Energy Resources Aotearoa
POWERING A BETTER NEW ZEALAND TOGETHER

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Submission on *A regulatory roadmap for battery energy storage systems (BESS)*

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 consultation relates to the Electricity Authority's (the 'Authority') early thinking about a regulatory roadmap for battery energy storage systems ('BESS').

Key messages

3. There is no silver bullet that will solve all our energy security needs. All options need to be on the table. New Zealand needs the right regulatory frameworks to let market participants determine the best source of energy storage. In that context, long-duration, large-scale energy storage and thermal peakers must be at the forefront of the Authority's thinking. Only large scale, centralised batteries and generation have the potential to provide grid stability, over a 24/7 period of a week or more, when the wind, rain and sun cannot deliver secure electricity.

4. For large-scale energy storage, we think there could be useful information in the NZ Battery Project, in particular, options that were cast aside when chasing an implausible goal of 100% renewable electricity by 2030.

5. New Zealand will need a range of battery options, from small-scale (household size and the 2MW+ batteries that can support a township or rural area) to larger scale peaking and firming assets that can run on multiple fuels. Access to fuels is critical and requires a fuel agnostic approach to policy.

6. New risks associated with a complex, bi-directional electricity grid will need to be anticipated, mitigated and carefully managed. Batteries will play an important role but the smaller-scale options introduce new challenges to energy stability and reliability. New Zealand is at the leading edge of this; we do not want to go too fast and hard and end up over the ledge. We want the world to learn from our successes rather than our mistakes. We are inventing the wheel for others to follow.

7. We support the cross-sector collaboration signalled in the discussion document as necessary to manage the challenges BESS will bring. We are especially pleased to see a strong focus on collaboration with industry bodies, like ourselves.

Submission

8. As described in the discussion document, the future electricity grid will be bi-directional, running on a mixture of wind, solar, hydro-electric power (lakes will be kept high and may be spilled), natural gas and coal generation, and supplemented with batteries, including town-sized BESS, rooftop solar, and home-charged electric vehicles (EVs).

9. We see this future system as highly complex and risky. With a large proportion of generation and flexibility that cannot be modulated to match demand, this future system will be prone to inertia problems, which can cause grid stability issues.

10. Backup storage and fuel will be needed to firm the system during periods of peak demand. New Zealand needs better options for firming over longer periods of time, roughly for a week or more, during winters when the lakes are low, or in summer when there is low wind and lots of cloud. We need a range of storage solutions (not just BESS), in the form of:

    a thermal generators or 'peakers';

    b fuel for those thermal peakers such as natural gas, diesel, pellets, or coal (bio-alternatives may be available in future);

    c stored gas (LNG is a potential future option) and its associated infrastructure;

    d batteries or BESS – small *and* large-scale (we recommend that another look be taken at options previously discarded, such as air storage); and

    e hydroelectric power (if it has rained sufficiently to keep the lake levels high).

11. This highly complex future system cannot be left at the mercy of the weather, nor can the government expect households and businesses to conserve energy or offer it back to the grid, even if compensation is offered. The future system must be adequately planned for so that New Zealand does not continue to face an energy crisis every winter.

12. Smaller scale batteries and two-way grid electricity flows are all well and good in theory but in reality, cannot alone solve the increasing problems of weather-dependency that our highly renewable electricity system creates. The grid is increasingly becoming an ecosystem as more diverse and intermittent supplies of energy are connected to it.

13. We see several key risks that will need to be managed:

    a grid stability will be difficult to maintain as bi-directionality introduces problems with synchronicity;

    b access to capital and resources may not be cheap or plentiful, and technologies may not get cheaper as predicted;

    c digital services, grid connections, standards and specifications may not keep pace with demand for, and complexity of, the grid;

    d rooftop solar and EVs may not be widely adopted; and

    e large-duration energy storage, or peaking plant, may not be delivered if it cannot be made economically viable. Sovereign risk is a major drawback for investment and the government must make coherent, bipartisan decisions for the public good.

14. We are disappointed that the discussion document does not mention new peaking plants in its work programme. This is a key source of stability, along with long-duration energy storage, which both connect to the central grid. As we have said above, all options need to be on the table.

15. Too much focus on decentralised energy sources and bi-directional flows to and from the grid will take away the focus needed on stability and reliability of the electricity system. We wrote to the Authority with our views on decentralisation in June 2025 – see our submission here.

16. Below we provide additional information under some of the key topics listed in the discussion document in which we have the most interest.

Sectional responses to the discussion document

Different sizes of BESS bring different challenges and opportunities

Small-scale BESS

17. We think consumers will enjoy the choice and optionality that small-scale BESS will bring. We also agree that multiple small-scale batteries will cause power quality issues if not properly managed. Needing different regulatory settings for different sized batteries is a serious issue for the Authority to prepare for. We share the enthusiasm for consumers having new and non-networked opportunities to participate in the power system.

