A submission on the Electricity Authority's Green Paper 01-A: Working together to ensure our electricity system meets the future needs of all New Zealanders

Summary of the re:generations partnership submission

- We agree with the broad definition of a decentralised electricity system, but query:
  - What scale of shift from centralised to decentralised is envisaged?
  - What does the transition pathway look like?
  - What role does geography, scale, ownership or purpose have in defining a decentralised electricity system?
- We agree with the summary of potential outcomes and benefits from decentralisation, and suggest additional potential systemic benefits:
  - Increasing energy awareness among citizens.
  - In conjunction with the electrification of fossil fuelled machines, enabling a decentralised **energy** system.
- We agree with the outline of possible challenges to unlocking the benefits of decentralisation, we offer insights from our personal experience of trying to establish a small solar farm, and we suggest:
  - The role of competition in creating a decentralised electricity system should be considered carefully.
  - Power asymmetry is likely to be an obstacle and may need to be addressed.
- We think that the articulated opportunity statement for a more decentralised electricity system is a great start, but it might be worth being more explicit that the objectives are:
  - To address the electricity trilemma.
  - Specifically, to enable decentralisation to address the electricity trilemma.
  - To empower citizens to become active participants in the electricity system through decentralisation.

Our working assumptions

- Decentralising the electricity system is a good idea because it will help address the electricity trilemma.
- It is plausible that competition in the Aotearoa New Zealand electricity market might hamper some of the system-wide collaboration required to fully and swiftly realise the benefits of decentralisation.
- Only renewable distributed electricity generation can address the trilemma. Distributed electricity generation from fossil fuels or nuclear technology will not deliver environmental restoration.
- Renewable electricity is a potentially misleading term. It is the primary energy source such as sunlight or wind that is renewable. The machines that we use to capture it such as photovoltaic panels and wind turbines are at best rebuildable and at worse single use.
- Electricity currently constitutes only around 25% of Aotearoa's total energy consumption, with the balance of energy still coming from fossil fuels. We believe that electrification of fossil fuel machines will deliver benefits to Aotearoa New Zealand and this means that the electricity system must grow. Decentralising electricity generation and storage is a resilient and rational approach to this growth and provides a pathway to decentralising our broader energy system, which would be highly beneficial. Accordingly, it is important to be deliberate in the use of the terms electricity and energy. They are not necessarily interchangeable.

Who are the re:generations partnership?

re:generations is a partnership between Roger and Melissa Robson-Williams and Nature to explore how to be more regenerative than extractive in the ways we grow much of our own food, fibre and fuel, restore native bush on our property, manage waste, and generate a surplus of renewable electricity. It was created to deliver environmental and social benefit for current and future generations of humans and other species living around Oxford, Canterbury. Roger works as a Chief Sustainability Officer and Melissa as an environmental scientist.

A systemic view of the purpose of the electricity system and its implications for decentralisation

The challenges and opportunities facing decentralisation of electricity in Aotearoa New Zealand will be shaped by the overall **purpose** of the system of generation, storage, distribution, and retail. It may be slightly hyperbolic to suggest that the current system of disparate businesses appears unified only by a common interest in creating short term financial value for shareholders from electricity. However, at best, it isn't obvious that the all the entities in the electricity system are working **collectively** towards a clearly articulated common purpose.

If we dig a little deeper, we find that individual organisations generally have statements of purpose that appear to align broadly with the worthy goal of resolving the electricity trilemma (environmental sustainability, security, and equity). Here is a random sample of purpose statements copied from relevant web pages on 22 June 2025:

- *Clean Energy for a Fairer and Healthier World*.
- *Committed to delivering reliable, sustainable energy, we prioritise transparency, community engagement, and innovation*.
- *Powering a cleaner and brighter future with our community.*
- *Powering a sustainable and thriving Aotearoa*.
- *Our purpose is to enhance New Zealanders' lives, prosperity and environment through electricity.*
- *To empower the energy future for New Zealand – a future that delivers a net-zero carbon economy and a reliable and secure electricity system*.
- *We're helping to move Aotearoa to a low-carbon future, powered by renewable energy.*

Is it possible that in some cases meaningful expression of these good intentions can fall foul of a key system setting: the necessity to act in self-interest as individual businesses operating within a competitive market? Is it even possible to have an authentic whole-of-system purpose such as addressing the trilemma under such conditions?

If we assume for a moment that the implicit purpose of the electricity system is to address the trilemma, what effects might a competitive market have on achieving that goal? Specifically, how might competition impact the decentralisation of generation and storage in pursuit of environmental sustainability, security of supply, and equity of access?

