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Electricity Authority

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Submission on working paper – *Entrant generators – context, headwinds and options for power purchase agreements*

Introduction

1. Energy Resources Aotearoa is New Zealand’s peak energy sector advocacy organisation. We represent participants from across the energy system, providing a strategic sector perspective on energy issues and their adjacent portfolios. We enable constructive collaboration to bring coherence across the energy sector through and beyond New Zealand’s journey to net zero carbon emissions by 2050.
2. This document constitutes our submission on the Electricity Authority’s (the ‘Authority’) [working paper](#) entitled ‘*Entrant generators – context, headwinds and options for power purchase agreements*’.
3. For the purposes of this submission, we refer to ‘firming’ as a shorthand for flexible resources, which could be new flexible generation, natural gas or other fuel fired peaking plant, other storage, grid-scale batteries or long duration energy storage. We refer to ‘demand response’ separately, even though it is typically considered a form of flexible firming for electricity.
4. The priority must be *additional* generation and urgently, and with it, more competition for **flexible firming**, resulting in growth, to support the increasing intermittency of the system. We provide a summary of views supporting this in *Appendix One: Views on future electricity demand and the need for new thermal fast-start capacity*. Relying on hydro for long-term flexibility is a sub-optimal outcome.

Key messages

5. Energy *is* the economy. It unlocks economic growth. An abundant supply of fuel and power generation infrastructure, and competitive provision, are the best antidotes to high energy prices. Electricity is not a fuel.

6. We agree with the Authority's assessment that New Zealand needs new generation for electricity. We agree that **flexibility and proportional firming** for renewable generation are essential in underpinning our increasingly intermittent system for the benefit of all New Zealanders.
7. The proposals go some way to addressing challenges with flexibility but do not address problems with demand for firming at low-scale. New generation from new entrants, such as solar and wind, are welcome but require back up storage or 'firming' for when the sun, rain and wind cannot deliver energy. Existing options like swaptions only address large-scale demand.
8. We applaud recent efforts by the Authority to introduce flexible trading products through their new trading events. These work within existing energy capacity constraint but do not induce demand to increase it. We need a regulated market platform to coordinate and match the new generation with proportional firming.
9. The fundamental weakness of the options in the working paper is that they only seek to reallocate existing energy available and do not induce additional capacity. Attention must be on the problem of accessing reliable non-weather dependent fuel, like natural gas, and new firming capacity to firm new weather-dependent generation.
10. There is no proposal in the working paper that would make *additional* firming capacity more likely or operational. This is the glaring omission that we urge the Authority to grapple with, rather than simply shuffling the deck chairs or worse, ignoring the underlying problems. It underlines the importance of fuel supply in the Authority's overall risk assessment.

Options analysis

11. We support most of the options provided in the working paper. However, the range of options provided will only reallocate existing capacity. The core problem is low investor confidence in sourcing additional gas reserves, which is required for the much-needed firming capacity.
12. Almost all modelling assumes gas will be required beyond 2050 yet market confidence in gas is at an all time low. Petroleum reserves data for 2P reserves have dropped dramatically and are likely to drop further on next publication, reflecting significantly diminished investment confidence in the upstream oil and gas sector. As the market moves toward higher shares of renewable electricity capacity the real need for gas-fired generation to provide back-up for the variable nature of renewable generation.

13. Of the intervention categories and associated options that are listed for further consideration on page 31, we think **option (m) is problematic:**
- (m) allocation – allocate firming resources by requiring holders of critical firming resources to make volumes available to support PPA transactions.*
14. Option (m) hints at the problems entrant generators might face when trying to connect to the grid, but we believe it is the wrong way around. Rather than ‘requiring holders of critical firming resources to make volumes available’ through central allocation, we think **entrant generators should meet a standard of firming that balances their intermittency risk**, thus adding demand for new firming, increasing the number of participants and the level of competition. This would address the risk and the lack of induced demand for firming when a renewable energy project enters the market.
15. We prefer demand-led market solutions, rather than coerced supply options that socialise the costs of intermittency onto the rest of the system. Option (m) should be ruled out.
16. Demand response is slightly different. It reduces economic output. Asking New Zealanders to reduce their energy use is akin to asking New Zealanders to reduce their food bills. Large-scale peak demand response (such as what we experienced in winter 2024) will be needed for some years to come and is very valuable but it is not a great solution for economic growth. It is essentially a tax on productivity.
17. To be helpful, we offer some alternative options for the Authority’s consideration:
- a a **firming market option** (to support and grow current firming options and swaptions, and as distinct from capacity market models); and
 - b failing that, or as a complementary measure to avert full-scale structural reform, a **government guarantee option**.

