

Memo

To: **Gillian Blythe, Meridian Energy Limited**
Date: 28 August 2011 (Revision of Draft 10 August 2011)
From: Lewis Evans
Subject: **Comment on Daryl Biggar's "Independent Review of Transmission Pricing Advisory Group: Transmission Pricing Discussion Paper: 7 June 2011" prepared for the Electricity Authority and dated 14 July 2011.**

Background and Summary

1. You have asked me to comment on the 14 July 2011 "Independent Review of *Transmission Pricing Advisory Group: Transmission Pricing Discussion Paper: 7 June 2011*" (IRDB) prepared for the Electricity Authority by Darryl Biggar. For these comments I have taken IRDB's reporting of *Transmission Pricing Discussion Paper* (TPAG) as correct, and hence have not examined the statements or findings of TPAG.
2. IRDB finds that TPAG is deficient in that it does not base its arguments and thus its recommendations on fundamental departures from an industry standard of efficiency (p.4, p.18). It goes on to critique the regulatory principles that TPAG uses (3.2) and posts its own set of principles (s.3.3.2). However, IRDB's consequent analysis does not explain the electricity industry's departure from the IRDB abstract standard and hence it does not utilise its advocated approach to public policy. In fact, IRDB recants its criticism of TPAG (p.24) in the list of principles IRDB ultimately advocates. IRDB admits its own list is in accord with certain of the principles applied by TPAG.
3. IRDB's policy principles adopt a static industry benchmark of perfect competition and define problems for the TPAG to address as being departures from this standard. The TPAG approach is to take the status quo as given – including relevant characteristics of the broader electricity market and evaluate a change by means of its impact on dynamic efficiency of the market, which is the value today of expected future economic efficiency over periods into the foreseeable future. The TPAG approach which is incremental and in accord with i) fostering the long term benefit of customers, and ii) the use of cost benefit analysis as the evaluative tool, be it implemented by simulation of the market as a whole or applied to particular

choices. The incremental approach of TPAG is to be preferred (as an aside, the incremental approach is a common justification for the dynamic efficiency of common law).¹

4. The structure of the electricity industry is reflected in its overall regulation, where natural monopoly elements are singled out for regulation by the Commerce Commission, and the Electricity Authority (EA) is responsible for codes of behaviour more broadly. This regulatory structure is the result of assessment of IRDB's "market failures" for the industry and it is not the role of TPAG to review them in its consideration of transmission pricing principles. Put another way, the IRDB was to take the legal strictures of the industry as given (IRDB p.5).
5. In any event IRDB does not test actual industry structure and characteristics against the (infeasible) perfect competition structure benchmark it espouses. Instead, IRDB proposes principles that Biggar (2009) justifies by arguing that regulators in general do not implement his own benchmark approach.²
6. IRDB does not generally propose answers to issues, but claims that TPAG should have set out issues in more detail and considered more alternatives. It does suggest principles that are forward looking, but one of these principles is at variance with a process that yields the long-term benefit of consumers.

Efficiency Principles

7. At (1.2 and s2) IRDB states that desirable policy relating to the electricity market should be the correction of departures (market power, externalities, public goods, asymmetric information) that are known as market failures (asymmetric information is also a government failure). The parallel for electricity, it is suggested, is a wholesale electricity market with constant returns to scale, no sunk costs and intense competition at each node, and it reports and uses such a model in Appendix A.
8. Perfect competition is not generally efficient for any dynamic market, because it is a timeless abstract construct. Dynamic efficiency requires conditions for investment and innovation, and the management of risk that are not present in perfect competition. Furthermore these conditions interact with economies of scale of investment to vastly complicate the design of effective regulatory rules³; and investment scale economies are characteristic of transmission

¹ Evans and Hahn (Lewis Evans and Robert Hahn, *Regulating Dynamic Markets: Progress in Theory and Practice*, with Robert Hahn, SSRN discussion paper (<http://ssrn.com/abstract=1646957>), May 2010, 42pp.) discuss dynamic efficiency albeit in the context of telecommunications.

