Submission on *Measures for Transition to an Expanded and Highly Renewable Electricity System*

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Part 1: Growing Renewable Generation

Are any extra measures needed to support new renewable generation during the transition?

1. Please keep in mind existing investment incentives through the energy-only market and the ETS, and also available risk management products. Any new measures should add to (and not undermine or distort) investment that could occur without the measures.

Yes: serious Government support is justified for a nationwide rollout of small and medium scale renewables – rooftop solar, batteries, small windfarms and so on. That sort of arrival of new technology into a moribund existing market set-up, dominated as it is by rent-seeking and rent-taking monopolists and oligopolists, almost certainly will (and should) "undermine investment that would otherwise take place" – this is the whole point of disruptive innovation and creative destruction. Protection of the investment plans of incumbents against disruption by new entrants is myopic and counter-productive. I can't imagine why MBIE would explicitly rule out such disruption unless its priorities lie with sheltering the incumbent gentailer cartel from actual competition.

2. If you think extra measures are needed to support renewable generation, which ones should the government prioritise developing and where and when should they be used? What are the issues and risks that should be considered in relation to such measures?

Facilitate widespread adoption of rooftop solar (including by subsidies), enable establishment of Multiple Trading Relationships at individual ICPs, unbundle Transpower's grid charges from distribution networks' lines charges to recognise that distributed generation is a competitor to, and partial substitute for, the transmission grid. The central issue and risk is obstruction and anticompetitive conduct by the incumbent gentailers and Transpower, seeking to protect their asset values and profits.

3. If you don't think further measures are needed now to support new renewable generation, are there any situations which might change your mind? When and why might this be?

4. Do you think measures could be needed to support new firming/dispatchable capacity (resources reliably available when called on to generate)? If yes, which kind of measures? What needs do you think those measures could meet and why?

The first essential requirement is to reorganise the control and management of the existing hydro resource (New Zealand's unique advantage over most other countries) to function as a coordinated system battery over the daily cycle of intermittency. That means shifting hydro dispatch out of the middle of the day when solar will be at a maximum once a nationwide rollout has been achieved. A glance at the Australian market's generation mix at https://opennem.org.au/energy/nem/?range=7d&interval=30m (which shows rooftop solar at around 40% of the midday generation, and utility solar nearly another 20%) shows what will need to happen here if the Government does get serious about renewables-based electrification. My personal view is that this will require renationalisation of a substantial part of the legacy hydro estate to put management of hydro under centralised, public-interest-focused control. Alternatively, the wholesale market rules will need more than just marginal tweeking!

5.	Are any measures needed to support storage (such as battery energy storage systems or BESS) during the transition? If yes, what types of measures do you think should be considered and why?
	See response to 4 above.
6.	If you answered yes to question 4 or 5 above, should the support be limited to renewable generation and renewable storage technologies only or made available across a range of other technologies? Keep in mind that fossil fuels are generally the cheapest option for firming, though this may change over time as renewable options (particularly batteries) become more efficient and affordable.
	Fossil fuels need to be crowded out of the mix, and fast. That means "overbuilding" solar and wind capacity and transforming the role of the existing hydro assets as described in 4 above. The only parties whose interests lie in preserving fossil fuel dependency are the big gentailers and Transpower. The gentailers will do all in their power to keep fossil fuels on the wholesale market margin, given the enormous rents that fall into their laps.
7.	If you answered yes to question 6 above, what are the issues and risks with this approach? How could these risks and issues be addressed?
	See 6 above. There are major regulatory challenges ahead if distributed renewables capture a large market share. In particular, the writing-down of incumbents' stranded asset values has to be confronted. This means both stranded in the sense of reduced flow on some grid assets (though there is no guarantee of this – some parts of the grid will need to expand to cope with offshore wind, while others such as the link into Northland may lose utilisation}; and stranded in the sense of "fair value" write-downs once lower-cost distributed renewables put the squeeze on the excessive profits of gentailers. I have some very limited sympathy for Transpower; I have none whatsoever for the gentailers and their shareholders, who have banked two decades of rich pickings at ordinary consumers' expense. For once, let the logic of actual market competition and the sharemarket do their jobs.
8.	Are any measure(s) needed to support existing or new fossil gas fired peaking generation, so as to help keep consumer prices affordable and support new renewable investment?
	No. Fossil fuel generators have been a key pillar holding prices <u>up</u> and affordability <u>down</u> since the 1990s. Their malignant effect on the wholesale market applies not only when they are generating but equally when their mere existence allows the owners of hydro and geothermal assets to offer their assets for dispatch at prices based on the cost of the fossil fuel backstop. Support for new renewable generation needs to be direct, not through some fantasy back-channel via fossil fuels.
9.	If you answered yes to question 8 above, what measures should be considered and why? What are the possible risks and issues with these measures?

10.	If you answered yes to question 8 above, what rules would be needed so that fossil gas generation remains in the electricity market only as long as needed for the transition, as part of phase down of fossil gas?
11.	Are there any issues or potential issues relating to gas supply availability during electricity system transition that you would like to comment on?
	Yes. Getting gas and coal out of the electricity generation mix as soon as possible will slow the depletion of existing gasfields so that this premium fuel can be conserved both for more important long-term purposes and for non-extraction.
12.	Do you agree that specific measures could be needed to support the managed phasedown of existing fossil fuel plants, for security of supply during the transition?
	Yes. Some common sense will need to be applied.
13.	If you answered yes to question 12 above, what measures do you think could be appropriate and why? What conditions do think you should be placed on plant operation? For example, do you have any views on whether there should be a minimum notice period for reductions in plant capacity, and/or for placing older fossil fuel plant in a strategic reserve?
	See 12.
14.	If you answered yes to question 12 above, what are the issues and risks with these measures and how do you think these could be addressed?
	Mainly there will be a need to resist and overcome two predictable defensive responses by incumbent gentailers and gasfield owners: pre-emptive retirement and dismantling of CCGT and OCGT generation plant to trigger a crisis situation and force Government's hand; and exploitation of any dry year that may materialise during the transition, for the same purpose. Ideally, fossil fuel plant should be subject to a pre-emptive right for Government to compulsorily acquire (at scrap value) any plant scheduled for closure, to be held and managed as reserve for the explicit purpose of getting through the transition without disruption.
15.	What types of commercial arrangements for demand response are you aware of that are working well to support industrial demand response?
16.	What new measures could be developed to encourage large industrial users, distributors and/or retailers to support large-scale flexibility?
17.	Do you have any views on additional mechanisms that could be developed to provide more information and certainty to industry participants?