Background

18. The working paper is focused on initiative 1A – entrant generation – of the Taskforce’s Package 1. The goal of Package 1 is:

‘to enable new generators and independent retailers to enter, and better compete in the market. This will encourage more and faster investment in new generation, which puts more energy into the system, strengthens resilience against future shortages and puts downward pressure on prices.’

19. The Market Development Advisory Group ('MDAG') [recommendations](#) in 2023 started from big picture and rightly highlighted the need for medium-to-long-term duration firming for renewables. MDAG's greatest concern is the provision of flexible supply for **periods of a week or longer** into the spot market.¹ This has been somewhat obscured in the more detailed working paper. In this translation, we seem to have lost the vision of the core problem – **(s)low investment in new firming due to difficulty in accessing fuel due to low investment confidence.**
20. We wish to stress that to fundamentally restructure the electricity market now could be destabilising and worsen investor and consumer confidence. Should such a restructure be warranted we would expect evidence for it to emerge from the [Frontier Economics](#) review. We are supportive of many of MDAGs recommendations but do not support the progressive nature of the advice that puts forward options resulting in virtual disaggregation of the market. In our view, restructuring would not deliver market confidence or induce demand for more growth.
21. We believe the exclusive focus on Power Purchase Agreements (PPAs) in the paper could be limiting. This is because PPAs are not representative of all the firming needs in our energy system, yet they rely on access to firming. PPAs, if correctly configured, are a necessary but insufficient part of the solution. We support the proposals that improve access to PPAs, but the prior focus must be on improving access to *fuel* and the confidence this will provide for investors in firming infrastructure.
22. The recently released paper from KPMG and Concept Consulting, entitled '*The need for energy storage: Firming New Zealand's renewable energy*', provides further evidence that we need more natural gas, thermal generation, firming and storage. The report concludes that we need long-term, long-duration flexible energy that can be used infrequently to underpin our highly renewable generation system.

What New Zealand needs to overcome the barriers for new entrant generation

More fast-start thermal generation

23. We argue that we need *more* thermal firming in the short- and long-term, and we are not alone in this view. Appendix One provides a summary of views about future electricity demand and the need for more fast-start thermal generation. Estimates vary widely about future demand which illustrates the need for system settings to retain optionality and respond to changing circumstances.

¹ "This is because much of this physical flexibility comes from fossil-fuelled plant that will progressively withdraw in the shift to a renewables-based system. Batteries are unlikely to be economic for cycling over a week or longer. This means the control of medium and longer-duration flexibility would become more concentrated among parties with the flexible hydro generation capacity and the remaining thermal capacity, all other things being equal." Appendix D – [MDAG final recommendations 2023](#).

24. The key takeaway from Appendix One is that virtually all of the electricity system modelling undertaken in recent years have revealed an economic role for thermal firming in their generation 'stacks'. We note the view of the Electricity Authority in recent years and hope that that this view has shifted, given events in 2024.
25. The benefit of gas-fired, fast start open-cycle gas turbines ('OCGT's' or 'peakers'), is that they operate on indigenous fuel, on New Zealand market prices (not international prices like LNG would introduce), and can be up and running within minutes of being called upon. They can provide the energy intensity needed for large industrials. It is our understanding that new plant could be operational within about two years, *if investment conditions were favourable* including availability of fuel.
26. With so many experts in agreement about the need for flexible firming, the question then becomes, how to motivate investors to build, and how to pay for the flexibility. In principle, we believe that market mechanisms are more likely to find least cost pathways and that the market should pay. However, with gas market confidence so low we think the market may struggle on its own.

