Ara Ake
Future Energy Development

Ara Ake submission to the Electricity Authority Te Mana Hiko:

Working together to ensure our electricity system meets the future needs of all New Zealanders, 25 June 2025

Tēnā koe,

Thank you for the opportunity to comment on this green paper outlining the opportunities and challenges of a more 'decentralised' electricity system.

Our submission will cover three key points:

1. Support for the Authority's exploration of the changing nature of our electricity system
2. Ara Ake experience with exploring this new 'decentralisation' paradigm including:
    a. What we've heard from innovators and community groups
    b. Pilots and commercialisation support examples
3. Ara Ake proposal that the Authority explores true regulatory sandboxing

Please consider our earlier verbal feedback as part of this submission. We are happy to support further work and exploration of this topic.

Ara Ake and our role in the energy sector

Ara Ake's purpose is to accelerate the demonstration, commercialisation, and deployment of energy innovation to support New Zealand's transition to an affordable, resilient and sustainable energy future.

We have three strategic priorities for our current work programme: *sustainable molecules; energy resilience and distributed flexibility*. These areas represent domains where New Zealand has a critical need to drive energy innovation to meet strategic national priorities. The latter two align closely with the topic explored in this 'decentralisation' green paper.

We provide commercialisation support to New Zealand innovators, set up testbeds and pilots, provide research and insights, adopt and adapt global innovations and carry out Ara Ake Challenges[1] to unlock impact across these strategic priorities.

Our work sits alongside the Electricity Authority's work programme and priorities. In setting up pilots and testbeds, running Challenges, or adopting new innovations, our stakeholders can encounter market and regulatory barriers that inhibit innovation. We have shared insights on these barriers, as they are uncovered in the course of our work, with the Authority. Following the launch of the Power Innovation Pathway late last year, Ara Ake has been able to collaborate even more closely and take advantage of a more seamless feedback loop with the Authority.

[1] Working directly with industry, communities and energy-sector organisations to clearly articulate problems faced in the energy transition and collaborate with innovators to develop solutions to these problems. See: EDB Challenge; Queenstown Flex Challenge; National Flex Discovery Challenge/Fund.

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Support for the Authority's exploration of the changing nature of our electricity system

We are strongly supportive of the Electricity Authority's exploration of changing nature of the electricity system in this green paper and inviting feedback from both traditional electricity stakeholders and less typical stakeholder groups such as councils, civil defence groups, iwi and hapū leaders, community groups, businesses and investors. These groups are becoming the owners and operators of distributed energy resources (DER) and want a say in how these devices are integrated with the electricity system. As electricity consumers, many Kiwis also want more of a say about the service they receive.

As the pace of the energy transition picks up, a new paradigm for thinking about our electricity system is needed. As New Zealand's energy innovation centre, Ara Ake welcomes the Authority's green paper inviting feedback from diverse stakeholder groups. We acknowledge the framework for thinking about a more decentralised electricity system (Figure 4, page 9) and the opportunity statement for thinking about this topic (page 15) as an excellent starting point for further work.

Ara Ake experiences exploring this new 'decentralisation' paradigm (a response to Question 5)

Energy resilience

Despite significant cost reductions in distributed energy resources such as solar panels, batteries, and electric vehicles over the last few decades, their uptake in New Zealand remains low. In Australia, 33% of homes have rooftop solar and some communities already exceed 50% saturation following government subsidies[2]. This compares to just 3.1% penetration in New Zealand[3].

A recent report by Rewiring Aotearoa modelled the cost of rooftop solar as already significantly lower than grid-based electricity in terms of delivered energy.[4] This price difference is only likely to increase in the future as economies of scale continue to drive solar costs down.

Ara Ake has learnt from multiple consumer groups and communities, including marae trustees, iwi, community housing groups, councils and council organisations, energy innovators and community energy projects, that they would like to be able to manage locally owned renewable energy generation, share the benefits of it, and reduce energy bills across their community.

While DER offer consumers greater choice and energy bill reductions over the long-term, there are further applications and opportunities for community- and consumer-owned DERs:

- Remote and isolated communities can benefit from the development of community energy projects in the form of islanded/hybrid micro-grids. Benefits include greater resilience during natural disasters or extreme weather events with reduced risk of being cut off due to weather; locally sourced generation with lesser electrical losses; greater choice and control and; more affordable energy over time.

