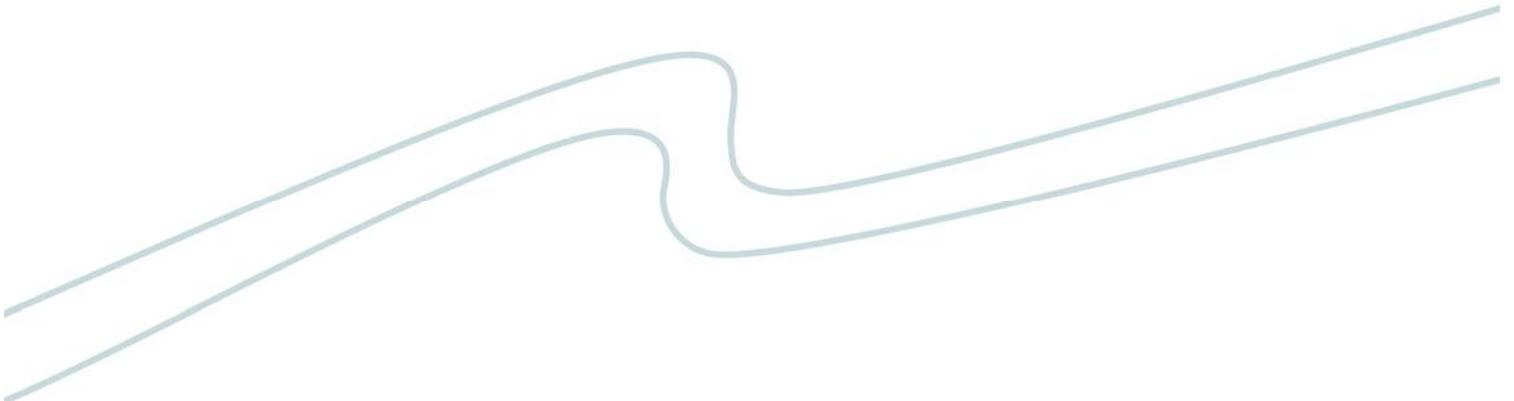


Locational Rental Allocation and Financial Transmission Rights

Report to MEUG

October 2006



Preface

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice to clients in the public and private sectors, throughout New Zealand and Australia, and further afield.

NZIER is also known for its long-established *Quarterly Survey of Business Opinion* and *Quarterly Predictions*.

NZIER was established in 1958.

Authorship

This report has been prepared at NZIER by Brent Layton

8 Halswell St, Thorndon
P O Box 3479, Wellington
Tel: +64 4 472 1880
Fax: +64 4 472 1211
econ@nzier.org.nz
www.nzier.org.nz

NZIER's standard terms of engagement for contract research can be found at www.nzier.org.nz.

While NZIER will use all reasonable endeavours in undertaking contract research and producing reports to ensure the information is as accurate as practicable, the Institute, its contributors, employees, and Board shall not be liable (whether in contract, tort (including negligence), equity or on any other basis) for any loss or damage sustained by any person relying on such work whatever the cause of such loss or damage.

Contents

1.	Introduction	1
2.	The Effects of Zonal and Nodal pricing.....	1
3.	The Effects of Grid Density and Form.....	1
4.	The Effects of Size and Scale.....	2
5.	The HMDSG's Specific FTR	3
6.	Wealth Transfer Effects.....	4
6.1	Current Practice.....	4
6.2	The Hybrid FTR	5
6.3	LRA.....	6
6.4	Wealth and Efficiency	6
7.	Summary of the Trade-Offs	6

1. Introduction

The Electricity Commission (the Commission) is currently consulting on two papers prepared for it by the Hedge Market Development Steering Group (HMDSG). Both papers are titled “Hedge Market Development – Issues and Options”. One is described as the “Overview Paper” and the other as the “Technical Paper”.

We have been asked to provide a report to assist the members of the Major Electricity Users’ Group (MEUG) to evaluate the inclusion of Locational Rental Allocation (LRA) in the HMDSG’s preferred package of recommended actions. The alternative means of managing locational price risk considered by the HMDSG is Financial Transmission Rights (FTRs).

This paper is the report. In it we have tried to avoid repeating the contents of the Commission’s consultation documents. We have focussed on the bigger picture and the trade-offs required in making the choice between LRAs and FTRs.

2. The Effects of Zonal and Nodal pricing

If New Zealand had a market structure that generated zonal prices there would be no need to debate whether to adopt LRAs or FTRs.

If there were zonal prices, prices would be averaged over a wide area and prices would not vary within each region (except possibly by relatively fixed factors). There would not be any locational price risk within regions for generators and consumers to manage. This is the situation in Australia, where each state is essentially a single zone. So whether to have FTRs or not, and in what form, is not debated there.

New Zealand adopted a nodal pricing regime and prices vary between the roughly 260 nodes to reflect the marginal costs of electricity at each node. The price at each node is made up of the marginal cost of energy and the marginal cost of transport of electricity to the node.

