Notes on the Role of Regulation in the Management of New Zealand's Electricity

Introduction

The Electricity Industry Bill is due to be passed at some point this month and to come into force on 1 October (or maybe 1 November)[1]. It proposes a number of changes:

- The Electricity Commission is to be replaced by an Electricity Authority;
- The Authority's functions will be narrower, but the Authority will be independent of Minister(s);
- Seven issues are to be addressed by the Authority in its first 12 months, including "*mechanisms to help wholesale market participants manage price risks caused by constraints on the national grid*" (i.e. locational pricing), "*imposing a floor … on spot prices for electricity in the wholesale market during supply emergencies (including public conservation campaigns*" (what the EC refers to as "scarcity pricing"), compensation for consumers during public conservation campaigns, and facilitating an active financial hedge market;
- The separation between retailing/generation and distribution is to be reduced further;
- The responsibility for approving transmission investment (by the monopoly grid) is to shift (from EC to CC);
- Asset swaps, both real and virtual.

I want to address the role of regulation in the context of these changes. What are we regulating for? How best do we achieve this?

My premise is that much attention is given to generation and transmission, but less to their regulation. Yet arguably regulation is an integral part of our system. The way we regulate electricity is easier to change than its physics or the plant we use to generate it. But arguably it has as big an impact. For example, the introduction of the wholesale market (i.e. using a half-hourly auction to determine the order in which generation plant is dispatched).

[1] See Minister's Press Statement of 15 September 2010

The Bill narrows the objective of the Authority as compared to the Commission. Arguably it drops extraneous considerations, such as sustainability and energy efficiency, which have never been the main focus. Certainly they are important, but not as the main focus of a regulatory authority. Having too many objectives weakens accountability (e.g. the Reserve Bank).

Public responses suggest that two attributes matter to consumers more than others: cost and quality (security). Both are encompassed in the new statutory objective[2]. Consumers are typically more concerned about one than the other at different times. I.e. the trade-off between cost and security isn't static, and these two objectives pull in opposite directions.

Importantly we cannot achieve absolute security - though we can build redundancy into the transmission network or generation stack, but at a cost. (cf. Ireland, West Australia)

The Regulation of Transmission

The present system applies a straight-forward cost-benefit test to transmission investment. It is based on the cost of alternatives, including non-supply. This can sometimes be difficult to calculate, but not on average. And currently the EC is undertaking empirical research to update VoLL (i.e. to determine the value consumers would actually assign to the cost of being without electricity). Meanwhile the Electricity Governance Rules use $20,000MWh as a rebuttable proxy. (cf. $1m a MW for generation).

Basic analysis suggests we should be minimizing the sum of the cost of new investment and the cost of non-supply. And that we should compare any proposal against its alternatives – the most obvious alternative usually being building the same project later. (e.g. HVDC Pole 3). Sometimes new generation could be an alternative to new transmission, e.g. the NAaN project.

[2] "To promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers." Clause 17, Electricity Industry Bill

Transmission is a monopoly service. Its owners don't like to be second-guessed. Public monopolies face perverse incentives, e.g. to minimize public criticism, rather than to minimize the cost to consumers. Currently Transpower is spending $5b on new "lines" in the next 7 years – more than doubling the current book value of the transmission network. The review process has generated friction between the regulated and regulator. Hence the ETAG review.

I regret that the responsibility for reviewing transmission investment is being transferred from the EC/EA. I think this transfer is likely to result in the duplication of administrative costs (and competition for scarce resources) because the EA will still need a modelling and analytical team. CC oversight may lead to less scrutiny of individual projects if the CC moves to the form of "envelope" approval of investment that it currently applies to lines companies. Possibly this may not be a significant problem until the next major transmission builds.

Generation

By comparison there is no actual plan for generation. Nothing says what types of plant are to be built where. (RMA approvals address local impacts only). In my view that's as it should be. But for many this is counter-intuitive. Instead we have a market for the dispatch of generating plant. This minimizes wholesale energy costs, leaving generators to manage locational or plant risk. (NB 3/5 are SOEs, so we still face risks as tax-payers). Arguably the system works well except when supply (hydro) is short.