² Biggar, Darryl, (2009a), "Is Protecting Sunk Investments By Consumers a Key Rationale for Natural Monopoly Regulation?", *Review of Network Economics*, 8(2), 128-152

³ Investment economies of scale arise when an increment of capacity costs less per unit when it is built in one step rather than a sequence of steps. The implications for regulation are discussed in Lewis Evans and Graeme Guthrie "Incentive Regulation of Prices When Costs are Sunk", *Journal of Regulatory Economics*, 29(3), 2006, 239 –264, and in more detail in

networks. IRDB's position is (s2.1, 10) that the long term benefit of consumers is enhanced by policy that addresses departures from the perfect competition bench mark. This is not correct; rather the long-term benefit of consumers is enhanced by dynamic efficiency.

9. In keeping with its standard of perfect competition IRDB's only consideration of time is differentiation between the long run and the short run - both timeless static equilibrium positions.⁴ In discussion of regulatory governance (where it discusses a long term contract (Table 1, p.25)) IRDB does introduce time but without a link to its use of perfect competition.
10. By consideration only of short and long term competitive equilibrium positions the facts of the oligopoly nature of electricity markets is ignored. Consideration of these equilibria can be helpful but strategic competition in an oligopolistic market with volatile demand and fuel supply will materially affect the evolving performance of the electricity market, should be reflected in policy.
11. Having laid its "public policy" foundation, IRDB goes on to set out its principles for regulation of transmission services (Table 1, p.25). They are motivated by an argument of the author that transmission customers should generally be provided with security for their long-term investments. The principles are, as IRDB acknowledges, quite different from the public policy framework IRDB has espoused to this point, and more in accord with TPAG.
12. The IRDB principles listed (Table 1) are unremarkable because their application depends upon the definition and use of the terms used. An exception is the claim that investments and prices should not be changed such that a subset of transmission customers is made worse off. This rule of thumb is not in accord with dynamic efficiency or cost benefit analysis (for example correcting a perverse incentive for investment may be dynamically efficient but leave some customers worse off). As I read it, the IRDB reason for the suggestion is to provide certainty for customer investment in long-lived assets and not because it might be construed as an undesirable wealth transfer. In fact, such certainty is provided by the credibility and stability of the (relational, or three party⁵) contract that IRDB is implicitly suggesting, including the criteria for investment and pricing. Certainty under a regulatory contract does not imply guaranteed investments.
13. There is also a question about IRDB's assumption that locational prices should be the same for loads and generators: this may well be the case – and will be for the spot market – but one should leave open the possibility that load and generation interact in ways – perhaps due to quality issues – that differential pricing would increase welfare (the two sided market issue).

Lewis Evans and Graeme Guthrie, *Price-Cap Regulation and The Scale and Timing of Investment*, SSRN Discussion Paper, Electronic copy available at: <http://ssrn.com/abstract=1826662>, 2011, 36pp.

⁴ Static models can be useful in an appropriate context: an example is SPD.

⁵ The third party being the regulator or government: see Williamson Oliver E. (1979), "Transaction-Cost Economics: The Governance of Contractual Relations", *Journal of Law and Economics*, 22(2), 233-261.

14. Throughout IRDB

- a. there is no recognition that property rights of energy transfer on an AC grid are not enforceable (by Kirchhoff's law) and hence that investment in one section of the network will affect the performance of other parts of the grid; particularly where there are networks vs the situation of spur lines. This renders the loss and constraint rentals at a node a poor indicator of what could be recovered from additional investment at that node, and a useful but partial indicator of efficient investment. The discussion of the HVDC does not suffer the network issue; but other transmission will (see IRDB p.64);
- b. it does not discuss the transmission externality issue posed by essential allied services. The ability to backup particular generators in reserves or voltage support requires that they be connected to other generators not just load: this is relevant to the HVDC;
- c. it does not mention that the loss and constraint rental is a useful, but generally an imprecise indicator of the social value of investment in transmission capacity;⁶ and
- d. it suggests that loss and constraint rentals only arise where node capacity is reached p.56 and 64: they arise as losses rise and these occur before capacity is exhausted.

