prudent allowance for the actual cost of capital rising above current values through the next price control period.

Incentives to make accurate assessments of CAPEX requirements at price reviews

During the recent GDPCR, Ofgem again used the IQI approach, noted above, which it initially employed in DPCR4. This approach has a number of dimensions; however, its most powerful incentives are that:

- an individual company will create the most profitable opportunities for itself by aligning its own assessment of its CAPEX requirements with Ofgem’s assessment;
- having done so, it has a strong incentive to spend less than this assessment (rewards for such underspending are greater the more the company agrees with Ofgem on what it should be spending).

Does the IQI process itself encourage an efficient level of network investment? Not necessarily. The company which is deliberately overstating what it would like to invest is encouraged to reduce its CAPEX bid—but the company which genuinely believes that it should be investing more than Ofgem’s assessment is also financially encouraged to bring its bid into line with that assessment.

The level of CAPEX allowances

Regardless of whether Ofgem has set the price review CAPEX allowances at the correct levels, those levels have clearly increased in the last cycle of price reviews compared with the previous round. For example:

- DPCR4 CAPEX allowances for the forthcoming price control period were 48% above the forecast actual level of spend for the preceding five years;²
- on the same basis, CAPEX allowances in the last transmission price control review (TPCR4) were around 43% higher.³

By themselves, therefore (and recognising the importance of incentives to spend more or less than the allowances—see the following section), increased CAPEX allowances have facilitated increased network investment.

Specific incentives to spend less than the CAPEX allowances

Under the current transmission and electricity distribution price controls, and under the forthcoming control for gas distribution networks (GDNs), companies face a fixed percentage incentive not to spend money throughout a price control period. A company that spends less than its CAPEX allowance is rewarded by a fixed percentage of that underspend, and is penalised for spending more than the allowance by the same fixed percentage of the overspend. Ofgem has usually implied that this penalty would normally be applied at the subsequent price review, even if the company could show that the 'overspend' was efficient (maybe because input costs had risen more than assumed in the price control, or because unanticipated circumstances had required a higher-than-expected volume of spend).

These percentages are substantial—between 29% and 40% for DNOs; between 33% and 36% for GDNs; 25% for NGET; and between 25% and (over) 35% for NGGT (depending on whether the CAPEX in question is asset replacement or customer-driven network enhancement).⁴

By themselves (and, in particular, without taking account of parallel incentives to deliver network outputs), these figures represent strong incentives not to invest, even when required CAPEX turns out to be broadly consistent with price control assumptions. When these assumptions turn out to be incorrect, the incentives will tend to work asymmetrically against investment being undertaken. In other words:

- when the required CAPEX turns out to be **lower** than assumed in the price control (perhaps because input costs are lower than expected), it is unlikely that companies will undertake a higher-than-assumed volume of spend. This is partly because of companies' desire to financially outperform the control, and partly because the way that Ofgem has described the various incentive mechanisms leaves open the possibility that the extra spend would be interpreted as inefficient at the next price review and not fully incorporated into the company's RAB;
- when, on the other hand, required CAPEX turns out to be **higher** than assumed in a price control, the company has the penalties listed above as a reason for still not spending more than its price control CAPEX allowance, albeit that Ofgem has been less ambiguous on this point when the higher requirement is due to higher input prices, rather than a higher CAPEX volume requirement.

Incentives on network outputs

By establishing an incentive not to spend money, RPI – X regulation is, at one level, doing no more than

simulating the pressures on companies operating in competitive markets. However, what these competing companies will also do is set the incentive to keep their costs down against the 'outputs' or benefits from investing (for future costs, revenues and, indeed, corporate survival).

What are the countervailing output and related pressures and incentives for energy networks? These include:

- statutory and/or licence obligations to develop and maintain efficient networks, and the associated risk of being found to be in breach of those obligations, being fined, and suffering substantial reputational damage;
- obligations to connect those requesting connection (and prepared to make the relevant financial commitments) alongside standards which imply the network reinforcement necessary to accommodate new connections on both gas and electricity networks;
- 'revenue drivers' that allow more revenue for user-driven network reinforcement (especially for NGET and NGGT, but also the Distributed Generation Incentive for DNOs), and which encourage efficiency through basing the additional revenue, at least in part, on ex ante estimates of efficient costs;
- the requirement on NGGT to 'buy back' transmission entry capacity which it has contracted for, but which is not available on the day;
- the 'mains and services replacement incentive' on GDNs;
- a variety of 'quality-of-supply' incentives, including NGET's Network Reliability Incentive and incentives on DNOs with respect to the frequency and duration of supply interruptions.

The following section addresses the question of whether these output incentives are enough, on balance, to mean that companies are being encouraged to invest—including being encouraged to invest when actual CAPEX requirements turn out to be higher than assumed at the setting of the price control.

So, are networks being encouraged to invest?

On the basis of the discussion above, the energy network companies are being encouraged to invest:

- to the extent that the costs of capital underlying the existing price controls are above companies' actual current costs of capital;

- by increased CAPEX allowances in existing price controls relative to previous controls.

At the same time, they face substantial penalties for exceeding those CAPEX allowances, even if the extra spend is subsequently judged to have been efficiently incurred.

Beyond these high-level generalisations, things become more complicated and more sector-specific.