Professor Wolak conducted a review of NZ's wholesale market for the Commerce Commission. He found that "*the four large suppliers in the New Zealand market have both the ability and incentive to exercise unilateral market power, and that this exercise of unilateral market power has resulted in substantial wealth transfers from consumers to producers during several sustained periods of time between 1 January, 2001 and 30 June, 2007.*"[3]

[3] "An Assessment of the Performance of the New Zealand Wholesale Electricity Market" by Frank A Wolak, Stanford University, 19 May 2009

This was a very important report. Frank Wolak is a Harvard PhD, lecturing in Economics at Stanford University. He has considerable experience of US markets (though these are very different in some respects, e.g. largely thermal with constant supply costs).

A key aspect of New Zealand's wholesale market is that it pays everyone at the marginal cost of supply. (The result is unlikely to be different even if it switched to pay-as-bid). This is justified by the need to ensure security of supply. (NB: the whole market will fail if there is even a small imbalance in supply and demand). We need to ensure that generating capacity is built in a timely way. Which in turn requires that new plant is economic. It won't be if generators are paid only an average return (and new plant costs more than the average to build and operate).

Notoriously, the NZ system has limited (hydro) storage (and no ability to import or export). And we have experienced several dry years in the last decade. So it is doubly important to reward the new building of marginal capacity – particularly peaking capacity.

Arguably Wolak's analysis is flawed in several respects. Critics have suggested that he got his supply costs wrong, and therefore that his calculation of the gentailers' supra-competitive margin is wrong. Secondly that his mathematical model may be flawed (in that his supply and demand curves aren't independent of each other) (Prof. Lew Evans). Above all we do want thermal plant to reflect hydro opportunity costs – and to recover fixed not just variable costs (contrary to Wolak's arguments and calculations.

Wolak's report has led to the proposed swap of Tekapo between Meridian and Genesis. Based on very little (arguably flawed) analysis.

Scarcity pricing looks a more useful response to shortages (but note this will **increase** wholesale costs). A similar approach is used in Australia.

At the same time more competition may occur by allowing hedging of transmission risk – mainly across the HVDC – and (perhaps) by more uniformity of distribution tariff structures. It's unclear whether the latter is a barrier to competition, though Wolak also thought so. The

EC/EA is also reviewing the methodology of transmission charges, especially how the HVDC is paid for (by SI generators), which arguably disadvantages SI generation.

Regulation

There have been two periods of electricity regulation since the wholesale market was created in 1996. From 1996-2004 the industry regulated itself, via three private multi-lateral contracts. Self-regulation was unusual. There are very few examples of anything similar (Argentina fixes transmission investment contractually; and Singapore has some similarities, but is essentially a city not a national system). The three private contracts included an attempt to set voltage and frequency standards contractually. These arrangements fell apart in an attempt to extend them to transmission (investment and pricing). Transpower disagreed with the industry arrangements and remained suspicious of the generators. Comalco and consumer organizations (except Federated Farmers) also opposed industry self-regulation.

The hydro shortages in 2001 and 2003 added pressure for change and in 2004 the industry arrangements were replaced by public regulation. The result is a compulsory market, regulated via a conventional public agency that in turn is subject (for the moment) to Ministerial direction. The further shortage in 2008 led to a further review resulting in the legislation now before Parliament.

Most consumers have been unaware of these regulatory changes. Mainly they have noticed (but been largely indifferent to) competitive retailing. Most remain on fixed price/variable volume contracts, which insulate consumers against the price impact of shortages, but have exposed them to regular (usually annual) price increases.

It remains unclear why residential prices have increased more than commercial and industrial. One would expect unit prices to fall as volumes rise. Costs of service may be higher and competition lower. In fact, though, retail margins vary with the population being served. Above all the public remain completely oblivious to the need to cover the marginal costs of the marginal supplier.

The idea of private industry agreements is superficially attractive. We shouldn't regulate where we don't need to. We should also remember the long life of electricity assets. We shouldn't change regulatory regimes lightly or arbitrarily. But it looks easy for the small number of gentailers (the supply side) to gang up on consumers. It's proved hard to get a responsive demand side. Many consumers remain on FPVV contracts. Remotely readable, time of use meters may help, but only if they lead to variable tariffs.

Whatever reforms find there way into the Industry's Participation Code in the next few years, monopoly problems will remain. Transmission is a natural monopoly and system operation is about to become a statutory one. Whatever our concerns about the wholesale energy market, other areas display even less competition, e.g. frequency keeping, where only two suppliers bid in each Island.

Public regulation is unsurprising. It needs to be independent of both Ministers and the industry. In return the "market" needs to be more transparent. And better understood. Consumers are entitled to have more confidence – or electricity will continue to be politicised.

David Caygill
10/9/2010