[2] Australian household adoption of solar photovoltaics: A comparative study of hardship and non-hardship customers
[3] Electricity Authority - distributed generation trends up to 31 May 2025
[4] Rewiring Aotearoa – Electric Homes report

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- The ability to share locally produced energy between customers, known as peer-to-peer trading or sharing, is of great interest to consumers, particularly collectives like iwi Māori, retirement homes, apartment blocks or other community or social housing entities.
- With more flexible and controllable resources being available at the consumer level, the market can adopt solutions such as Multiple Trading Relationships, to enable consumers to choose more than one electricity service provider at their household, organisation, or business (e.g. one for exporting solar, another for charging EVs, for example).
- Opportunities emerge to deploy aggregated and flexible DER solutions (such as Virtual Power Plants) as more cost-effective alternatives to traditional transmission and distribution infrastructure investments.

Given the increased economic and environmental resilience requirements and the need for an equitable and sustainable transition, Ara Ake has played an important role in piloting innovative and flexible DER applications within communities and exploring mechanisms to encourage DER uptake. (See table below for examples). Regulatory and market frameworks also need to evolve to encourage and support these trends so that electricity remains affordable, resilient and sustainable, as laid out in this 'decentralisation' green paper.

Ara Ake energy resilience projects underway	
Kāinga Ora Multiple Trading Trial[5]	Separation of import and export registers at installation control points (ICPs) where solar has been installed on 160 Kāinga Ora (KO) properties in Wellington, allowing KO to capture the value of excess solar electricity being exported to the grid and benefit other customers facing energy hardship. This trial is enabled by regulatory exemptions granted by the Authority in 2023/24.
Franklin Energy Sharing Trial[6]	Off-market peer-to-peer trading to be enabled in Franklin. Counties Energy has funded a solar panel and a recycled community-scale battery at its headquarters in South Auckland to provide energy credits to local charitable organisations. Regulatory exemptions are currently being considered by the Authority. (Green paper case study 2, page 24)
Community Energy Activator[7]	The Community Energy Activator is a collaborative initiative between Ara Ake, Orion Group and the Community Energy Network, aimed at empowering communities to establish resilient energy projects. Based on the Ara Ake Community Energy How-To-Guide, it offers a curriculum that helps individuals and groups develop project plans and business models, ensuring the long-term success of community energy initiatives.
Queenstown Electrification Accelerator[8]	The Queenstown Electrification Accelerator is led by Rewiring Aotearoa with support from Ara Ake, Destination Queenstown and Queenstown Lakes District Council. It is a local, dedicated team of electrification experts working to enable the rapid electrification of businesses and homes, as well as the uptake of flexible DER and their effective integration into the local electricity system in the region to address resilience and affordability for customers.

[5] Kāinga Ora Multiple Trading Trial
[6] Franklin Energy Sharing Pilot
[7] Community Energy Activator
[8] Queenstown Electrification Accelerator

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Distributed flexibility[9]

Electrification of the energy sector to achieve climate targets will see demand for electricity grow in coming years. Meanwhile electric vehicles, rooftop solar and batteries are making electricity flows more bi-directional and decentralised, eclipsing the conventional unidirectional flow of electricity from large, centralised generation sources through to consumers. The transmission and distribution infrastructure that supports electricity flows will need investment and upgrades, or alternative solutions to manage DER integration and intermittent large-scale renewable generation.

Distributed flexibility gives New Zealand households, organisations, businesses and communities choice and can enable them to play an active role in the energy transition by managing intermittent renewable supply, reducing or shifting daily demand peaks and minimising long-term system investment needs. It also helps Kiwis to get more value out of an investment in DER and ensure these technologies can be integrated safely into our electricity system and markets.

A key challenge and opportunity is to develop markets and systems which make it easier to unlock the value of DER and flexibility. The level of investment in distribution and transmission networks forecasted, up to NZ$42 billion in the 2020s according to analysis by Boston Consulting Group, is likely to result in significant increases to consumer electricity bills.[10] Distributed flexibility offers alternatives to reduce the levels of investment required and minimise increases to end-consumers' bills.

Ara Ake has played a leading role in accelerating the commercialisation of flexibility business models and innovations in New Zealand. We are a trusted expert on these issues and seen as a key player in this field. Our contributions have included demonstrating how Virtual Power Plants made up of household solar and battery systems can contribute to supporting low residual capacity events at the national level, in collaboration with SolarZero and Transpower, the System Operator.[11]

We have also supported innovators' efforts to make flexible DER more visible and discoverable to the energy system via open-access flexibility platforms, particularly to potential procurers of flexibility, such as Transpower and electricity distribution businesses.[12] Ara Ake has supported the deployment of an internationally proven Localflex trading platform, delivered in New Zealand by Our Energy in partnership with international energy trading software leader, EPEX SPOT.[13]

[9] Flexibility is the modification of generation injection and/or consumption patterns, on an individual or aggregated level, often in reaction to an external signal, to provide a service within the electricity system. Practically speaking, flexibility is available in some devices already, such as smart solar inverters that can lower generation output; battery storage systems, including those in EVs, that can either charge/discharge and; equipment, such as electric vehicle charge points, space and water heating, ventilation and air-conditioning, machinery can turn down, on or off.