There is a need for more certainty for ordinary households and small businesses that they will have the chance to exercise agency in a fair and open local market setting, and that Government will stand ready to underwrite part at least of the cost of installation of solar, wind and battery assets.

There is equally a need for certainty on the part of fossil fuel operators that their days are numbered and that they will not be propped up simply to appease large vested interests.

In some areas, less certainty would be helpful. For example, shareholders in the gentailers should face greater uncertainty about the value of their assets as market forces bite, and should have plenty of chance to exit their holdings.

Part 2: Competitive Markets

18. Do you agree that the key competition issue in the electricity market is the prospect of increased market concentration in flexible generation, as the role of fossil fuel generation reduces over time?

No. The key competition issue is the lack of competition which has persisted from day 1 of the "reforms". The privatisation and fragmentation of control of the flexible hydro assets has gone along with rent-taking behind the shelter of the fossil-fuelled margin of the spot market, and with monopoly profits from vertical integration and exclusionary conduct by the gentailers.

19. Aside from increased market concentration of flexible generation, what other competition issues should be considered and why?

Gold-plated asset valuations in transmission and distribution networks will have to be written down at some stage if the transition is to be done sensibly – but the Commerce Commission's trick of "accelerated depreciation", which simply loads the cost onto consumers while keeping the asset owners (more than) whole is not a good way to proceed.

20. What extra measures should or could be used to know whether the wholesale electricity market reflects workable competition, and if necessary, to identify solutions?

A quick eyeball test tells you this is a fat lazy cartel. Workable competition is a distant dream. In any case the desirable future at the level of centralised large-scale hydro generation lies not with multiple owner/operators with or without workable competition – the better option is to renationalise legacy hydro and separate generation from retailing.

21. Should structural changes be looked at now to address competition issues, in case they are needed with urgency if conduct measures prove inadequate?

Yes.

22. Is there a case for either vertical separation measures (generation from retail) or horizontal market separation measures (amending the geographic footprint of any gentailer) and, if so, what is this?

Vertical separation absolutely yes. Mucking around with horizontal separation is merely a charade that leaves the basic flaws in the market set-up unchanged.

23. Are measures needed to improve liquidity in contract markets and/or to limit generator market power being used in retail markets? If yes, what measures do you have in mind, and what would be the costs and benefits?

Yes and yes. Compulsory arms-length hedging and separation of retail from generation.

24. Should an access pricing regime be looked at more closely to improve retail competition (beyond the flexibility access code proposed by the Market Development Advisory Group or MDAG)?

Yes, there needs to be a new set of market rules to facilitate local-level Multiple Trading Relations at individual ICPs, to enable retailers to offer a range of feed-in tariffs better aligned with local market conditions, to give more agency to households and small businesses operating as prosumers.

25. What extra measures around electricity market competition, if any, do you think the government should explore or develop?

26. Do you think a single buyer model for the wholesale electricity market should be looked at further? If so, why? If not, why not?

The single buyer proposal was an attempt to fix the glaring inadequacies of the twentieth-century wholesale market setup where the market is located upstream of the grid. The future market arena for competition, if it is allowed to emerge, will be downstream of the grid. There will be a good case for establishing local market operators within each distribution network to manage inflows and outflows at the point of connection with the grid.

Part 3: Networks for the Future

27. Do you consider that the balance of risks between investing too late and too early in electricity transmission may have changed, compared to historically? If so, why?

Yes. First, climate change is becoming more pressing as an issue and it is not going away. Second, the grid's role is going to change from operating as a top-down monopolist to operating in a more neutral way between the two generation systems (central and distributed).

28. Are there any additional actions needed to ensure enough focus and investment on maintaining a resilient national grid?

Yes. The Electricity Authority should be either replaced or upgraded from its present role as protector and cheerleader for the established vested interests in the industry.

29. Do you agree we have identified the biggest issues with existing regulation of electricity distribution networks?

No

30. Are there pressing issues related to the electricity distribution system where you think new measures should be looked at, aside from those highlighted in this document? How would you prioritise resolving these issues to best enable the energy transition?

Yes. The role of distribution network operators will become more important as distributed renewables increase their market share. The lines-energy split at local level should be ended immediately to allow trust-owned distributors to play an active role in their local community-level markets, to own renewable generation of their own and to enter into joint ventures with other generation developers. Large corporate-owned distributors should continue to be restrained from using their market dominance to build mini-empires rather than facilitating decentralised generation.

31. Are the issues raised by electricity distributors in terms of how they are regulated real barriers to efficient network investment?

Please give reasons for your answer. Is there enough scope to address these issues with the current ways distributors are regulated? If not, what steps would you suggest to address these issues?

Distributors are currently price-regulated only with respect to their total allowed revenue. There is an urgent need to regulate the detail of retail charges to reverse the present situation where households pay higher charges simply because of their relatively low demand elasticity (Ramsey pricing).

32. Are there other regulatory or practical barriers to efficient network investment by electricity distributors that should be thought about for the future?

The lines-energy split is a major barrier to innovation and market integration at local level.

33. What are your views on the connection costs electricity distributors charge for accessing their networks? Are connection costs unnecessarily high and not reflective of underlying costs, or not? If they are, why do you think this is occurring?

The allowed revenues of distributors are too high and serve mainly to sustain gold-plated asset values, given the way the Regulatory Asset Bases were originally constructed. Underlying costs are far less than the allowed revenues once account is taken of the effects of regulatory capture in the setting-up stages of the regulatory system. The notion of cost-reflective pricing has been hijacked to give cover to large monopoly rents.

34. If you think there are issues with the cost of connecting to distribution networks, how can government deliver solutions to these issues?