– **Asset replacement:**

- GDNs have strong direct financial incentives (in the shape of the Mains Replacement Incentive) to carry out the planned mains replacement programme efficiently; but
- NGET has weak direct financial incentives to carry out adequate asset replacement. It faces a 25% incentive not to invest; its exposure to the Network Reliability Incentive is modest; and, in any event, the linkage between asset replacement and network reliability is quite weak within the five-year control periods over which incentive regulation operates. It is the case that NGET is also exposed to network failure through its system operator incentives (BSIS), but these are currently set for only one year at a time, and therefore cannot be expected to impact significantly on investment plans;
- DNOs sit somewhere in the middle of this spectrum, with greater financial exposure than NGET to supply interruptions, but with less-clear output requirements than the GDNs.

– **Customer-driven or load-related investment:**

- NGGT has powerful incentives to respond to signals from the long-term capacity auctions, and the associated capacity buy-back incentives, to provide extra entry capacity to the gas transmission network. At the same time, the auction mechanism can deal far more easily with incremental expansion of the transmission network than with major ‘lumpy’ enhancements;⁵
- NGET has strong incentives to efficiently reinforce the electricity transmission network to cope with financially backed connection requests from users. These incentives include specific licence obligations to connect new generation/demand, and to adequately reinforce the system to cope with those connections, as well as revenue drivers to encourage this reinforcement to be undertaken

at minimum cost. However, the need for user financial commitment to underpin network reinforcement, as with gas transmission, will typically work more effectively for small additions to the network than for larger ones.⁶ In any event, the requirement for user financial commitment as a pre-condition for network enhancement may well delay network investment by encouraging the application for planning consent for new power stations, on the one hand, and, on the other, for network reinforcement to be sequential, rather than parallel, activities;

- there is a mechanism for encouraging DNOs to undertake efficient investment related to distributed generation, albeit that the current financial parameters of the mechanism do not seem to be making the incentives attractive to the networks. In any event, DNOs do not have the more general revenue-driver mechanisms which help to insulate the transmission companies from unanticipated requirements for customer-driven network investment;
- incentives on GDNs to reinforce their networks are somewhat bound up in the ongoing process of offtake reform.

Having said all of the above about financial incentives for investment, Ofgem might say that this summary omits the obligations on all the companies to develop and maintain efficient networks. However, the regulator has also typically accepted that financial incentives and statutory/licence obligations should be aligned with each other as far as possible—and, indeed, that is normally what incentive regulation is seen to be about.

What remains to be done?

The above summary shows that Ofgem has done a great deal to develop the various network regulatory regimes for a world in which securing efficient investment in networks sits alongside the objective of reducing operating costs. However, the most obvious holes in the current arrangements would seem to be as follows.

- The weakness of the financial incentives to undertake asset replacement on the transmission systems, albeit that asset replacement is currently a much bigger issue for the electricity network than for the gas one.
- The extent of the reliance on user commitment to drive transmission network enhancement investment—not simply because of the delays that this may cause, but also because it is unlikely that user commitment alone will efficiently determine the

required amount of major 'lumpy' network enhancements.

- Strong incentives not to invest above price control allowances, even when such overspend can be shown to be efficient, possibly because relevant circumstances have changed since the last price review, and even when there are no revenue drivers in place to proxy changes in circumstances.
- The lack of transmission-style or other mechanisms (other than the apparently unattractive incentive for investment associated with distributed generation) for encouraging DNOs to provide customer-driven

investment which was not anticipated at the previous price review.

Summary

Ofgem has responded to the need for increased investment in energy networks by modifying the various network regulatory regimes. The fact that there are arguably elements of these regimes which could do with further development is, in part, what some of the existing programmes (gas offtake reform, the transmission access review) are about and, in part, what will underlie the new cycle of price reviews, starting with DPCR5.

Tim Tutton

¹ See, for example, the House of Commons Trade and Industry Committee's 2004 report, 'Resilience of the National Electricity Network', which was a direct response to the 2003 power cuts (both in the UK and elsewhere), and states that 'there is a danger that there is currently insufficient investment in the [national electricity] network to replace in a planned and orderly way equipment which is reaching the end of its life', and 'we consider that the Regulator's concern to reduce costs to consumers should now be tempered by a greater emphasis on ensuring that electricity network owners have the financial resources necessary to secure a viable long-term electricity supply'.

² Ofgem (2004), 'Distribution Price Control Review: Final Proposals', November.

³ Ofgem (2006), 'Transmission Price Control Review: Final Proposals', December, and Oxera calculations.

⁴ Sourced from Ofgem's Final Proposals documents for the last price reviews for electricity distribution (November 2004), transmission (December 2006), and gas distribution (December 2007), combined with Oxera calculations.

⁵ For example, if only one of the two shippers which have purchased entry capacity at Milford Haven had chosen to bid in the relevant long-term capacity auctions, NGGT would only have had an incentive to build a relatively small pipeline through South Wales, which would have created the uncomfortable possibility of having to build a second pipeline if a second shipper had subsequently chosen to bid for capacity.

⁶ For example, justifying expansion of the transmission system to service new renewable generation in mid-Wales would require more or less simultaneous financial commitment from a large number of would-be generators.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.com

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