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

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Release of information

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Responses to questions

Part 1: Growing Renewable Generation	
1.	Are any extra measures needed to support new renewable generation during the transition? 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. Risk management products are not widely available, and this inhibits variable renewable generation and small-medium enterprise load electrification. Risks are centred around the high volatility of spot prices, combined with political and investment uncertainties. While it can be argued that in principle volatility incentivises demand response and storage, and high prices incentivise new generation, in practice the strong dependence of these on market participant behaviour disincentives these necessary investments. The Government needs to create stability in market pricing, both short term and long term, to enable further investment in renewable generation and demand side electrification. This needs to be done by incentivising price-stabilising storage investments.
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?
	Variable renewable generation is dependent on demand response and storage for load matching. To enable variable renewable generation, a storage service could be required to be offered by hydro operators. Hydro storage offers a very strong natural advantage for renewable generation, which at the moment is held by a limited number of generation companies. To level the competitive playing field, sharing of this resource could be required.
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?
	N/A
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?
	Yes. If a storage 'banking' system can be brought into play, this could be engaged with by both loads and variable renewable generators, and the service provided by demand response, hydro reservoirs, batteries etc
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?

	Yes. Storage not only allows for low generation/high load periods over a range of timescales, but can provide reserves which enable a more flexible dispatch of renewable generation. Storage includes fuel reserves at thermal stations.
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.
	Yes. If carbon-emitting generation (or storage) is only called upon rarely, the carbon footprint is low. Industries that can provide strong demand response (Hydrogen manufacture?) should have guaranteed remuneration for engaging in the inter-temporal energy hedging market.
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?
	It can be argued that building carbon emitting support of variable renewable generation locks in carbon emissions. This is predicated on the assumption that the sunk cost of such an investment will drive excessive generator run-time. The incremental sunk cost implied by retaining existing assets is quite small, though, and the issue may become more one of maintaining reliability from such assets. In both cases, though, the incentive to over-generate would be driven by reliance on an energy-only market. Market design needs to move beyond that to include some form of capacity payment mechanism and/or capacity related hedge market.
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?
	Yes. Gas peaking generation will provide a critical role in enabling the transition to renewable generation, by providing the effective energy storage (gas fields) that variable renewable generation requires. They just need market conditions that incentivise their existence and maintenance, even when they rarely generate. If local gas supplies become critical, the same might also apply to very occasional generation based on imported 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?
	Supplementary capacity market mechanisms seem to be required.
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?
	Taxes such as a carbon tax will gradually incentivise other players in the energy storage (hydro, batteries, biomass stockpiles etc) to operate, as running a fossil fuelled plant becomes more expensive. As alternative dispatchable technologies and their price points improve, and generation and demand response diversity increases, fossil gas based generation will gradually fall into a position of very rare usage. The bigger issue may become maintaining some degree of reliability from such rarely used assets, and their supporting gas supply, as above.

11.	Are there any issues or potential issues relating to gas supply availability during electricity system transition that you would like to comment on?
	No. except that it would obviously be critical.
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. Specific measures will be required to ensure that plant can be maintained such that it will be reliably available during the transition period.
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?
	Yes. The electricity supply system needs stability and predictability, and advertising and slowing down market exits will help with this.
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?
	Don't know
15.	What types of commercial arrangements for demand response are you aware of that are working well to support industrial demand response?
	Don't know
16.	What new measures could be developed to encourage large industrial users, distributors and/or retailers to support large-scale flexibility?
	In principle, the controllable variability of large scale flexibility is no different to that provided by generation or storage technologies. It should theoretically be treated in the same way. But the absence of a storage-based hedging product that could be sold by demand side responders must inevitably inhibit participation, and potential demand-side responders are much less aware of the value they could contribute, and of how that might be arranged to their profit. So, govt should consider funding a research, education, and liaison function. The fragmented nature of both distribution and retailing sectors makes it difficult to achieve scale economies with respect to developing systems to support/incentivise/ coordinate demand side responses utilising batteries or storage of processed goods and non-electrical energy in industrial, commercial and domestic settings. Development of a universal national framework and protocol could assist.
17.	Do you have any views on additional mechanisms that could be developed to provide more information and certainty to industry participants?
	No
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?
	Yes, or at least is a key issue. Incumbent generators with hydro reservoirs are significantly advantaged.

