Regulatory Incentives for Capital Investments in Electricity Systems

This Technical Insight article is based on the 2013 publication of WG C5.10 Technical Brochure 565.

Background

Over the last 20 years, the UK energy market has been liberalised. However, the energy networks remain largely monopolistic, so economic regulation is required to protect consumers from excessive costs and poor service that could result from a lack of competition. The primary objective of the regulator is to protect consumers and promote competition, whilst enabling network companies to raise the necessary finance to deliver and maintain network infrastructure to contribute towards security of supply.

Technical Brochure 565

The aim of Technical Brochure (TB) 565 is to describe experiences in several countries and derive practical conclusions relating to regulatory arrangements that encourage investments in network infrastructure and electricity generation. The Working Group used a questionnaire to gain feedback that provided an overview of the regulatory trends across 13 countries, using data from 2008/09. The TB reviews those markets and covers the governmental / regulatory involvement in generation and incentives for investment in networks. Figures were used to illustrate the findings, along with further detailed analysis.

Technical Brochure 565: UK Relevance

1. Regulatory Incentives for Networks

The UK uses revenue cap ("incentive" or "RPI-X") regulation to provide regulatory incentives to networks. The revenue cap involves the regulator setting ex-ante revenue to cover the efficient level of future costs (OPEX and CAPEX). However, the utility is incentivised to out-perform because it can keep any savings until the next price control. The regulator will review performance and will set new tougher targets for the next price control period if out-performance occurs, thus passing benefits to consumers.

One of the key elements associated with this is the use of the building blocks model, which uses a Regulatory Asset Base (RAB). This keeps track of investments that have been made by companies, but have not yet been recovered. Once an investment has been added to RAB the utility can earn regulatory depreciation over the regulatory life of the investment, as well as a return on the "undepreciated" value. The RAB is not a list of assets (like an asset register) it is a "regulatory construct" that gives the utility confidence that it will recover the cost of the investments it has made, with a reasonable return.

The TB reviews the building block model as applied in Australia, UK, Ireland, and South Africa, and covers its relative benefits and draw-back compared to other network incentives that are used world-wide.

2. Building Blocks with Explicit CAPEX Projections

Under the building blocks approach, the Regulator needs to establish an efficient level of OPEX and CAPEX. At the start of the regulatory period, the utility has to provide an overview of its intended investments during the next regulatory period. The regulator will then develop its view of which investments to include in the RAB.

It may create a perverse incentive for companies to overstate investment projections, and associated CAPEX, in order to increase the allowed RAB, and hence revenue for a particular regulatory period. The regulator will then assess (ex-post) whether they were efficient in their investments. The efficient expenditure is then added to the RAB and a return on the investment can be recovered. Inefficient investments can be disallowed from the RAB (in which case the utility cannot recover the cost of those investments, or any return, so consumers will not be exposed to funding these inefficient costs).

For an ex-post efficiency assessment using total cost, the regulator does not differentiate between OPEX and CAPEX, but sets efficiency requirements on the sum of these total costs (TOTEX). This means that the regulator does not need to consider investment projections by the firm; instead it performs a benchmarking analysis of actual incurred levels of

TOTEX. This method works best when there are similar companies to compare. In the UK this method can work for distribution companies (DNOs), but it is more difficult for transmission companies as there is a much smaller number of comparators.

3. RIIO

Since production and publication of TB 565 (from 2010 to 2013), Ofgem has applied a new form of incentive known as RIIO (Revenue = Incentives + Innovation + Outputs). RIIO is a performance based model for setting the network companies' price controls, which will last eight years. The framework has now been applied to electricity transmission and distribution as well as gas transmission and distribution.

The key elements include: putting stakeholders at the heart of network companies' decision-making process; investing efficiently to ensure continued safe and reliable services; encouraging the reduction of present and future costs; delivering a low carbon economy and focusing on wider environmental objectives.

4. Interconnectors

Interconnectors cannot be built by existing UK Transmission Operators and fall outside the RIIO onshore price controls. Since the production of the TB, Ofgem has finalised a regulated route for near-term electricity interconnectors, known as the 'Cap and Floor' regime, which was finalised in August 2014. It incorporates elements of the Strategic Wider Works approach under the RIIO-T1 price control.

In this model, if developers' revenues exceed the cap then the excess is returned to consumers. Conversely, if their revenues fall below the floor then consumers top up developers' revenues to the level of the floor. The floor encourages interconnectors to be built as it limits developers' potential losses, and reduces the risk of investments. Alternatively, the developer may choose to take on the full risk, in exchange for higher potential returns.

5. Competition for Monopoly Rights

Ofgem is introducing a regime to introduce competition for the right to build and own new onshore transmission infrastructure (following its introduction in the offshore transmission arena). Ofgem believes that this route will allow more innovative solutions to be offered, access to resources that incumbent firms may not have, and access to more efficient sources of funding.

6. Incentives to Build Generation Plant

The TB details 8 different models that could be applied and the issues that each of them may face. It puts forward observations on each, such as their likelihood of providing reliability, level of economic efficiency provided, possibility of creating barriers to entry, and evaluates whether they should be used individually or in combination.

In the UK, Contracts for Difference (CfDs) are designed to provide long-term revenue stabilisation to low-carbon generators, attracting investment at a lower cost of capital, and therefore a lower cost to consumers. The mechanism is designed to provide cost-effective revenue stabilisation for new generation, by reducing exposure to volatile wholesale electricity prices. Generators sell electricity into the market and CfDs provide a variable top-up from the market price to a pre-agreed 'strike price'. The generator pays back the difference when market prices are high.

The capacity mechanism was implemented as part of the Electricity Market Reform project in early 2014. It was developed by DECC with the purpose of boosting investor confidence in the generation sector to the level needed for security of supply, whilst keeping costs competitive. Payments will be provided for reliable sources of capacity, alongside their revenues for actual electricity generation. This combined income will encourage the investment needed to replace older power stations and provide backup for inflexible or intermittent low carbon generation sources.

Other useful links

- Ofgem high level summary of regulatory regimes
- Ofgem Cap and Floor Regime, issued December 2014
- Ofgem network regulation – The RIIO model

Find out more...

Founded in 1921, CIGRÉ, the Council on Large Electric Systems, is an international non-profit association for promoting collaboration with experts from all around the world by sharing knowledge and joining forces to improve the electric power systems of today and tomorrow.

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