- **Environmental sustainability.** Competitive markets (almost without exception) reward the externalisation of environmental and social costs wherever possible. This provides an incentive, perhaps even an imperative, for the unsustainable consumption of energy and materials and the disposal of pollutants at the lowest possible short-term financial cost. In the electricity sector, efforts to level the playing field with the emissions trading scheme are welcome but only partially address one dimension of the environmental impacts of

electricity generation. It is critically important to eliminate all forms of environmental harm because in the medium to long term, all economic activity is dependent on a healthy and stable biosphere. Unfortunately, the short-term imperative to survive in a competitive market, and specifically to meet financial performance expectations, almost always takes precedent over environmental sustainability.

- **Electricity security.** The electricity market in Aotearoa presumably offers certain incentives to some of the current incumbents to meet specific performance criteria relating to their part in the reliable supply and distribution of electricity. The nature and effectiveness of these is somewhat opaque to those outside the system. What is also unclear is whether the system as a whole has effective mechanisms to reward cooperative action on systemic improvements in electricity security. Could it even be the case that competition law might discourage this?

- **Equity.** At best, markets are agnostic to equity and fairness. It is often left to charities such as the stalled *Empower* initiative to intervene in the most egregious instances of electricity insecurity. If citizens cannot afford to pay for electricity, it seems plausible that what is frequently framed in terms of individual energy poverty is actually a symptom of structural energy injustice.

- **Efficiency.** An often-unexamined assumption is that competitive markets drive efficiency and that this is always a good thing. This may be the case for some dimensions of efficiency, especially when considered over short timescales and with narrow system boundaries. However, the pursuit of efficiency can be a race to the bottom as market participants are compelled to make ever-more strenuous efforts to externalise costs. Moreover, from an environmental standpoint, efforts to improve efficiency may in any case fail to deliver benefits due to Jevons Paradox. This is the phenomenon whereby improvements in resource use efficiency decrease the cost of that resource and thereby increase demand for it. Such efficiency gains can simply make previously uneconomic activities profitable at further cost to the environment.

Viewing competition through this lens calls into question the modus operandi of the Electricity Authority: *We work to achieve a **competitive**, reliable and efficient electricity market for the long-term benefit of everyone in New Zealand* (my use of bold for emphasis). Could it be that well-intentioned efforts to foster competition may inadvertently preclude, or at least severely hamper, the creation of a resilient, environmentally restorative, and socially just electricity system?

Question 1 from the Green Paper: Do you agree with the description of decentralisation? If not, why not?

We agree with the definition of decentralisation set out in this paper and we offer some additional dimensions for your consideration.

Paragraph 2.1 describes a **shift** from large-scale centralised generation to smaller scale renewables. In practice, it seems unlikely to be possible to totally displace the need for some large-scale generation in the short to medium term. So, in terms of total kWh of electricity production, perhaps it's more accurate to talk about a gradual augmentation of the current centralised generation with an increasing proportion of decentralised generation and storage? Or perhaps the aim **is** to bring about a total shift from centralised to decentralised generation?

This begs the question, is there a target for the proportion of electricity coming from centralised and decentralised generation over time? What does the augmentation, or transition pathway, ideally look like?

Also, how is a 'decentralised electricity system' more formally defined?

- By geography e.g., more spatially dispersed than current generation capacity?
- By scale of generation e.g., are megawatt-scale commercial solar farms considered centralised or decentralised?
- By ownership model e.g., community versus private?
- By business purpose e.g. for community benefit or for shareholder returns?

Question 2 from the Green Paper: Do you agree with the articulation of the potential outcomes and benefits from decentralisation for consumers? If not, why not?

We agree that decentralisation of electricity generation could make a significant contribution to addressing the electricity trilemma. The Green Paper sets out many of the benefits clearly.

An additional potential benefit arising from engaging citizens and communities as participants in the electricity system is that this is likely to grow understanding and interest which can, in turn, support efforts to be more mindful about where electricity comes from and how we use it.

However, there would be considerable merit in framing this discussion around creation of a decentralised **energy** system, not just a decentralised electricity system. Electricity makes up only a proportion (around 25%) of the nation's total energy use. The largest share comes from oil, mainly used for transport. Much of this transport could be electrified quite readily. Reframing as decentralising the energy system would dramatically scale the potential benefits of decentralised electricity generation and storage. These benefits would include significant emissions reductions, trade deficit reductions, reduced reliance on imported fossil fuels and so on. In short it could help to accelerate urgently needed action to transition all our machines from burning (mostly imported) fossil fuels to consuming electrons.

Question 3 from the Green Paper: Do you agree with the articulation of the possible challenges to unlocking the benefits of decentralisation? If not, why not?

The Green Paper clearly articulates many of the possible challenges to advancing decentralisation. However, it is silent on what may be a significant and problematic system dynamic: how individual businesses are compelled to respond in self-interest in a competitive market.

Additionally, it will be challenging to create an equitable operating environment in the electricity sector because there is such overwhelming power asymmetry between citizens and current incumbents. This includes access to capital to invest in machines for capturing renewable electricity, access to network connections and upgrades for exporting electricity, and access to the wholesale electricity market.