Investment confidence

27. Something must be done to address the sovereign risk introduced by flip-flopping governments on core attributes of our energy system (e.g., the oil and gas ban of 2018).
28. There is a highly charged political climate for New Zealand's energy sector. A prudent policy objective should be to provide investors with a level of comfort that their long-term investments will be not affected by any radical changes in resource or climate policy from the government-of-the-day.
29. Immediate attention is needed to avoid more industry shut-downs and exits. Access to thermal fuels, flexibility and firming are all integral to this and will put downward pressure on electricity prices.
30. All options need to be on the table from all fuel sources. LNG could be part of this future (at least for electricity generation), but in our view, it would be an inferior outcome to domestic investment in natural gas and it would introduce high international gas prices and likely more expensive than coal.
31. The newly introduced [Infrastructure Priorities Programme](#) could bolster investment confidence through its rigorous, contestable process but as currently conceived, the Programme has not made the critical links to the energy sector for which it seems ideally suited.

Alternative solutions not in the working paper

32. We have attached our early thinking on solutions that could remove investment hesitancy, depoliticise the choice of fuel for firming (all fuels on the table) and hasten economic growth. Both could work together to solve the market size problem and the lack of induced demand for firming when a renewable energy project enters the market.

Firming market option

33. Building on option (l) – flexibility trading – but with a twist, we envisage that new entrant generators would connect to the grid on the proviso that they meet some sort of standard for firming their intermittency. This would induce new demand and innovation for matching firming capacity with the new generation in a way that does not simply reallocate existing capacity or exclusively rely on the gentailers, who should contract freely.
34. A market solution at grand scale is occurring as we speak. The big four power companies have agreed to extend the life of Genesis' coal and gas-fired Rankine units at Huntly by entering a non-binding agreement over several years (details have yet to be made public). This is a market response, risk managed, to avert large scale shortages.
35. This sort of flexibility could extend to gas firming (which has the benefit of quick-start flexibility, suited to emergencies), and ultimately all fuels – with 'packages' of firming to suit different needs on a trading platform. Such solutions are already happening to some degree but lack a regulated platform and could use greater coordination. Shorter term contracts (one or more weeks) could be traded within longer-term contracts to manage small bursts of firming risks by smaller generators and allowing them to trade unused firming from existing contracts. Those offering firming through the platform would be matched through the market, not a central control as proposed in option (m).
36. A range of storage market solutions are being introduced in other parts of the world, and there are some interesting examples from Europe that could be worthy of investigation for the New Zealand context. See, for example, this [McKinsey report](#) on *Evaluating the revenue potential of energy storage technologies*.
37. A demand-led firming market solution could work much like the cloud computing model (modern IT solutions) where additional computing resources (physical or virtual) are held on servers and purchased on demand. This model unlocked huge growth in internet usage and resulted in economic growth.
38. This type of solution could avoid large scale reform of the electricity market, which we consider would reduce investment confidence.

39. The pricing system for electricity relies on the real time balancing of demand and supply. If there is fuel or capacity scarcity, this will be reflected in prices (as we experienced in winter 2024 with a shortage of natural gas, water and wind). The high prices that resulted are seen by some as undermining the efficiency of the system, rather than a product of its efficiency. But the issue is that these prices should encourage new investment in firming generation. This isn't happening quickly enough, and pricing has not overcome our problem with fuel (as discussed above). A new mechanism is needed at the firming level to encourage new build.

Government guarantee option

40. While not our preferred option, all options must be considered. In this world, the government could act as a market maker by underwriting PPAs for the smallest end of the market (small scale renewable generation). The government is a large buyer itself with roughly 70% of the market and has the ability to withstand volatility and calm prices when new generation enters the market. Such an intervention could help to get new, small competitors into the market quickly by helping them to secure a lending contract (especially if they were to need firming to meet a standard, as per our suggestion above).
41. The problem with current arrangements for firming options and swaptions is that they cater for larger transactions and are generally tailored to high quantities. These sorts of bespoke arrangements do not suit smaller new entrant generators. Hindering their entrance limits competition and keeps prices high.
42. We do not generally support government underwriting. However in this case, the benefits of having more participants in the market, sooner than the market can provide under current settings, would benefit all New Zealanders and could mitigate the risk of further deindustrialisation. This approach would also serve to spur activity in the development of our gas resources.
43. Our clear preference is for the government to first address the investment risks associated with the natural gas sector. It is the source of fuel that would offer the most favourable conditions for firming electricity flexibly and a raft of other economic benefits.