[10] Boston Consulting Group – The Future is Electric

[11] Winter Peak Innovation Pilot

[12] Project Flexviz and Transpower Flex Visibility Project

[13] Our Energy Localflex New Zealand

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See table below for a summary of some of our key flexibility innovation pilots and commercialisation support.

Ara Ake distributed flexibility projects underway	
Flexviz[14]	An OpenADR-based platform developed by Kiwi innovator Cortexo that connects flexibility suppliers onto a common platform, enabling real-time visibility of available flexibility resources at grid-exit points around New Zealand.
Transpower Flex Visibility Project[15]	In 2024, Transpower, Cortexo and Ara Ake partnered to integrate the Flexviz platform with Transpower's Flexpoint (OpenADR-based) and provide visibility through to the System Operator control room
Winter Peak Innovation Pilot[16]	Ara Ake, Transpower and SolarZero partnered in winter 2023 to demonstrate that residential solar batteries can be dispatched into the wholesale electricity market, via Dispatch Notification Load, to address winter peak events where the forecast capacity residual is tight.
LocalFlex[17]	Our Energy has partnered with international platform provider EPEX SPOT to adapt and roll-out of an internationally proven flex trading platform in 2025 and 2026, with several EDBs. This will streamline contractual engagement; and establish consistent and transparent ways of transacting local flexibility.
Farmlands Flex[18]	Blackcurrent has partnered with Farmlands to help rural businesses reduce their reliance on fossil fuels by bringing solar, batteries, and smart software onto the farm. It works by managing on-farm energy as a microgrid, so that farmers can make better use of their DER investment and take part in demand response – unlocking new opportunities to earn income.

These projects all utilise digital tools like software platforms, data tools, common communication protocols and remote operation of DER ("smart" devices). Decentralisation of the electricity system will necessarily require rapid digitalisation. To this end we welcome the publication of the Authority's digitalisation green paper in tandem with its decentralisation green paper. We also support the inclusion of digitalisation as underpinning the framework for thinking about a more decentralised electricity system in this the green paper (Figure 4, page 9).

Unlocking the flexibility value stack and new revenue streams to commercialise flexibility solutions will also require changes to our current regulatory and market settings. This topic is explored further, from the flexibility innovators' perspective, in our white paper: *Barriers to flexibility uptake from the innovators' perspective.*[19]

Ara Ake proposal that the Authority explores true regulatory sandboxing

A key finding from our white paper, *Barriers to flexibility uptake from the innovators' perspective,* and a request Ara Ake has heard in other contexts, is that a true exploration of market and regulatory redesign for a decentralised electricity system is not possible under the current

[14] Project Flexviz
[15] Transpower Flex Visibility Project
[16] Winter Peak Innovation Pilot
[17] Our Energy Localflex New Zealand
[18] Farmlands FLEX
[19] Barriers to flexibility uptake from the innovators' perspective

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settings. Innovators would welcome opportunities to test and trial new technologies and business models, as well as new policies or rules, in "regulatory sandboxes."

The UK has pioneered the use of sandboxes in many sectors to support innovation, including energy, transport and aviation. This provides useful examples we can draw on in the New Zealand context.

In previous discussions, the Authority has indicated that it considers a regulatory sandbox as simply a list of exemptions from the Code provided by innovators and project participants. Each electricity market participant involved is responsible for applying for exemptions from clauses in the Code. The Authority then provides feedback on whether the list is well-defined and complete.

Following an initial informal consultation period, and once applications are submitted, the Authority has moved from a position where decisions might take six months to being able to provide a decision within 6-8 weeks. We would like to recognise the incredible effort to move at pace and support innovation that this change in decision-making timelines represents.

Yet, obtaining regulatory exemptions for project collaborators remains a lengthy and resource-intensive experience – for both the Authority and project participants. It's also quite bespoke.

We propose that the Authority now takes a more proactive approach, working with Ara Ake and key stakeholders to define a regulatory sandbox as a space where new business models, technologies and policies can be deployed and used in a way that is safe and responsible, including engaging with real-world consumers. This would be open to multiple innovators at any given time.

Given the current interest in decentralisation and digitalisation at the Authority, working on defining an environment where a fully decentralised and digitalised electricity system could be redesigned, trialled and tested, would unlock significant innovation and learnings. As the regulator you would take on a leading role to provide guidance, exemptions and regulatory support to multiple innovators within this sandbox. This seems like a next logical step for the Power Innovation Pathway programme. We would welcome a conversation with your staff to explore this idea further.

Thank you for this opportunity to provide feedback.

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