

**Submission on**

**Electricity Industry Bill**

**by**

**Electric Power Optimization Centre**

**University of Auckland**

<http://www.esc.auckland.ac.nz/EPOC>

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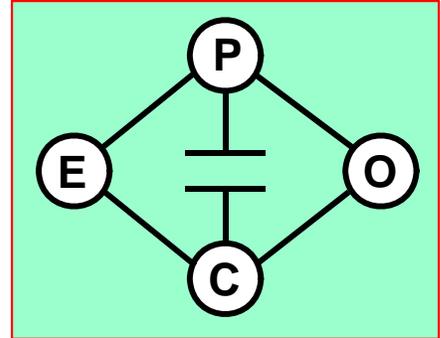
## **Executive Summary**

The Electric Power Optimization Centre (EPOC) is in favour of measures to increase competition in the New Zealand Wholesale Electricity Market. However it has not been demonstrated that some of the proposed initiatives to be implemented by the Bill will lead to better market outcomes. The papers accompanying the proposed measures in the Bill do not quantify the benefits from improved retail competition, which may be less than the estimated costs of the measures.

In imperfect markets, single measures to improve market performance can sometimes lead to unanticipated outcomes that actually make the market perform worse. We recommend a comprehensive market modelling study be carried out for each proposed measure, to provide some evidence that they will deliver improved market outcomes. Proposed market improvements should be implemented only after they have been fully tested in market simulations, and the implications fully understood.

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<sup>1</sup> This document expresses the personal views of Professor Andy Philpott and Dr Golbon Zakeri. The submission does not represent the official view of The University of Auckland or The Energy Centre at The University of Auckland.



## The measures to be implemented

We discuss some possible implications of the measures below.

1. Transferring Tekapo A and B power stations from Meridian Energy to Genesis Energy, and transferring the government-owned Whirinaki to Meridian Energy;

The intent of this measure is to improve retail competition in the South Island and alleviate the perceived local monopoly that Meridian Energy has on South Island water, especially during dry winters. In the Cabinet paper, it is asserted that the asset swap would give more contestable views on water values, leading to more competition in the wholesale market, while possibly providing some security of supply benefits by increasing the diversity of views on water storage. It is not clear what is meant by “more competition” here. If it is lower prices, then we would assert that this statement is not necessarily true. Moreover, if one of two “diverse” views on water storage is wrong then together they provide less security of supply than a single correct view.

In the absence of prices on water transfer, it has been shown empirically by Lino et al<sup>2</sup> that (even in the case of perfect competition) bid-based dispatch is inefficient when different owners operate reservoirs on the same river chain. Appropriate transfer prices for water release from upstream reservoirs can remove this inefficiency.

When generators have market power, disaggregation of the electricity supply chain might lead to worse outcomes, even in the presence of transfer prices. In the supply-chain literature, where this phenomenon is known as *double marginalization*, it is well known that upstream suppliers mark up the prices at which they supply to retailers, who then markup their sales prices, leading to higher prices and lower volumes of sales than would be obtained by combining supplier and retailer in one entity.

To our knowledge there have been no published results from oligopoly models dealing with this particular asset swap, so there is little evidence that such a transfer of ownership will be beneficial to wholesale market performance<sup>3</sup>. Production efficiency losses have been estimated to be at most \$30 million per annum, but there appears to be no evidence that allocative and dynamic efficiency gains from enhanced competition will exceed this.

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<sup>2</sup> Lino, Barrosso, Pereira, Kelman, Fampa. “Bid-based dispatch of hydro-thermal systems in competitive markets”, *Annals of Operations Research*, 120, 2003.

<sup>3</sup> Although see A. Downward, D. Young, G. Zakeri, “Swapping Generators’ Assets: Market Salvation or Wishful Thinking”,  
[http://www.esc.auckland.ac.nz/EPOC/asset\\_swap.pdf](http://www.esc.auckland.ac.nz/EPOC/asset_swap.pdf)

When different owners operate reservoirs on the same river chain, it will be difficult to monitor and regulate the interaction of Meridian and Genesis on the Waitaki river. Many questions need answering before this measure is enacted, e.g. should the companies be allowed to collude in the interests of a more efficient dispatch of power, even if prices increase? We would contend that rigorous market oversight on the future operations of Meridian with their current ownership structure is a much simpler and more effective means of improving competition than an untested and poorly understood asset swap.