Concluding comments

44. We thank the Authority for the opportunity to contribute to the early thinking in the working paper. We would welcome a discussion on our submission.
45. The two solutions we propose are mechanisms intended to bring new renewable and firming capacity to market and signal a clear need for fuel agnosticism (i.e., do not favour renewables over fossil fuels). They would reduce the risks of

political football and sovereign risk. The trading option also requires regulation for the platform. Only the Authority can do these things as we propose:

- a a firming market option that requires new, small-scale generators of renewable energy to meet a firming standard, thus inducing new demand rather than reallocating existing firming capacity, and restoring confidence in the gas market; and
 - b a government guarantee option to support the smallest new entrant renewable generators come to market.
46. The primary concern for improving electricity market competition is access to fuel. We hope the suggestions in our submission trigger some fruitful debate.

Appendix One: Views on future electricity demand and the need for new thermal fast-start capacity

Date	Report	Total electricity demand	New thermal peaking capacity
Jul 2024	MBIE's Electricity Demand and Generation Scenarios ¹ Reference and growth cases	Reference: 62.1 TWh in 2050 Growth: 71.7 TWh in 2050	Reference: 800 MW by 2050 Growth: 900 MW by 2050
May 2023	Concept Consulting's report for the Electricity Authority ²	50 TWh in 2032	<i>None, at least until 2032</i>
Apr 2023	EnergyLink's Role of Gas in Electricity and Industry ³ Low demand and high demand cases (note these only run to 2038)	Low demand: 46 TWh in 2038 High demand: 54 TWh in 2038	Low demand: 200 MW by 2035 High demand: 320 MW by 2035
Oct 2022	BCG's The Future is Electric ⁴ Preferred pathway (Smart System Evolution)	54 TWh in 2030 77 TWh in 2050	200 MW by 2030 400 MW by 2040 600 MW by 2050
May 2021	BusinessNZ Energy Council's TimesNZ 2.0 ⁵ Kea and Tui scenarios	Kea: 45 TWh in 2030 75 TWh in 2050 Tui: 54 TWh in 2030 83 TWh in 2050	Kea: 200 MW by 2030 1,830 MW by 2050 Tui: 400 MW by 2030 1,770 MW by 2050
May 2021	Climate Change Commission's <i>Inaia Tonu Nei</i> ⁶ Demonstration pathway	50 TWh in 2035 66 TWh in 2050	200 MW by 2035
Mar 2020	Transpower's <i>Whakamana I Te Mauri Hiko</i> base case ⁷	55 TWh in 2035 70 TWh in 2050	400 MW by 2035

Note: in many cases this new capacity is offset, at least partially, by the decommissioning of existing slowstart capacity). Note that these reports use different reference periods and timeframes, so these figures are not necessarily directly comparable. Relevant years are noted to assist.

¹ Additional thermal peakers are especially required under the Growth and Reference scenarios with between 0.8 and 0.9 GW more thermal peaking capacity required by 2050 compared to the other scenarios. [Electricity Demand and Generation Scenarios: Results summary July 2024](#) page 41.

² https://www.ea.govt.nz/documents/3147/Appendix_C_-_Concept_Consulting.pdf

³ <https://www.energyresources.org.nz/dmsdocument/243>

⁴ <https://www.bcg.com/publications/2022/climate-change-in-new-zealand>

⁵ <https://times.bec.org.nz/>

⁶ <https://www.climatecommission.govt.nz/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf>

⁷ See Transpower's *Whakamana I Te Mauri Hiko* report, available at <https://tpow-corp-production.s3.ap-southeast-2.amazonaws.com/public/publications/resources/TP%20Whakamana%20i%20Te%20Mauri%20Hiko.pdf?VersionId=FljQmfxCk6MZ9mlvpNws63xFEBXwhX7f>