Separate distribution from transmission charges and bundle the latter with centrally-generated energy as was done in the old Bulk Supply Tariff.

35.	Would applying the pricing principles in Part 6 of the Code to new load connections help with any connection challenges faced by public EV chargers and process heat customers? Are there other approaches that could be better?
36.	Are there any challenges with connecting distributed generation (rather than load customers) to distribution networks?
	Yes. Mainly the skewed incentives and imbalance of market power in favour of the gentailers and Transpower. But also the market power of some of the larger corporate distributors.
37.	Are there different cost allocation models addressing first mover disadvantage (when connecting to distribution networks) which the Electricity Authority should explore, potentially in conjunction with the Commerce Commission?
	The Electricity Authority is not a trustworthy agency to be given this sort of remit.
38.	Should the Electricity Authority look at more prescriptive regulation of electricity distributors' pricing? What key things would need to be looked at and included in more prescriptive pricing regulation?
	Retail prices are massively skewed against households and in favour of commercial consumers. Reversing the price trends of recent decades would have big well-being impacts.
39.	Do current arrangements support enough co-ordination between the Electricity Authority and the Commerce Commission when regulating electricity distributors? If not, what actions do you think should be taken to provide appropriate co-ordination?
	One possibility would be to abandon the regulation of lines businesses altogether and let market forces and common law back into the picture. An alternative would be to try actual regulation of distribution networks as common carriers with proposals for bypass treated on merit.
40.	Will the existing statutory objectives of the Electricity Authority and Commerce Commission adequately support key objectives for the energy transition?
	No. The Commerce Act s52A explicitly allows "excessive profits" to be taken. The Electricity Authority has from the outset been captive to the vested interests of gentailers and Transpower, and has eschewed any role in confronting equity issues.
41.	Should the Electricity Authority and/or the Commerce Commission have explicit objectives relating to emissions reduction targets and plans set out in law? If so, • should those objectives be required to have equal weight to their existing objectives set in law? Why and how might those objectives affect the regulators' activities?
	Yes, but the weight to be given depends on the nature and quality of the "emission targets and plans set out in law". Current emission targets and plans are incoherent and confused, so are more a hindrance than a help in moving to a fully-renewable electrified future.

42.	Should the Electricity Authority and/or the Commerce Commission have other new objectives set out in law and, if so, which and why?
	Yes. Especially the Authority.
43.	Is there a case for central government to direct the Commerce Commission, when dealing with Electricity Distributors and Transpower, to take account of climate change objectives by amending the Commerce Act and/or through a Government Policy Statement (GPS)?
	Yes.
44.	If you answered yes to question 43, please explain why and indicate: • What measures should be used to provide direction to the Commerce Commission and what specific issues should be addressed? How would investment in electricity networks be impacted by a direction requiring more explicit consideration of climate change objectives? Please provide evidence.
Part 4: Responsive Demand and Smarter Systems	
45.	Would government setting out the future structure of a common digital energy infrastructure (to allow trading of distributed flexibility) support co-ordinated action to increase use of distributed flexibility?
	Probably.
46.	Should central government see how demonstrations and innovation to help inform how trade of flexibility evolves in the New Zealand context, before providing direction to support trade of distributed flexibility? If yes, how else could government support the sector to collaborate and invest in digitalisation now?
	No need to wait. The ripple-control technique of managing flexible demand was quite highly developed half a century ago and has largely fallen into disuse in the post-corporatisation New Zealand electricity industry. But there's no mystery about it – the problem is that lines operators have no incentive to offer that service because their regulatory framework rewards them for building new lines capacity, not for avoiding it. And retailers operating ripple control are not able to capture much if any of the benefits to (a) customers and (b) the system as a whole.
47.	Aside from work already underway, are there other areas where government should support collaboration to help grow and develop flexibility markets and improve outcomes? If yes, what areas and actions are a priority?
	Clearing away anticompetitive obstruction by incumbent vested interests - the usual problem.
48.	Could co-funding for procurement of non-network services help address barriers to uptake of non-network solutions (NNS) by electricity distributors?

49.	Would measures to maximise existing distribution network use and provide system reliability (such as dynamic operating envelopes) help in New Zealand? If yes, what actions should be taken to support this?
50.	What do you think of the approaches to smart device standards and cyber security outlined in this document? Are there other issues or options that should be looked at?
51.	Do you think government should provide innovation funding for automated device registration? If not, what would best ensure smart devices are made visible?
52.	Are extra measures needed to grow use of retail tariffs that reward flexibility, so as to support investment in CER and improved consumer choice and affordability?
	Yes.
53.	Should the government consider ways to create more investment certainty for local battery storage? If so, what technology should be looked at for this?
54.	Should further thought be given to making upfront money accessible to all household types, at all income levels, for household battery storage or other types of CER?
	Yes. There is a clear case for interventions including subsidies, suspensory loans, and support for cooperative ventures at community level to integrate rooftop solar and batteries across participating households and small businesses. Where possible, targeting to low-income households would be desirable. The most difficult household type is low-income renters who should be able to have some stake in local solar, wind and batteries but who lack the property right to install equipment on their rented premises.
55.	Should government think about ways to reduce 'soft costs' (like the cost of regulations, sourcing products, and upskilling supplier staff) for installing local battery storage with solar and other forms of CER/DER storage? If so, what technology should be looked at?
	Yes. Most important is restructuring the market arrangements at the centre to allow space for local decentralised initiatives to flourish and to ensure that the large legacy hydro assets are operated to stabilise the market for rooftop solar and small-scale wind..
56.	Is a regulatory review of critical data availability needed? If so, what issues should be looked at in the review?
Part 5: Whole-of-system considerations	
57.	What measures do you consider the government should prioritise to support the transition?

Recognise distributed small- and medium-scale renewable generation as a fifth element in the market, not simply a marginal player subsumed under the general category "generation". That means taking seriously a major and growing role for 'prosumers', at the expense of the market share of the big incumbent players. It means facilitating the uptake of rooftop solar, small wind, batteries, and other decentralised technologies while confronting the challenge of managing this competition for the market in a way that does not privilege the incumbents by enabling them to erect anticompetitive barriers to small-scale entry, or to assert dominance over local markets.