19.	Aside from increased market concentration of flexible generation, what other competition issues should be considered and why?
	There are so few participants in the electricity generation market, and those participants are indirectly incentivised to exclude competition. This doesn't provide a fertile ground for fresh entrants to implement variable renewable energy investments, load electrification, or storage technologies.
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?
	Generation offers are first and foremost used to inform the dispatch mechanism that the system operator runs. It does this well, and generators are able to be dispatched to approximately meet their committed load. However, the resultant highly volatile spot prices and the associated risk to those exposed to the spot market limits the rate of future decarbonisation. This volatility needs to be measured, and controlled to be more manageable through peak/capacity/storage pricing components.
21.	Should structural changes be looked at now to address competition issues, in case they are needed with urgency if conduct measures prove inadequate?
	The prospect of urgent changes creates uncertainty and risk. However, if it is agreed that the market is not delivering the decarbonisation changes we need, changes should be looked at. Relatively stable pricing regimes are required to enable demand side investment in electrification. This requires storage capacity, and although highly volatile prices do incentivise storage, this is not enough to provide the price stabilisation that is necessary.
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?
	Don't know.
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?
	Transparency in hedge contracts and similar, and extra liquidity in that market would allow greater accessibility to electricity consumers and storage/generation providers, and reduce investment risk. But innovation seems to be required in introducing a wider range of products specifically targeting storage capacity and/or generation capacity that is sustainable over various time frames.
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)?
	Don't know.
25.	What extra measures around electricity market competition, if any, do you think the government should explore or develop?
	In order to enable load electrification and renewable generation to expand, the electricity market needs to expand to include flexibility/capacity services (ie storage, demand response), and to ensure that incumbents with significant storage use their storage to support this expansion.

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?
	Maybe. If a single buyer purchasing strategy can include incentives for flexibility/capacity services, including the retention of older thermal plant, it may have value.
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?
	The issues regarding the appropriate transmission system investment have been identified well (pages 66-67). The issue is not whether the balance of risks have changed from what it was historically but whether appropriate for today. The risk has changed historically as previously development was more centrally controlled (generation and transmission) and the ratio of generation capacity to maximum demand was larger. Now with a market and many participants, meeting their needs is harder. Due to the long lead times for transmission system reinforcement and the consequences of an inadequate system stifling decarbonisation there is a need to ensure the transmission system is adequate for the future.
28.	Are there any additional actions needed to ensure enough focus and investment on maintaining a resilient national grid?
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29.	Do you agree we have identified the biggest issues with existing regulation of electricity distribution networks?
	The main issues have been identified.
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?
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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?
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32.	Are there other regulatory or practical barriers to efficient network investment by electricity distributors that should be thought about for the future?
	The distribution systems are old and issues identified look at maintaining business as usual model. Flexibility is needed to allow distribution companies to trial quantum leaps in technology (e.g. Low Voltage DC) which may prove to have long term benefits in the future in terms of efficiency and resilience.

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?
34.	If you think there are issues with the cost of connecting to distribution networks, how can government deliver solutions to these issues?
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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?
	No! Distribution companies are undertaking the necessary studies to enable public EV chargers to be installed. Notes 243, 244 and 245 (page 80) discuss connection Process Barriers. The discussion is to duplicate in some way Part 6 of the code (for DG) for electrified load connections. The first question is whether Part 6 of the code is working well and is reasonable. The distribution systems are large and built/developed over many years. This means that system data has often been lost (particularly at low voltage level) and it is difficult to model and develop export congestion maps (either now or in the future) with any accuracy. The speed of the approval process is dependent on; (i) the number of applications and (ii) the work entailed in performing the engineering studies. Many distribution companies are struggling to provide accurate information required by Part 6 of the Code due to the complexity of the distribution system and lack of accurate computer models for parts of their network.
36.	Are there any challenges with connecting distributed generation (rather than load customers) to distribution networks?
	Yes, and these are well known. The distribution networks were designed for power conveyance in one direction. Forward and reverse power flows makes voltage magnitude management much harder.
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?
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?
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?
40.	Will the existing statutory objectives of the Electricity Authority and Commerce Commission adequately support key objectives for the energy transition?
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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?

42. Should the Electricity Authority and/or the Commerce Commission have other new objectives set out in law and, if so, which and why?

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)?

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?

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At the retail level there are significant barriers to adoption of various technologies, and the fragmented nature of distribution, retailing and technology installation sectors makes it complex for consumers to assess options and move forward with installation. (One small example would be that consumers are being told that the regulations prohibit the net treatment of 3 phase solar import/export, which we believe to be normal in almost every other country. But Dr Grant Read, who chaired the inaugural Retail Competition Committee, and approved the wording of that regulation assures us that the intent was merely to require the data to be collected, on the grounds that retailers and regulators in the then distant future would then have the option to price on a net basis, or not.*)*

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?

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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?
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48.	Could co-funding for procurement of non-network services help address barriers to uptake of non-network solutions (NNS) by electricity distributors?
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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?
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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?
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51.	Do you think government should provide innovation funding for automated device registration? If not, what would best ensure smart devices are made visible?
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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?
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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?
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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?
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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?
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56.	Is a regulatory review of critical data availability needed? If so, what issues should be looked at in the review?
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Part 5: Whole-of-system considerations

57.	What measures do you consider the government should prioritise to support the transition?
	Some of the rules and regulation are not fit for purpose and are hindering the transition to renewable energy. For example NZECP36 was developed over 40 years ago and is not appropriate for the present situation and yet is still a requirement. The rules and regulations need to be carefully reviewed and amended to the present situation. AS/NZS standards already have a probabilistic approach which is more rigorous and based on IEC standard and should be considered as a replacement to NZECP36.
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.
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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?
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60.	Should MBIE regularly publish opportunities for generation investment to enable informed market decision-making?
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61.	How should the government balance the aims of sustainability, reliability and affordability as we transition to a renewable electricity system?
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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?
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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?
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General Comments:	