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Electricity Authority

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## Submission on the future operation of New Zealand's power system

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### Introduction

1. Energy Resources Aotearoa is New Zealand's peak energy sector advocacy organisation. Our purpose is to enable constructive collaboration across the energy sector through and beyond New Zealand's transition to net zero carbon emissions in 2050.
2. This document constitutes our submission on [The Future operation of New Zealand's power system](#).
3. We have focused our feedback on questions 2, 7 and 9 in the consultation document.

### Submission

#### ***Overarching issues***

4. While the new Government has committed to get to net zero by 2050 by doubling renewable electricity, they have also committed to ensuring that climate change policies are aligned and do not undermine national energy security.
5. Achieving this will require asking the 'what if' questions. Explorative scenarios are an important tool that establish the needed guardrails to explore sensible options and deliver resilient policy settings that are more likely to be responsive to changing circumstances.
6. We encourage the Authority to closely monitor changes in the power system over the next few years and be agnostic to technologies needed to provide New Zealanders with secure energy, while making the necessary preparations for digital and infrastructure changes in the least-cost, low-barriers manner.

## ***The coming decade is a critical time for energy security and climate***

7. We agree with the Electricity Authority's (the Authority) assessment of the nature of the current power system operation in New Zealand over the coming decade and beyond. The next 10 years are going to be a tumultuous and critical decade for ensuring supply can meet energy demand. For electricity, this is going to require an ongoing supply of non-renewable generation and peaking fuel. Reliable and resilient supplies of energy should be front-of-mind for the Authority and others in the system with a regulatory role.
8. Like many energy commentators, we firmly believe natural gas (and emerging supplies of biogas) will play an important role in stabilising the increasingly intermittent supplies of weather dependent renewables, especially as renewables supply closer to 90% of New Zealand's total energy consumption.
9. The last few percentage points of low or zero emissions generation will be incredibly difficult and expensive to achieve, and the system will be more vulnerable to supply disruptions than it has ever been. The system will also be challenged with unfamiliar and unforeseen problems, as well as new technologies not yet known or proven.
10. For this reason we are very supportive of the work the Authority is undertaking through this consultation.
11. Transmission and distribution infrastructure play a largely invisible support role. This part of the system requires robust, stable regulation, competitive markets, and a safe and skilled workforce capable of carrying out the specialist technical and consumer facing roles. In the next ten years, how that power gets distributed is set to change, with consumers having more of a role in determining their demand through efficiencies and redirecting their excess electricity back into the grid.

## ***Drivers of change in next ten years***

### *Key driver 1: Changes in generation technology*

12. We accept that technology and the need to reduce greenhouse gas emissions are driving changes in generation technology towards greater use of wind, solar and battery energy storage systems (while we maintain that gas can provide battery storage too).
13. Thermal generation, particularly gas, is underplayed in the consultation document given its importance in stabilising the system now and for the foreseeable future.
14. We have heard confirmation this year from the Authority and Transpower that there are real risks to energy security if gas assets are retired too early.

### *Key driver 2: Changes in consumer technology*

15. We agree that flexibility products have an important role at the consumer end of the system in providing the needed suppleness to bridge gaps between demand and supply. Through dispatch information, consumers can use their excess power rather than it going to waste. Empowering consumers to have some leverage in this will become an important feature of New Zealand's energy security in the next ten years. But Distributed Energy Resources (DER) cannot prevent a large-scale disaster resulting in black outs.
16. We agree with the Authority that the system needs greater oversight and connectivity to leverage the benefits of DER. However, consumers and technologies do not always behave the way regulators intend.
17. For instance, in paragraph 4.30 (page 29) there is an assumption that New Zealand will have a large fleet of electric vehicles that could become the largest source of demand-side flexibility, overtaking hot water cylinders. Several problems could arise with this scenario:
  - a) forecasted levels of EV fleet saturation are not achieved;
  - b) owners choose not to run-down their battery quicker by providing it to the grid; or
  - c) EV technology is overtaken by superior transport technologies that are not electric (e.g., alternative fuels).

### *Key driver 3: Changes in operational technology*

18. We agree that a 'system-of-systems' will emerge and that new operational controls will need to become more automated. The Authority will need to monitor and manage the pace at which the operational technologies are employed.

### *Key driver 4: Changes in information technology (digitisation and digitalisation)*

19. We agree that digital tools will improve the performance of the power system over time, and that data exchange across the system will require robust cybersecurity and privacy practices to provide consumers with confidence and protection.
20. The expected new data exchanges provide impetus for large investments in servers, IT infrastructure, workforce and capabilities that ought to be planned for. However, we caution against investment in IT that takes away from investment in fuelling the power system at the source. Such decisions will require coordination between generators and suppliers of energy, which the consultation speaks to in its final section.

#### *Key driver 5: Climate change and extreme weather events*

21. This driver is possibly the most important because climate policies will give preference to weather dependent electricity generation, which is by nature more prone to the impacts of extreme weather, thus the future power system will be more volatile.

#### *Key driver 6: Electrification of the energy system*

22. The increase in demand for electricity driven by the expected electrification of transport and process heat is uncertain, as is the pace in which that electrification will occur. We encourage the Authority to continue modelling of demand on a regular basis and exercise caution in building new transmission ahead of consumer-driven changes.
23. As discussed earlier, consumer behaviour is not always rational or predictable, and technologies can evolve rapidly and in many directions at once. It would be prudent to monitor the transport fuels sector closely over the next few years while the markets for EVs and alternative fuels mature.
24. Prematurely building additional transmission and capacity risks locking in a technology or predicting consumer behaviour that does not endure.

#### ***Challenges of coordination in network planning are a future issue***

25. We are not aware of evidence that there is currently a coordination problem worthy of intervention. However, as the power system evolves to include more actors and more layers of data and interdependencies, coordination problems are likely to occur. For that reason, we are supportive of the Authority developing a problem definition based on the key drivers identified in the consultation paper. It would be premature to develop options for problems that might exist in future, when it has not been established that there is a sufficient problem.
26. New Zealand's single jurisdiction means that we can avoid many coordination problems experienced overseas where there are multiple states and a federal legal system to plan for and navigate.
27. We think it is best to avoid adding complexity to the electricity system, which is already very intricate. However, using exploratory scenarios would help ascertain the boundaries of feasibility in an uncertain future. A useful example is the BEC2050 Energy Scenarios<sup>1</sup> which showed two different and equally plausible scenarios of New Zealand's energy future out to 2050 to help us think about the range of trade-offs and choices we might need to make as we have rapidly changing patterns of energy use and technologies.

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<sup>1</sup> [BEC2050 Energy Scenarios – MARKEL | BusinessNZ Energy Council](#)

***Conflicts of interest are not apparent but could be a future issue***

28. We repeat the flavour of the above on this issue. We are not aware of any current conflicts of interest. If monitoring reveals an issue then a problem definition would be the sensible starting point before options for intervention.
29. Again, we suggest that scenarios could help if a problem is identified in future.

**Conclusion**

30. We thank the Authority for the opportunity to submit on the future operation of New Zealand's power system. We would be happy to discuss any of the contents with you if that would be helpful.