3. The Effects of Grid Density and Form

If New Zealand had a thick, meshed transmission grid there would be no need to debate whether to adopt LRAs or FTRs; if there were no transmission losses and no transmission constraints the price of electricity would be the same at every node.

Compared with the cost of energy, transmission losses are small and relatively stable. For this reason they do not generate any material price

risks. It is constraints that can give rise to significant inter-nodal price variability and risk. Constraints can cause this by:

- reducing access for power from generators with lower marginal costs at nodes ‘downstream’ of the constraint and increasing the availability of power from these lower cost generators at nodes ‘upstream’ of the constraint;
- requiring cheaper sources of power to be replaced by more expensive sources to avoid overloading lines and in so doing raising the marginal costs of power at a node, sometimes to several times any generators’ offer (spring washer effects); and
- facilitating generators ‘downstream’ of the constraint to use their market power and offer and sell at prices above their marginal cost.

New Zealand has a relatively sparse and stringy grid for good economic reasons, but this does mean that inter-nodal price differences, and hence locational price risk, can be very significant, even when compared with other countries.

4. The Effects of Size and Scale

If New Zealand had a much larger electricity market with more and larger entities involved in the market there would be no need to debate whether to adopt LRAs or FTRs; the net market benefit of adopting FTRs would be positive and clearly greater than for adopting LRAs.

FTRs are an internationally tried and well-tested means of providing market participants with an efficient vehicle to hedge locational price risk in a nodal market. The mathematics and software to back FTRs are well developed and known by many. FTR’s produce reasonably efficient price signals for market participants in nodal price markets.

LRAs are an untested and not yet fully developed proposal, the practical implications of which have not been explored in New Zealand, or elsewhere. There is no existing software to implement the proposal. LRAs do not produce the theoretically correct price signals for efficiency although they do improve the signals for large price setters over those generated in the status quo.

The doubts about introducing FTRs in the New Zealand context stem from either the thinness of the local market or particular features of the specific form of FTR evaluated by the HMDSG that are not essential design features.

The thinness of the local market leads to concerns that if FTR's were adopted:

- generator-retailers (gentailers) will be able to afford to bid in the initial allocation and secondary auctions for FTRs to 'corner' the supply of FTRs to a region because having the ability to apply a market 'squeeze' will greatly enhance their ability to charge well above their marginal cost and recoup much more than their costs of buying the FTRs;
- gentailers will possess superior knowledge of when their plant will be in and out of production and will be able to strategically bid on the basis of this information at the auctions for FTR's accordingly; and
- the need to understand, monitor and participate in auctions and secondary market trading of FTRs will be very time consuming and costly, especially for small organisations.

5. The HMDSG's Specific FTR

Some of the costs and concerns about FTRs raised by the HMDSG relate to the particular form of hybrid FTR it chose to evaluate. These features are not essential design elements of an FTR.

The HMDSG refers to the form of FTR it has evaluated as the hybrid FTR because under the proposal some FTRs will be allocated and some will be auctioned. The aspects of the proposal which cause concern that are not necessary features of an FTR are:

- The very short-term nature of the FTRs – only one month, initially, and then out to one year. There is no reason why long-term FTR's cannot be issued. In fact, it is standard in overseas jurisdictions to grant investors in transmission capacity expansion long-term FTR's over the resulting capacity;
- The high transaction costs in holding monthly auctions. Short-term auctions can be restricted to parties interested in trading some overs and unders by making a longer-term allocation;
- The need to decide at which nodes competition is limited and FTRs should be allocated. Allocation on this basis is a unique feature of the hybrid FTR;
- The holding of open auctions which makes it possible for gentailers to 'corner' the supply of FTRs. There are FTR schemes

that operate structured auctions among certain groups of participants that control this risk;

- The limiting of FTRs to 20 hubs, rather than individual nodes, means they are unlikely to provide cover for those most exposed to locational price risk. There is no reason why FTRs cannot be allocated for all locations at which parties want them; and
- The requirement lines companies are obligated to pass FTR payments through to end use customers. FTRs can be allocated in the first instance to direct connect customers and retailers.

6. Wealth Transfer Effects

A common feature of the LRA and hybrid FTR proposals is that they both involve re-allocation of the loss and constraint rentals. These rentals are allocated already, so the introduction of either proposal could potentially create wealth transfers.

The wealth transfer affects of the two alternatives is very little discussed in the Commission's consultation documents. The omission is understandable; from a net public benefit perspective wealth transfers do not matter and net public benefit is the focus of the Commission. However, wealth transfers are clearly a potential issue, and if there are no material gains in terms of improved efficiency from undertaking them, the question arises as to whether they are worthwhile.

6.1 Current Practice

Transpower uses the software program SPD to schedule, price and dispatch electricity. Loss rentals arise because of how the SPD model prices energy at off-take nodes. SPD bases the price at each node on the price offered by the marginal dispatched generator plus the marginal cost of transporting energy from the marginal generation node. The marginal cost of transport is the marginal loss of energy in transport and for technical reasons this always exceeds the average cost of transport. Since generators are paid on the basis of average losses, the Clearing Manager receives more money from buyers than it has to pay out to generators; the difference is the loss rentals.