Section-Specific Comments

These are not comprehensive

15. Section 2: IRDB argues that the problems of concern are not identified sharply enough in TPAG: and by this IRDB means identified in terms of market failure (s.2.3.1). Since the market is subject to a set of codes it is reasonable that these be evaluated in terms of incremental welfare stemming from change in them: and that they be so (re)evaluated from time to time. The broader "market failure" issues have been addressed to a considerable degree by the regulatory structure (the allocation of tasks to the Commerce Commission and the EA) of the industry. A cost benefit analysis of change is in accord with dynamic efficiency improvement and should in any event identify the key issues affecting dynamic efficiency whether or not the analysis is implemented empirically.

16. Section 3: Beneficiary pays: the discussion here is unremarkable and partly to do with interpretation. My interpretation of the "beneficiary pays" principle is simply that the EA – being distinct from the Commerce Commission – is left with oversight and codification of the workably competitive sector of the electricity market: in this setting TPAG is saying that the codification of transmission should allow or encourage decentralised decision-making of the electricity market (unstated: with the overall objective of dynamic efficiency). The pros and cons of decentralised decision-making are well known; and the pros would seem to carry the features of beneficiary pays listed in s3.2.2 p.18. Of course, because of externalities – not discussed by IRDB – in the delivery of energy across and within networks – due to

⁶ Evans and Meade (2001), *Economic Analysis of Financial Transmission Rights (FTRs) with Specific Reference to the Transpower Proposal for New Zealand*, ISCR Discussion Paper (www.iscr.org.nz), 73p.

Kirchhoff's law and different reserves and quality demands - decentralised decision-making possibilities with respect to transmission are limited. The "beneficiaries pays" principle may be a statement on the trade-off between centralised and decentralised control. Without dwelling on specific comments; IRDB's critique is derived from its assumption of static pricing/equilibrium principles and doesn't address dynamic efficiency that, by its nature, is concerned about the *process* of competition. IRDB's analysis relating to points (a)-(c) on p.19 do not address this issue. [IRDB ultimately recants its approach to public policy: see p23-25.]

17. I agree with IRDB's suggestion that wealth transfers (3.2.3) are not a part of (static) efficiency. Nor are they inputs to dynamic efficiency (on this I disagree with IRDB's statement top of p. 21 that one of its principles is based on no wealth transfer. I disagree because a) there is no rationale for the principle⁷ and b) the basis for it is in IRDB's own approach not wealth transfers but surety of investment). The long-term benefit of New Zealand consumers of electricity is enhanced by dynamic efficiency and its evaluation does not include wealth transfers.
18. S.3.3.1 There has long been literature on the consideration of regulation as a long term contract and indeed it is a useful way of viewing the frame work of the Commerce Commission's role in anti trust and price regulation; as well as the EA's role. The key is that the regulatory contract (or compact) admits evolution in response to demand and supply (e.g. technology and risk fuel supply) conditions over time. For the EA, one can view these as three-party relational contracts in which the EA is formalising and enforcing a code, where the contracting is between the EA and the participants and the third party is government that oversees the evolution of the contract. A key feature of IRDB is its claim – second bullet p.24 – that one would expect that grid customers be assured that they should not be made worse off by a transmission investment or pricing decision. In fact the surety required for investment in long term sunk assets is that the contract is not ad hoc and there is no opportunism in changing terms in the contract: it is not that net benefits from change should be non-negative to all customers. The credibility of the contract/regulatory process is what matters for investment: if dynamic efficiency will be improved by a contractual change then that change should be implemented.
19. The second leg of the second bullet (p.24) seems to be advocating beneficiary pays. However, it is not informative about the application of the principle when there are external effects. These effects materially complicate the pricing of transmission services.
20. P. 24. The paragraphs below the bullets illustrate that IRDB's previous criticisms of TPAG rest on a static framework. The contract approach is not suggested by IRDB's public policy framework of perfect competition; and hence the introduction of it by IRDB is to contradict the basis of much of its critique of TPAG. But its claim in these paragraphs that no customer should be made worse off by a change in the contract is simply not in accord with the argument for

⁷ As IRDB seems to suggest in its discussion of efficiency (3.2.3).

dynamic efficiency, or the contractual approach to regulation. Apart from departing from the framework of dynamic efficiency for rules and operation of the market, it poses questions such as: what market provides this surety, who carries the cost of the risk; how can it be implemented when there are externalities?