58. Are there gaps in terms of information co-ordination or direction for decision-making as we transition towards an expanded and more highly renewable electricity system and meeting our emissions goals? Please provide examples of what you'd like to see in this area.

Yes. The conspicuous gap is in local-level coordination downstream of the grid. Local energy communities based on distribution networks, within which prosumers can interact with each other in a local-market setting, would establish a distribution-network-wide residual supply or residual demand that is the net grid withdrawal or injection requirement for that network. At the gid entry/exit point is where a coordinating market operator is required, to manage, measure, and assign values to, the net energy transfers across the GXP/GEP. Leaving Transpower and the present wholesale system operator with control over local market interactions and transactions is a recipe for choking off innovation opportunities in distributed renewable generation. The grid's role is to balance, and coordinate with, total residual demands/supplies across the national system, with the large central flexible generators (basically hydro) operated as a system battery alongside their role as energy suppliers. Whether the existing wholesale pricing mechanisms can provide the appropriate signals for this is not clear, since it would be the first time since 2000 that the central generators have faced actual competitive pressure on the wholesale price.

59. Are there significant advantages in adopting a REZ model, or a central planning model (like the NSW EnergyCo), to coordinate electricity transmission investment in New Zealand?

Would a REZ model for local electricity distribution be an effective means of addressing first mover disadvantage with connecting to electricity distribution networks?

No. The REZ model is a self-serving Transpower-designed mechanism for exercising centralised control over local market outcomes and developments. The need is for decentralised market operators or brokers, located within local distribution systems, each one acting as the import/export agent for that local market in relation to the grid. The Griffiths notion of "grid neutrality" (for reference see footnote 134 p.111 of the discussion document) should apply - not the top-down grid dominance foreshadowed by Transpower in its REZ work.

60. Should MBIE regularly publish opportunities for generation investment to enable informed market decision-making?

If they wish to, it would probably do no harm.

61. How should the government balance the aims of sustainability, reliability and affordability as we transition to a renewable electricity system?

	Give priority and agency to small-scale actors by ensuring they have a neutral local market arena within which to operate and trade.
62.	To what extent should wholesale, transmission, distribution or retail electricity pricing be influenced by objectives beyond the (affordability-related) efficiencies achieved by cost-reflective pricing, such as sustainability, or equity?
	The present practice of bundling Transpower grid charges into distribution networks' line charges should end. Grid costs should be combined with central generators' wholesale prices to produce a delivered-wholesale price at each grid exit point, in order for local distributed generation to compete on a level playing field with centralised generation. Breaking the vertical integration of gentailers would be an important step towards making a genuinely liquid, neutral and competitive market possible at local community level.
63.	Are the current objectives for the system's regulators set in law (generally focusing on economic efficiency) appropriate, or should these also include more focussed objectives of equity and/or affordability?
	The current objectives of the system's regulators are to protect the asset values and market power of the incumbents. Part 4 of the Commerce Act 1986 requires a rewrite, and the Electricity Authority's Memorandum of Understanding that enables it to abdicate from equity issues in the setting of retail prices should be cancelled.
General Comments:	
See below	

The market structure is changing but policymakers aren't keeping up

I was encouraged to see Saul Griffith's book *Electrify: An Optimist's Playbook for Our Clean Energy Future* cited at the start of chapter 11 on priorities and "improving coordination". I was immediately disappointed when the next paragraph (number 360) started with the word "however" and proceeded to set aside that entire stream of work, on the specious and irrelevant ground that "New Zealand is a small country and, as support measures are developed, this will be carried out with finite funding and resources."

Thereafter there seemed to be no acknowledgment of the arguments made by Griffiths and others in the same vein. Yet for a small country with limited fiscal resources but ample renewable energy resources spread across our geographic space, the option of decentralised utilisation of those renewable resources by small and medium-scale operators, taking responsibility for their own resource mobilisation, stands out as the logical starting point for prioritisation, unless one is committed above all else to preserving the privileged position of the long-established vested interests in central generation and transmission.

I strongly recommend that before writing-off the options canvassed by Griffiths, officials and ministers should delve further into the literature on twenty-first-century technologies and market arrangements. One forum in which these have been widely analysed and discussed is the International Association for Energy Economics (IAEE), of which I have been a member

since 2002[1]. A long-standing colleague of mine in the IAEE, Fereidoon Sioshansi, has edited and published numerous books of essays on electricity economics written by energy economists around the world. These include five books in the past five years[2] on decentralised electricity systems supplied by small and medium sized distributed generators alongside the traditional central grid-connected ones.