Constraint rentals arise whenever the amount of electricity transmitted on a circuit reaches its maximum limit set in SPD. The additional load has to come from generation that does not violate the constraint. The marginal cost of satisfying that additional load at a node is charged for all the electricity consumed at the node, but generators are paid on the basis of the offer of the marginal generator dispatched. The Clearing Manager receives more money from buyers than it has to pay out to generators; the difference is the constraint rentals

The current arrangement is that the Clearing Manager collects the money and passes it on to Transpower that distributes it to its transmission customers. South Island generators receive the rentals accruing on the HVDC link. Rentals accrued in relation to HVAC connection assets are paid to those responsible for the connection charges associated with the assets. Rentals accrued in relation to the HVAC interconnection assets are paid to distributors and direct connect customers on the basis of the interconnection charges paid by those customers. Some distributors rebate the rentals they receive to customers, some rebate them to local communities and others pass them back to consumers through lower tariffs. The proposal of the HMDSG only relates to the HVAC assets. The HVDC rentals will continue to be returned to the South Island generators.

6.2 The Hybrid FTR

The adoption of the hybrid FTR would involve pre-allocation of FTRs in regions with limited competition. The allocated FTRs will go to regional direct connect customers and regional retailers and, from the latter, be passed on to retail consumers in the region, provided the retail market is competitive. The pre allocated FTRs will mainly relate to connection assets given that Transpower has been instructed by the Commission to adopt a deep connection approach to defining connection assets in its new pricing methodology.

The net result when compared with the status quo is likely to be less money in the hands of distributors that currently do not pass on the rentals and more money in the hands of retailers and ultimately consumers. In regions in which the distributors currently pass the rentals on to their customers, there will be no material wealth change from the pre-allocated FTRs.

The adoption of hybrid FTRs also involves auctioning some FTRs. The auctioneer will receive payment for the FTRs from the buyers (largely retailers and direct connect consumers). They will pass the rentals to the buyers of the FTRs in return for the payment. The proceeds from the auction will be distributed in the same way as the loss and constraint rentals are distributed at present.

If the market for FTRs is efficient, the amount buyers pay at auction for the rentals should average the actual rentals, so the effective flows relating to the auctioned FTRs should match what they would be under current arrangements. So there should be no wealth transfers relative to the status quo relating to the auctioned FTRs.

Overall, therefore, under the hybrid FTR arrangement, the wealth transfers will be minor and involve less money staying with some distributors and instead going to their customers. Specifically, the distributors that will lose out are those that both operate in regions where FTR's will be pre allocated

and currently do not pass on the rentals they receive from Transpower to their customers.

6.3 LRA

Under the LRA proposal, the wealth transfers from the status quo will be very much more significant. The allocation of the HVAC loss and constraint rentals will be to direct connect customers and retailers; distributors who currently retain the rentals will suffer a loss.

Moreover, the allocation will not be on the basis of payment of transmission charges. It will be driven by whether the nodal price faced by the purchaser is above the reference price level or not, and the extent to which it is above. The gainers will be direct connect customers, retailers and retail customers in regions with high average nodal prices. The losers will be the same parties in regions with average and low nodal prices. There will be a wealth transfer to those who are located in constrained transmission areas.

6.4 Wealth and Efficiency

In short, the hybrid FTR arrangement involves limited wealth transfers but will improve significantly the efficiency of prices and not dampen the price information about investment needs in nodal prices. On the other hand, the LRA proposal will result in significant wealth transfers, and will not universally improve the efficiency of prices but will tend to dampen the price information in nodal prices and so have adverse effects on the efficiency of investment decisions.

7. Summary of the Trade-Offs

LRAs	FTRs
Relatively simple to administer	More complex to administer especially if secondary trading developed
Basic principles easy to grasp and explain but mathematics and logic of full scheme is complex and hard to grasp	More difficult to understand and explain
No significant concerns relating to enhancing monopoly power for gentailers	Concerns about gentainer monopoly power being enhanced

LRAs	FTRs
No significant concern about gentailers having superior knowledge about outages and future constraints	Concern about gentailers having superior knowledge about outages and future constraints
No concerns that economies of scale in management will favour larger organisations	Concerns that economies of scale in management will favour larger organisations
Limited scope for secondary trading	Secondary trading easy to develop and this should enhance efficiency
No international implementation	Internationally tested and developed
No existing expertise anywhere	Academic and practical expertise available from elsewhere in world
No existing software	Several international software vendors with products
Limited understanding of effects in real world operation	Well understood effects in real world operation
Significant wealth transfers from regions with average or low relative nodal prices (limited price risk) to regions with high nodal prices (significant price risk)	Limited wealth transfers from distributors currently not passing on rentals to customers bearing price risk