18. Regulations must be able to keep pace with technology. While New Zealand's EV uptake peaked in 2023 and is not expected to recover in 2025, geopolitical risks could alter that picture and see EVs regain their popularity, even without subsidies. We support the Government's focus on EV charging as another source of energy security and choice, but regulatory enablers are the real key to unlocking the benefits that small scale BESS can provide.

Large utility-scale BESS

19. Large scale BESS are new in the New Zealand context, the first began operating in 2024. Future projects are expected and will also connect to the grid and Transpower appears to have a clear view of the pipeline.

20. We would like to encourage the Authority to maintain a broad and open view of technologies that could form a large-scale BESS. Thermal fuels will be needed well into the future for peaking plants. Coal is likely to be needed at Huntly, at least until biomass pellets are available. Other technologies that run on renewable energy are available, and suitable, for the New Zealand context.

21. Some considerations to be aware of are the geographical constraints on building a battery, not just where it connects to the grid, but how it fits with the landscape and draws on natural resources.

Learning from NZ Battery Project (not included in the discussion document)

22. It would seem sensible to learn from work already carried out on batteries, using the term 'battery' to describe large-scale energy storage solutions. The NZ Battery Project (the 'Project') assessed technologies against criteria that would protect New Zealand during a 'dry-year'.

23. The dry-year criteria set a high bar (and were set in a context of achieving 100% renewable electricity by 2030, which has rightfully since been abandoned). We think the criteria and technology assessments could be re-examined and the technologies potentially re-assessed using new criteria that is aimed at stabilising the grid in the context of 'decentralisation' and bi-directionality.

24. The Project discounted many worthwhile options that could help New Zealand's future grid stability in the future.

25. Emerging technologies, such as liquified air technology, have been dismissed in recent years through the NZ Battery Project,[1] but should be considered among the potential solutions for the future electricity system. These can have significant advantages over traditional 'batteries' such as pumped hydro. Liquefied air technologies are not strictly 'batteries' but behave like one. They are aimed at stabilising the grid in a context of 'decentralisation' and bi-directionality. A single system can provide up to 200MW as an affordable, renewable, modular, and locatable long-duration energy solution. We encourage the Authority to consider all options and fuels as potential solutions.

Industry bodies

26. It is heartening to see two sections in the discussion document dedicated to the collaborative work between the sector and industry bodies. We are such a body, and we lead work that supports workforce capability for the future energy sector with a long-term view of skills, training and jobs.

27. Recently, Energy Resources Aotearoa announced its partnership with the Electricity Engineers' Authority (EEA) to deliver a nationally coordinated energy workforce strategy and action plan, aligning industry, education, and government.

28. This partnership aims to attract, develop, retain, and connect the talent and skills required to power New Zealand's energy future, supporting sector growth, inclusive career pathways, and stronger collaboration across the energy ecosystem.

29. We would like to see this included in the list of collaborative work in the Authority's roadmap.

[1] The *NZ Battery Project* published a report by WSP in 2022 that found air storage systems not to have ranked as highly as other technologies. However, that information is out of date and overlooks some good options for today's context. See Other Technologies Feasibility Study – Options Analysis Report page 17, and 148. See also an air storage alternative that is now available and could be produced cheaper, in almost any location. Technology | Highview Power.

Concluding remarks

30. The regulatory roadmap for BESS needs to be focused on attracting more flexible generation and long-duration energy storage into the market. If this is not the priority, New Zealand will increasingly face a future that depends on the weather, or reducing economic output and energy use, to have energy security.

31. In our view, this means a regulatory work programme that commits resources to finding and reducing barriers to investment *in all technologies and fuels*. It is vital that the Authority communicates clearly its agnosticism to technology and fuel. Our country cannot tolerate further demoralising of thermal fuels, and deterring investment in them and their associated infrastructure, when New Zealand so clearly depends on them for energy security, and for the continuation of our industries and regions. Batteries will play some part, but they cannot do it all.

32. Technologies are emerging and improving all the time. We encourage the Authority to review the technologies in the NZ Battery Project to ensure that no technology is ruled out that should not be. We have seen a prime example of this in air storage. Contrary to conclusions in 2022 through the Project, liquified air storage is not geographically constrained, nor will it cost upwards of $16 billion to build.[2] Air storage was ruled out on those grounds in 2022, and we urge the Authority to revisit the technology and pricing that is available today.

33. We thank the Authority for the opportunity to submit and would welcome any questions or discussions.

[2] This was the projected cost for a pumped hydro scheme at Lake Onslow.