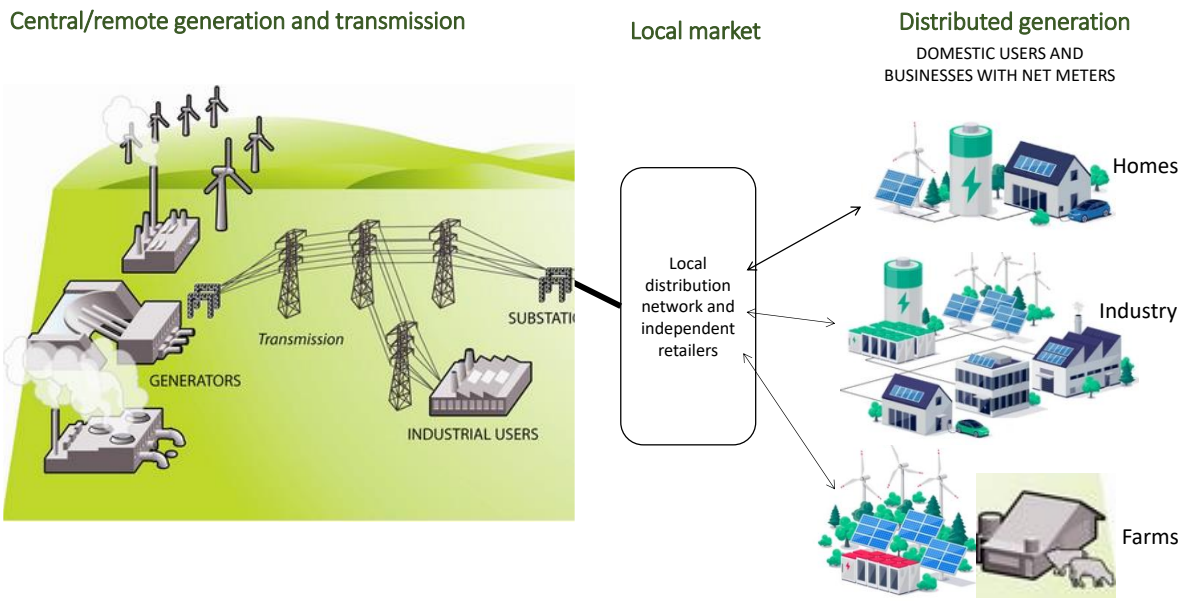
In contrast, the entire mind-set of the discussion document *Measures for transition to an expanded and highly renewable electricity system* [*Measures*] is backward-looking, trapped within the electricity industry architecture established between 1986 and 2015, and captive to the centralised top-down thinking promoted by Transpower and the gentailers. The big opportunities in the coming decade lie with radical decentralisation and diversification, as small-scale renewable-generation and battery storage technologies become increasingly competitive on cost, at the level of local markets, with the centralised grid-delivered bundle of energy + transmission.

Paragraph 6 on page 11 of *Measures* lists only four components of the electricity industry (generation, transmission, distribution and retail, with generation effectively identified with large central generation). This ignores the fifth element that will, and should, play a central role in the transition to renewables: distributed generation by households and small businesses acting as "prosumers" on the fringes of the system and selling into local community networks downstream of the transmission grid. Figure 1 on p.12 of *Measures* conspicuously omits these players altogether from its top-down diagrammatic representation of the supply chain. While true of the 1980s, this is an obsolete conceptual model for the 2020s and 2030s.

My reconstruction of Figure 1 would be:

[1] I served on the Institute's Council between 2005 and 2008, and convened its 30th International Conference in Wellington in February 2007.

[2] F. Sioshansi (ed) *Consumer prosumer, prosumager: how service innovations will disrupt the utility business model*, London: Academic Press, 2019; F. Sioshansi (ed) *Behind and beyond the meter: digitalization, aggregation, optimization, monetization* London: Academic Press, 2020; F. Sioshansi (ed) *Variable generation, flexible demand*, London: Academic Press, 2021; S. Lobbe, F. Sioshansi and D. Robinson (eds) *Energy communities: customer-centered, market-driven, welfare-enhancing?* London: Academic Press, 2022; F. Sioshansi (ed) *The future of decentralized electricity distribution networks* Amsterdam: Elsevier 2023.



In drawing this I have taken the liberty of presuming that the gentailers have been vertically separated to allow emergence of a retail market, operating on an open-access platform of local distribution networks, that is at least somewhat competitive. (The elimination of vertically-integrated gentailers is, I think, a necessary precondition for any sort of effective transition strategy to work.)

As soon as the diagram is redrawn, the questions of market definition and identification become central. The prevailing official model treats competition in generation as occurring entirely at the top of the supply chain, among players that offer supply into the wholesale spot market and are connected directly to the grid. But the arena of market competition in the next two decades will be the local market downstream of the transmission grid, with distributed supply competing head-to-head with grid-transmitted supply.

Throughout *Measures* it is striking that distributed renewable generation, besides being pushed to the margin of the discussion, is repeatedly described as being "grid-connected", rather than operating in local pools downstream of, and separate from, the transmission grid.

- On page 29 the discussion of feed-in tariffs talks of "small-scale renewable generation that contributes generation to the grid";
- On page 33, paragraph 74 speaks of "the potential for battery electric storage systems (BESS) in combination with intermittent renewables to enable excess energy produced during times of low demand to supply the grid during periods of high demand";
- Page 107 paragraph 347, discussing Australia, talks of "pay[ing] households for electricity exported to the grid";
- Page 113 para 368 A REZ could be designed such that generators inside a REZ would receive guaranteed, unconstrained access to the national grid" (para 369 recognises "complex issues" in the Northland case…)

The entire discussion in *Measures* treats the grid and the distribution networks as a single integrated entity under the overarching title "the grid" – an approach that clearly suits

Transpower's preferred narrative, but that ignores the new realities of the emerging market. Distribution networks get explicit separate mention only in relation to load-shedding (page 49 paragraph 126) and connection of new load (page 78 paragraph 232). Nowhere in *Measures* is there discussion of the issues surrounding new distributed supply connecting just to the distribution networks, as distinct from "the grid". Thinking of distribution separately from transmission is a fundamental step towards creation of genuine competition for the market.

In this connection I am in agreement with the recent presentation of Ben-David[3] in relation to the Australian electricity market:

> The electricity market and its regulation were established in very different times and under very different conditions to those that prevail today. The market reformers of the 1990s had the benefit of 70-80 years during which all the coordination problems of running an electricity system had been resolved inside monolithic, vertically integrated, state-owned monopolies. Production and delivery technologies were broadly in steady-state, and all the key transaction points were known. To the reformers' good fortune, the key transaction points were linearly arranged. In these circumstances, the risks to be managed via markets and regulation could be readily identified and managed... [But] the inputs and outputs comprising the future energy system cannot be known with any certainty. What is clear, however, is that transaction points will be multitudinous and scattered widely. Many will be bidirectional and some (or many?) may be multilateral… (p.13)
>
> …
>
> It is now a matter of urgency that governments, regulators, academics, engineers, economists, system planners, consumers and social scientists, work together to identify all the known and foreseeable transaction points in the future energy system; and ask what could go wrong at those points. (p.20)

Two of these "transaction points" stand out in relation to market entry by small-scale distributed renewables.

- The first is the interface between individual "prosumers" (for example, households with rooftop solar) and multiple local retail agents acting to match distributed supply with demand on the common-carrier platform of the distribution network. One important innovative approach in the New Zealand setting is establishment of Multiple Trading Relations (MTRs) at a single ICP[4].

