

# Solving New Zealand's electricity problems

Roy Hemmingway

Chair, New Zealand Electricity Commission

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Urban Health Theatre, BP House, cnr Customhouse Quay and Johnston St., Wellington

Roy Hemmingway has headed the Electricity Commission for six months now. Before taking up this role, he was Chair of the Oregon Public Utility Commission, Oregon, USA.

He explained that the Electricity Commission was formed in September 2003 in wake of the "failure of self-governance regulation" for the electricity industry. He suggested that this failure was not surprising. In fact only New Zealand and Germany had attempted full public deregulation and Germany was also re-establishing a dedicated public regulator.

The Electricity Commission is formally constituted under the Electricity Amendment Act 1991. This Act viewed public re-regulation as a fall-back position and is consequently "rather thin" in this regard. Two new legislative initiatives are currently in train to rectify the situation, namely the Electricity and Gas Industries Bill, (hereafter "Bill"), timetabled for completion in July 2004, and a new draft Government Policy Statement (GPS) (about to be issued for public consultation).

In most domains, the Electricity Commission does not possess direct authority. Rather, the Commission provides advice to the Minister of Energy, who in turn, has the statutory powers to take decisions.

The Commission does, however, have a number of specific responsibilities. It has a watching brief in relation to Electricity Governance Rules (EGR). The current set of rules (about to come into effect) was adopted in December 2003 and thereby predates the Commission. Notwithstanding, a number of EGR issues remain unresolved, primarily in the area of high voltage transmission.

The Commission does have the power to grant exemptions to EGR. This is a "quasi-judicial" role, for which the Commission wants to establish clear grounds and internal consistency.

The Commission is also required to monitor electricity markets. Hemmingway is personally interested in market operation during "extreme conditions". For instance, the recent Benmore/Haywards transmission outage (09-12 January 2004 when three pylons blew over) enabled North Island spot prices to reach \$1000 per MWh. This translates to \$2.20 per kWh in domestic terms, relative to \$0.15 per kWh as normal.

The Rulings Panel, previously known as the Market Surveillance Committee, was due to be appointed on 25 March 2004. The Commission has no direct

influence on the Rulings Panel, although the Commission can, of course, refer cases.

The Commission has responsibility for maintaining generation reserves and overseeing the grid pricing methodology for high-voltage grid operator Transpower. The Commission must also approve Transpower's grid operating plans. These plans, in effect, transform forecasts of need to statements of opportunity. The Commission then has a duty to test transmission reinforcement against new generation and demand response measures.

The Commission intends to develop model retail contracts. New Zealand, unlike most other jurisdictions, has no mandatory standardization in this area. Hemmingway also commented that whilst small consumers pay considerably more than large users, their contracts are "automatically hedged".

The Commission will be required to promote energy efficiency, given that these provisions remain in the new Bill.

Hemmingway discussed particular characteristics of the New Zealand electricity system. He noted that most systems around the world are "machine constrained", or generation plants dictate system capacity, whereas New Zealand is "fuel constrained" (a term which includes hydro inflows) and furthermore the fuel supply is highly variable. Given annual average hydro generation of about 40,000 GWh, a wet year is plus 7000 GWh and a dry year minus 5000 GWh. Moreover, this annual variation is "without any predictability". As an illustration, two large gas-turbine generators would need to run continuously for up to five months to compensate for this variability. Moreover, New Zealand has long transmission routes by any standards.

Thermal backstopping introduces its own set of issues. Huntly (a 1000 MW coal and gas plant), for example, would need to maintain a large coal inventory and establish fuel contracts with no guarantee of actually taking product.

The worst case is known as the 1 in 60 year problem (a term from legislation). Hemmingway then turned attention to worst case scenarios for 2005, the first year for which the Commission has explicit responsibility. A recent report (available from the Commission website) by Concept Consulting for the Ministry of Economic Development and the Commission analyzed options. The overall context has changed since the last dry year crisis: a number of

small generators are now underway or online, the fuel situation at Huntly and elsewhere is better, and Whirinaki (a 155 MW oil and gas plant) has been built and commissioned as part of the reserve generation pool.

The broader question is what else to do, given the lead times at play (particularly in respect of new infrastructure). Transpower is proposing to rebuild the national high voltage backbone. The Commission is required to weigh this option against the alternatives of new (better sited) generation, energy efficiency (as per the new Bill), and demand response initiatives.

#### Responses to Questions/Issues

- 1) Hemmingway was concerned about the resourcing of analytical capacity within the Commission and described some of the issues in more detail. New Zealand has a very pure wholesale market with 244 grid exit points and 30 minute intervals. It also has considerable system variability and poorly developed forward wholesale markets and retail competition. The Commission intends to address these two market issues as a matter of priority.
- 2) The need to separate analytically the issues of inherent variability, demand growth and ongoing growth tends to confound any solutions to variability. Hemmingway observed that there is no official electricity demand forecast, the Commission has no jurisdiction over gas, and "no direct role with respect to carbon charges". Moreover, Meridian is engaged in hydro developments (Project Aqua, still in planning) and Genesis is building thermal generation in the North Island.
- 3) The current state of systems modeling is sufficient for the Commission's analytical tasks. The Commission would adapt methodologies from overseas where need be. The main problem is one of data. For instance, a model might need information on the number of hot-water cylinders under ripple control in Christchurch.
- 4) Hemmingway mentioned that getting energy into Auckland will become increasingly problematic. There has been a substantial build up (of housing)

under existing high-voltage corridors and there is a clear "lack of new corridors". In this regard, demand side measures could act as a "stop gap".

- 5) Procedures covering the management of hydro-lakes, given that low stocks can exacerbate the dry winter problem. Hemmingway indicated that the "draw down rules" for hydro represent a complex issue, for which top-down command and control is no longer appropriate. New Zealand had earlier broken its generation system into two companies with hydro portfolios and two companies with thermal portfolios. Hence, the question was now how best to uncover "commercial arrangements" that give "sufficient incentives" for suitable management vis-à-vis reserve generation. The two reserve generation triggers are a price threshold, currently set at \$200 per MWh, and a storage "min-zone" approach. These triggers are discussed in detail in the aforementioned report from Concept Consulting.
- 6) Question about asymmetric market development and the lack of hedge products for demanders. Hemmingway observed that the fact that variability is more pronounced in New Zealand, relative to other jurisdictions, could account for the unwillingness of suppliers to offer hedges products. In contrast, purchase contracts extending five years are common overseas.
- 7) Question on how the Commission intends to cater for small consumers, meaning domestic, commercial, and small industrial. Hemmingway agreed that this area deserves dedicated attention.
- 8) Question on the monopoly parts of the industry, i.e. lines companies and Transpower. Hemmingway said that the current Commerce Commission role was to be transferred to the Electricity Commission under the proposed Bill. It was likely that the Electricity Commission would build on earlier work, including the threshold mechanism, by the Commerce Commission. Hemmingway also suggested the Commerce Commission was quite happy to hand over electricity sector competition policy to a new body.

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