2. Meridian, Genesis and Mighty River Power undertaking "virtual asset swaps" through a 15 year contract, ensuring the ability of each company to provide increased competition in the island where they currently have little to no generation capacity;

The performance of this measure, like the physical asset swap, will depend on the details of the virtual swaps. If each island has a mix of suppliers, then one might expect more competition amongst suppliers for local retailers. This appears to be a good outcome. It is claimed that there are no wholesale market competition benefits from this measure, but this is yet to be proven in our view, and will depend on how the retail demand is redistributed amongst the generators as a result of the virtual asset swap.

3. Requiring generators/retailers to compensate consumers in the event of conservation campaigns or a dry-year power cut;

This measure is worthwhile and provides a (currently missing) incentive for load reduction. It also has the effect of discouraging calls for conservation campaigns from electricity retailers who must make these compensation payments.

The grounds for a price floor as proposed in the Ministerial Review are less compelling. Although it might have the effect of reducing calls from retailers and large consumers for savings campaigns, a floor might also provide incentives for sellers to increase the likelihood of a shortage or to seek for it to be prolonged (to give a high price with low risk). In other words they might call for a savings campaign to be continued well past the point where the system is at risk. This places an onus on regulatory authorities to diagnose and regulate such behaviour, which may be more onerous than the judicious exercise of powers to intervene in the market in times of shortage.

4. Abolishing the reserve energy scheme;

The stated grounds for abolishing this scheme are that there is currently enough capacity to meet dry years, and some cross-hedging arrangements between Mighty River Power and Genesis to keep Huntly units available are emerging. However, this does not mean that there is no need for a reserve mechanism at all, and dry-year reserve margins need to be watched closely to ensure security of supply.

EPOC have argued in past submissions to the Electricity Commission that a reserve energy scheme that involves demand-side response as well as spare generation would be likely to lead to more efficient outcomes than participants paying a levy for backup energy.

5. Establishing a Security and Reliability Council to monitor Transpower's performance and advise on security of supply;

We agree with the establishment of a body such as this. Understanding security of supply in dry winters requires considerable modelling sophistication, and an appropriate security standard to be adopted. Like the Electricity Commission, a Security and Reliability Council will need to maintain and access a suite of complicated models to monitor this effectively.

6. Transferring responsibility for grid upgrade approvals to the Commerce Commission.

The Commerce Commission will need considerable modelling expertise to make good decisions here. The optimization of grid upgrades over time, when generation capacity expansion decisions occur contemporaneously, is a delicate modelling problem that must account for uncertainty in load growth and risk attitudes of market participants. Typically the Grid Investment Test does not account for competition effects, and can be poor at dealing with uncertainty in load growth. Even when uncertainty is modelled with real options, avoidance of risk by flexible plans can transfer risk to other investors who see a lack of certainty in grid expansion plans.

7. Transmission hedges

The most popular mechanism for transmission hedging in a nodal wholesale market are Financial Transmission Rights (FTRs)<sup>4</sup>. These have a lot of benefits for hedging location price risk. The drawbacks come from devising mechanisms for allocating these rights. To be revenue adequate, auctions must ensure "simultaneous feasibility" which means that hedges often cannot cover all positions that might be desired by a market participant (for example it would be impossible for Genesis to hold a 1300MW FTR on the price difference between Huntly and Benmore as this level of power cannot be feasibly transmitted between these nodes.) Secondly, FTRs give the highest payoffs to agents with market power, and so, unless their ownership is regulated, they will end up being owned by large generators.

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<sup>4</sup> For a more detailed discussion of these issues see A. Philpott and G. Pritchard, "On Financial Transmission Rights in Electricity Pool Markets", [www.esc.auckland.ac.nz/epoc/publications.html](http://www.esc.auckland.ac.nz/epoc/publications.html)