- The second is the interface between independent local retailers/aggregators and wholesale supply from the grid – a transaction that takes place at the grid exit point,

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3 Ron Ben-David, *Rethinking markets, regulation and governance for the energy transition* , paper for ACCC/AER Regulatory Conference, Brisbane, Australia, August 2023, https://www.accc.gov.au/system/files/Ben%20David%20R.%20Rethinking%20markets%2C%20regulation%20and%20governance%20for%20the%20energy%20transition.pdf .

4 See John Campbell, "How multiple trading relationships could upend the traditional single supplier business model", Chapter 18 in F. Sioshansi (ed) *The future of decentralized electricity distribution networks* Amsterdam: Elsevier 2023.

with the retailer balancing two sources of supply: that from "upstream" central generators, and that from "downstream" prosumers. Under the current wholesale pricing arrangements, retailers pay the energy-only prices of upstream and downstream supply, then pass on to all parties a lump-sum charge for both transmission and distribution lines services. But distributed supply is a substitute for transmission, which means that rolling transmission charges in with distribution clearly discriminates against distributed suppliers. I return to this below.

Relative economic performance of small-scale and grid-scale renewables is not so clearcut

A major shortcoming of *Measures* is highlighted by the fact that on page 23 the list of possible "further measures" completely misses any measures to facilitate and support small-scale distributed renewable generation.

Page 106 of *Measures*, paragraphs 343-345, offers a very brief discussion of rooftop solar and batteries, but paragraph 349 (p.107) states that "The general view to date by government agencies has been that widespread financial support of roof-top PV has not been warranted, as grid scale renewables are typically lower cost than roof-top PV, and also lower cost than fossil fuelled generation. So, promoting rooftop PV would probably just displace commercial investment in grid-scale renewables." Apparently following from this prejudgment of the merits, throughout the discussion document distributed generation is marginalised or ignored, with households and small business seen as sources of flexible demand response, but not of competitive supply.

Whether or not the alleged "general view" of government agencies is based on solid analysis, as distinct from industry lobbying, is unclear. It does seem likely that there are economies of scale in the construction and operation of solar arrays which could make them in the abstract a better commercial proposition than rooftop solar, but this does not translate to any generalised case against support for rooftop solar. Three relevant considerations to bear in mind are:

1. The national generation fleet in New Zealand is made up of a range of technologies and locations with widely varying costs. The existence of inframarginal lower-cost tranches of generated power does not imply any case for discouraging other sources of supply located closer to the market margin; the issue here is not whether grid-scale solar is more cost-effective, but whether it represents the future margin of supply. Given the speed of required electrification of the economy over coming decades, it is quite implausible that small-scale rooftop solar lies outside the market margin and is therefore strategically dispensable.

2. There are important negative distributional effects of boosting grid-scale supply at the expense of localised small-scale projects. Rooftop solar, and local batteries, have the potential to reverse the severely inequitable impact on households of electricity pricing since 1986. Simply by placing agency into the hands of ordinary New Zealanders, support for rooftop solar can go far to rebalance the scales of market-driven injustice.

3. In a market that has been systematically dominated by the gentailer cartel, grid-scale projects are inherently vulnerable to being bought-out, coopted or recruited by the incumbents, to be incorporated into their huge rent-seeking project – a project that has to date been subject to no effective constraint from either competition or regulation. In the intensely anti-competitive environment of the New Zealand electricity market, competitive disruption of the cosy oligopoly is far more likely to come from distributed small and medium scale renewables than from giant grid-scale projects that can simply be slotted into the cartel.

A level competitive playing field in the local market would require each of the competing sources of supply to recover its own costs on merit. This in turn requires a return to the pre-1986 pricing formula of bundling the wholesale energy price of centrally-generated electricity with the grid transmission costs of delivering that electricity to the grid exit point. The current pricing arrangements, under which all Transpower grid charges are charged as lump sums to local distribution companies, which pass them on to final consumers as fixed charges regardless of the proportions of central and distributed generation in the consumption bundle, are of great comfort to Transpower's shareholder but are toxic for achieving a timely transition to renewables with a cost-reflective market share for distributed generation.

The (flawed) thinking behind the original decisions to treat natural-monopoly components of the supply chain separately from "potentially competitive" ones has flowed over to pricing arrangements that bundle the total charges for all lines operations into a single lump sum. This destroys the original concept of local lines networks as neutral common-carrier platforms providing services without fear or favour to all competing suppliers. Forcing distributors to pass on transmission charges to all users including prosumers gives central large-scale generators a privileged position vis-à-vis the distributed renewable suppliers which represent true "competition for the market". No amount of official lip service to "competition" can substitute for the real thing.

In turn this implies that a market operator of some kind needs to be located downstream of the exit points from the grid, performing a function quite distinct from that of the current system operator upstream of the grid.

Two false premises

1. *Markets achieve lower prices than alternatives*

Paragraph 394 on page 120 contains the first of two false premises on which the remainder of the discussion paper rests:

394. It is generally accepted that:

- markets achieve lower prices, in the long run, if efficient pricing signals are used – incentivising generation, network, and technology investments in the right place and at the right time, that bring down prices for everyone
- redistributional mechanisms can work alongside markets, to achieve desired social outcomes (such as more affordable electricity for lower-income households, or for households in regions that face higher charges).

In fact it is not "generally accepted" that markets achieve lower prices, nor would it be generally true even if it were generally accepted. On the contrary, from the moment in 1984 when the New Zealand Treasury in its post-election briefing began to talk about changing from the NZED's public-utility model to a market model for electricity[5], it was apparent both to the management of NZED[6] and to outside observers[7] that the price of electricity would be driven up, not down, for straightforward reasons to do with (i) the cost structure of this particular industry[8] and (ii) the different economic logic driving state-owned monopoly utilities relative to commercial market operators. Simplistic slogans about some generalised magic power of markets to lower prices may have been promoted then and since by some Treasury officials and many politicians, but these reflected a misunderstanding of the economics of electricity supply, along with an ideologically-determined preference for markets over state-owned utilities.