A side bar on our own solar farm ambitions

The re:generations partnership has direct experience of trying to establish a small solar farm with battery storage (around 100kW generation capacity and 50-100kWh of battery storage). Our intent was to add renewable generation to the grid, generate a small financial surplus to donate to Empower to alleviate some symptoms of energy injustice, and to provide a small source of

stored electricity for neighbours and the community in the event of a major outage. We joined the Orion/Ara Ake Community Energy Activator, which was an excellent forum for learning more.

We have put the project on hold for the time being for the following reasons.

- Despite the goodwill of our local lines company, it was not possible for us to establish even a ballpark figure for the cost of a new network connection without paying for design work.
- More importantly, we could not assess the likely feasibility of potential network upgrades to enable an increase in export allocation. Understandably, our lines company was required to charge us a design fee to do this investigation and that required us to specify what export allocation we were seeking. We wanted to understand if there was a sweet spot where an affordable outlay for some level of upgrade would provide an allocation that we could work within. We could not afford to pay for investigations covering a range of export allocation scenarios, so the discussion stalled.
- It was also unclear to us whether we would retain in perpetuity to the right to an increased export allocation if we funded any network upgrades. The issues of ownership and right of access to upgraded network infrastructure seems fraught.
- Regardless of uncertainty surrounding network connection and upgrade costs, it became clear that a solar farm on the scale we had in mind was highly unlikely to return even a modest financial surplus to donate to Empower.

Consequently, we have pivoted to a smaller, behind-the-meter system, scaled to work within our current export allocation, and including some modest battery storage. The latter is supplemented with a 'hack' that enables us to supplement the house battery with power from our EVs. We have learnt how important it is, from a financial perspective, to balance consumption and production across all phases of our three-phase supply. Without a house battery, we had found it very difficult to self-consume more than around 35% of our generation, taken as an annual average. Given the differential between retail import and export tariffs, the financial case for solar rests on self-consumption.

Question 4 from the Green Paper: Do you agree with the articulated opportunity statement for a more decentralised electricity system? If not, why not?

The opportunity statement in the green paper starts: *By 2040, Aotearoa New Zealand's electricity system has unlocked the affordability, decarbonisation, and security and resilience benefits of distributed energy solutions for regions and communities. This more decentralised system empowers people and communities, ensures fair and secure access to energy, and drives regional and community-led economic growth.*

Another way of phrasing this is: *By 2030, Aotearoa New Zealand has empowered its citizens to transition from being passive consumers of electricity to active participants in the electricity system. This has been possible by encouraging the decentralisation of generation, storage, distribution, and sale of electricity. The outcome is an equitable, resilient, and environmentally restorative electricity system.*

The proposed rephrasing puts 'the how' first: empowering our people, whether as individuals, community groups, or iwi. It then states the output from this: a decentralised electricity system. And lastly it states the intended outcome: resolving the electricity trilemma.

The proposed rephrasing deliberately omits reference to economic growth. This is partly because resolving the trilemma is justification enough. It is also because to date no economy

has meaningfully decoupled economic growth from the unsustainable consumption of energy and materials. A decentralised electricity system may help with decoupling but that is unknown and beyond the control of the entities that will deliver the decentralisation.

The enablers listed in the green paper are necessary but may be insufficient. A potentially important omission might be fostering collaboration among businesses in the sector and eliminating competitive behaviour that is inimical to resolving the electricity trilemma.

Question 5 from the Green Paper: What other feedback would you like to provide to input into the discussion on, for example: a) what a more decentralised electricity system might look like, b) how this might benefit consumers, and c) what might be needed to unlock these benefits.

Perhaps more emphasis could be placed on role of decentralised, renewable electricity generation and storage on the rapid electrification of fossil fuel machines i.e., the decentralisation of the energy system as a whole.

Perhaps our national discourse regarding 'renewable' electricity could usefully differentiate between the **renewability** of the primary energy source (sun, wind etc) and the **capacity to rebuild** the machines we use to capture it (solar panels, wind turbines etc)? Doing so might help draw attention to the capabilities and capacities needed to create a genuinely renewable electricity system that can be rebuilt.

It is also critically important to emphasise the benefits of reducing overall energy consumption. Undoubtedly there will be participants for whom their current energy consumption is inadequate for a good standard of living. Headroom needs to be created for their consumption to grow, while the rest of us find ways to reduce gross consumption.

To summarise, we would like to conclude by riffing on Michael Pollen's famous quote about food: *'Eat food, not too much, mostly plants'*.

Use electrons instead of molecules, not too many, mostly renewable.

Thank you for taking the time to read our submission on this important topic. We are available for any follow up discussions if that would be helpful.

Roger and Melissa Robson-Williams, re:generations partnership