21. S.4: I have not studied GEMs or the experiments it has been used for. Without advocating a final position; I consider that questions raised by IRDB about the distinction between reliability and economic investment are reasonable. The reliability investment criterion should rank investment on a cost benefit basis even if the reliability definition is used as a rule of thumb for operational decisions. While I have not reviewed the value of extra locational-prices IRDB is not at all clear from the process described on p35 of IRDB. Solving for a future path of optimised generation, transmission and (to a much lesser extent) load would seem to be very very difficult for it would require modelling strategic risk – the game among generators and transmission, that the regulatory contract seeks to change - as well as intrinsic risks of demand volatility and trend uncertainty, and implications for the portfolio of plant. The way it (necessarily) abstracts from these issues will affect its utility. The questions posed by IRDB regarding security constraints and load shedding in the context of GEMs runs are on the face of it reasonable.
22. S.5 Generally IRDB seems to pose reasonable questions about the Appendix D analysis that it describes.
23. S6.2.2: para 2: is quite unclear: what exactly is IRDB's suggestion about the HAMI pricing and co-optimisation? TPAG seems to address optimisation given HAMI; so what extension is being suggested: generalising HAMI to a fixed locational charge?
24. P.52: assuming that the HAMI charge does incentivise different offers in the short run (because the South Island generators are charged for the HVDC on the basis of their peak loads) it is not clear to me why it is interesting for IRDB to introduce the long run perfect competition equilibrium. The point presumably is that in the short run there will be an efficiency cost to the extent that the particular HAMI affects offering behaviour and an additional dynamically (in) efficiency effect to the extent that it adversely affects investment choices; the electricity industry does not approximate perfect equilibrium - nor can it be expected to do so - and the path of the industry for the foreseeable future is what matters for economic efficiency or the long term benefit of consumers.
25. A second neglected fact of this discussion is that as long as inefficient rules persist (even in the short run) the less credible the rules are for the market at large and the less stable the regulatory environment.
26. S. 6.2.4 The first paragraph: the general suggestion that if the charge be identified as the problem then address it: but that is what is being suggested by TPAG; it would seem that IRDB considers that potentially useful alternatives were not sufficiently considered.

27. 6.3.3 is not that helpful since it is so much in the abstract. It is specifically about the HVDC yet does not narrow the options (e.g by the empirical evidence that flow is materially two way; by both the facilitation of provision and demand for reserves).
28. S6.3.4 The first paragraph (and the fifth) 57: there is no static or dynamic efficiency reason why no transmission customer should be left no worse off from a transmission contract change. This entire section simply poses issues without addressing them.
29. S6.3.4 This result is because there are assumed to be no investment economies of scale, or an increasing long run cost of plant and no decision making under uncertainty: generally load and generation would share the benefit.⁸
30. S.7.1 Again IRDB seems to want to cast the rule assessment in terms of identifying the problem: and address the static problem rather than ask what change in the rules will be dynamically economically efficient: it states "The Discussion Paper assess the scope for potential efficiency gains from changesbut quantification of potential efficiency gains is not the same thing as identification of the underlying problem." Finding the best incremental improvement must include addressing the key issue.
31. S.7.1.1 and 7.1.2 have no concrete IRDB propositions: it proposes sharper enquiry into the issues.
32. S.7.1 (p.63) I have not evaluated IRB on the anomaly.
33. S.7.2 4th para: no mention of network effects
34. P. 66 IRDB properly considers that load should contribute direct payment for transmission upgrades in certain circumstances. Its analysis is based upon a constant returns to scale model which means there is only consumer benefit. It does not consider externalities: e.g. network connection may reduce peak load at that location but the plant (and load) will benefit from network access to reserves and voltage control.
35. S.8 The IRDB discussion here seems reasonable.



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⁸ See Evans and Guthrie op cit.