Until the late 1980s, wholesale electricity was priced as a bundle comprising generation and transmission, in the form of the Bulk Supply Tariff (BST) which reflected the average cost of supply from a non-profit organisation supplying the two components (generation and transmission) at an average-cost price. Because generation is an increasing-cost activity while transmission is a decreasing-cost one (economies of scale), and furthermore because of the synergistic benefits of joint operation of generation and the grid (economies of scope), the

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5 NZ Treasury, *Economic Management* pages 276-286 and especially p.280 which accused NZED of underpricing relative to its cost of supply, in pursuit of "non-commercial objectives". Treasury at that time offered no evidence that NZED was in fact pricing below actual (average) cost, nor any evidence that NZED was not a prime example of "State ownership of trading enterprises [being warranted because] it is most efficient to have only one supplier [so that] State ownership is a means of providing the most efficient solution while avoiding the abuse of monopoly power" – a proposition that Treasury set out on p.283 only to sweep it aside in a flurry of irrelevant statements. The issue of "pricing below cost" subsequently turned out to turn on whether the relevant "cost" was marginal cost or average cost. For a state-owned utility focused on public welfare, the relevant cost is average cost, as is generally recognised by the standard US model of public utility regulation. Treasury's attack on NZED boiled down to a demand that electrical energy be priced at marginal cost, leading naturally to the structure of the present energy-only spot market, while transmission (with its downward sloping marginal cost curve) be separately priced at average cost. It was explicit from the outset that this involved an increase in the final wholesale price. (The relevant section of *Economic Management* is online at https://www.treasury.govt.nz/sites/default/files/2007-10/big84i-6.pdf.)

6 K.D. McCook, quoted in Easton and Pryke 1985 p.50.

7 Easton, B. and P. Pryke, "The future pricing of electricity", *NZIER Quarterly Predictions* June 1985 pp. 48-51.

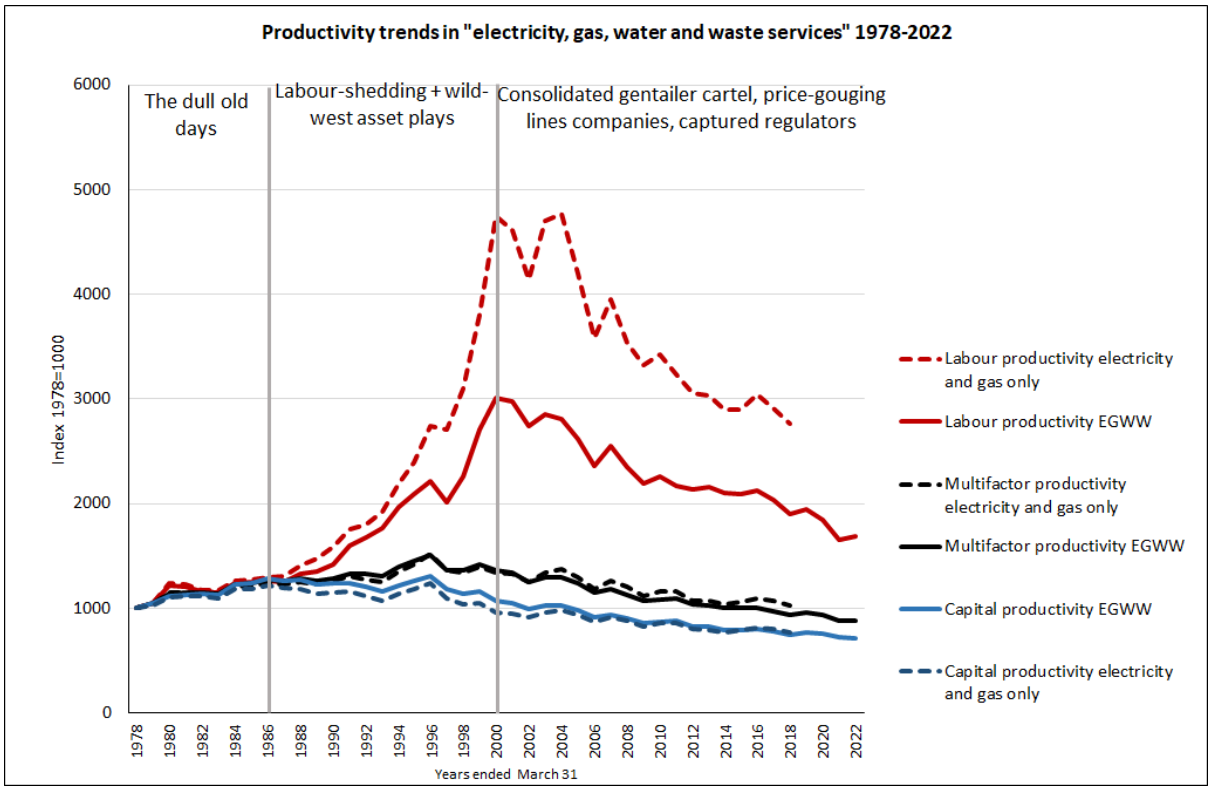
8 A useful introduction to the relevant economics is Part 1 of Stoft, S., *Power System Economics*, Wiley 2002.

old vertically-integrated NZED supplied electricity at a price (average cost of generation + transmission) that no new entrant to the market would have been able to match. To enable new entrants to compete for market share the NZED/ECNZ wholesale price had to be raised to marginal cost of generation plus the average cost of transmission, even under fully competitive conditions in central generation.

In addition, the transition from non-profit to fully-commercial objectives meant the addition of profit margins to costs which had previously been recovered with lower margins (the old BST was pitched to cover operating costs plus a margin to help fund new investment).

Standard Coasian theory of the firm explains why integration of generation with transmission conferred a strategic advantage on NZED relative to any new-entrant competitor for the market. It was the double-whammy of structural separation of the grid and addition of a profit margin to both energy and transmission, in the absence of serious competitive incentives to raise dynamic efficiency, that explains the increase in the price of electricity, especially since 1999.

Hopes of price reductions, insofar as some people entertained such hopes back in the 1980s and 1990s, rested entirely on the proposition that allocative and dynamic productivity gains would emerge from market competition under commercially-minded management. That would have required genuine competitive pressure to incentivise management to deliver. In practice, the opposite occurred: under noncompetitive market conditions in generation, transmission, and distribution, productivity has slumped. The productivity statistics produced by Statistics New Zealand show a clearcut story (see chart below).



Following an initial surge of labour productivity due to mass layoffs of staff, Multifactor Productivity (the measure of overall efficiency/productivity) began to fall in 1995 and has trended down ever since, to the point where it is now 32% below its level in 1986[9]. Capital productivity peaked in 1986 and has never regained the level it was at prior to corporatisation.

In terms of the affordability of electricity in New Zealand, the market model has been a failure to date. If market forces are to bring down the price of electricity in future, radical changes in the market structure will be required (see below).

2. The NZETS promotes decarbonisation of electricity supply

Page 20 paras 37-39 of *Measures* fundamentally misrepresent the incentive effects of the New Zealand Emissions Trading Scheme (NZETS), by suggesting that it incentivises a move away from fossil fuels in electricity generation. The main impact of the NZETS is to drive up the offer price of fossil-fuelled generators, enabling all other wholesale-market players to collect market rents that include the carbon-charge component or the wholesale spot price as pure cash in the bank. The long-run strategic imperative for those rentier owners of hydro, geothermal and large windfarms is to keep fossil fuel on the margin of the market for as long as possible – ideally, from their point of view, forever – at the ongoing expense of ordinary consumers. The NZETS has been a goldmine for rent-seekers in the New Zealand economy even as it has had no discernable impact on the economy's carbon emissions.

Backstopping intermittent supply

Para 54 p.26 says "price volatility is an inherent feature of a highly renewable electricity system". This is true most dramatically of a system designed like the NZ one which places the key resource for backstopping intermittent solar and wind – the legacy hydro dams – into the hands of commercial operators maximising profit without regard to the system-wide consequences. Because externalities are everywhere in this game, pure private profit-seeking will avoid the sort of flexible hydro response that would backstop wind and solar, and instead will seek to compete head-to-head with those renewables at peak times[10]. Socially-optimal coordination simply does not go hand in hand with the privatised profit motive, and trying to impose coordination by regulatory procedures that block profit-taking will produce resistance, subversion and political pushback.

This means there is a strong strategic case for restoring public ownership of legacy hydro and then giving its operators a mandate to operate as a battery-type backstop to intermittent renewables. Properly-coordinated operation of legacy hydro with new renewables should largely eliminate the case for the vastly expensive Onslow project. While it is true that in order to cover for dry years, intermittent renewables will need to be overbuilt and to spill energy at times, this is arguably an economically superior option compared with reliance on

[9] Multifactor productivity, electricity gas water and waste services, series PRDA.S1MDD1I in Infoshare table PRD014AA at 26 September 2023. Electricity comprises over 80% of this industry.

[10] This is in contrast to the situation in Australia, where the higher operating cost of fossil-fuel-fired baseload plant has made it easier for solar to bid that plant out of the market in the middle of the day.

a single gigantic project located remote from markets and overhung by major engineering uncertainties.

Protecting incumbents' asset values is not a strategic priority

I have for many years argued that the asset valuations for lines businesses that have been underwritten by the Commerce Commission as regulator are in fact fossilised monopoly values, sustained by monopolistic pricing that was implemented during the unregulated decade of the 1990s[11].

I am therefore happy here to quote, and agree with, Ben-David's summary of the same issue in the Australian setting[12]:

> 'Value' appears to mean whatever the regulatory machine delivers. That is, because the regulatory machinery is focused on efficiency, it is asserted *a priori* that it delivers value to consumers.
>
> Electricity and gas networks' … regulatory asset base (RAB) is the 400-pound gorilla sitting in the corner of this oddly obscure notion of regulatory 'value'. Everyone knows it is sitting there but no-one wants to look in its direction. This down-casting of the regulatory gaze has emerged as a primary concern in the ongoing economic regulation of the gas networks. The move to a decarbonised economy will, in all likelihood, see these assets stranding (ie. becoming obsolete) …
>
> In the *real* world, owners and financiers of stranding assets would 'take the hit' as they progressively wrote-down the value of those assets. The assets would be written-down to broadly reflect the diminishing net present value of the future stream of profits those assets were expected to generate.
>
> By contrast, in the regulatory world, the value of these assets is shielded from such a market-based outcome through annual indexation of the RAB. Moreover, the regulator has allowed investors to speed up the rate at which they extract this protected value (in cash) by approving the accelerated depreciation of the gas networks – adding to the prices paid by … customers.
>
> …
>
> Regulated electricity assets may also face stranding. It will depend on the technologies that emerge in the years ahead. It is unreasonable and unrealistic for regulators to continue to offer investors an unlimited financial indemnity over the value of regulated assets.
>
> For now, the arcane discrepancy between how assets are treated in the regulatory world versus how they are valued in the 'real' world has escaped public scrutiny. A

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11 See for example Geoff Bertram and Dan Twaddle, "Price-cost margins and profit rates in New Zealand electricity distribution networks since 1994: the cost of light-handed regulation", *Journal of Regulatory Economics*, 27, 3 (2005), pp. 281-307.

12 Ron Ben-David, *Rethinking markets, regulation and governance for the energy transition* , paper for ACCC/AER Regulatory Conference, Brisbane, Australia, August 2023, https://www.accc.gov.au/system/files/Ben%20David%20R.%20Rethinking%20markets%2C%20regulation%20and%20governance%20for%20the%20energy%20transition.pdf . pp.14-15.

> day of regulatory reckoning must come eventually. When that day arrives, regulators will need a more realistic approach for valuing regulated assets – probably linking the value of the assets to the stream of benefits those assets are expected to deliver to customers.

All these points apply as directly to New Zealand as they do to Australia. A rewrite of Part 4 of the Commerce Act 1986 would be a welcome part of facilitating an orderly transition to a de-monopolised as well as decarbonised electricity system.