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To whom it concerns:

I am grateful to Te Mana Hiko - The Electricity Authority for providing the opportunity to comment on the Green Paper: Working together to ensure our electricity system meets the future needs of all New Zealanders and seeking input on opportunities and challenges of a more decentralised system. I work on the energy transition, mostly for the United States, and based in New Zealand. Recently I was one of the participants of the roundtable discussion on a more decentralised electricity system, held at the Downstream conference on 22nd March 2025.

Questions for consideration:

1. Do you agree with the description of decentralisation? If not, why not?
2. Do you agree with the articulation of the potential outcomes and benefits from decentralisation for consumers? If not, why not?
3. Do you agree with the articulation of the possible challenges to unlocking the benefits of decentralisation? If not, why not?
4. Do you agree with the articulated opportunity statement for a more decentralised electricity system? If not, why not?
5. 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.
6. What other emerging case studies could we learn from?

I agree with the premise presented by the Authority that we need to explore descentralisation of the energy system as a solution to various goals: decarbonisation of the grid, resilience and emergency response, improved reliability and efficiency, cost reduction in the long term for the energy transition and its affordability and improvement of local economic development. The paper does a good job of explaining these benefits, and in a framework easy to understand: descentralisation, democratisation and digitalisation.

At the same time and despite all the benefits, the three Ds present various challenges that need to be overcome with policy guidance and regulatory structures. The paper does allude to these challenges and I would offer a few more comments:

- **Equitable Access**
  The high up front costs of the distributive energy resources, DERs–technologies such as solar panels, batteries, efficient and smart appliances, thermostats, power inverters, etc–and all the software needed is higher. Yes there are new models of community ownership and governance (with some economies of scale) but we need to recognise that these technologies are more expensive and consumers will need education,funding support (incentives, rebates, grants) and financial support (inclusive financial solutions).

  It is expected that the prices for these technologies will come down with more demand, batteries are a good example. Lithium - Ion batteries had the highest reduction (~20%) to a record low price last year.[1] However, they are still very expensive for most consumers, especially individual consumers and the period for cost recovery may not match the financial terms available. Furthermore, given that some of these technologies are also still new there is a higher perceived risk and the need for insurance or guarantees increases overall costs.

  The good news is that there are solutions for equitable access to DERs around the world and New Zealand can learn, analyse and adapt these models. There is a need for everybody to have access regardless of income, energy use, rental status or home ownership, single family house or multifamily buildings. Here some additional cases from the United States:

    - In **California**, there is a programme called **GoGreen Financing.**[2] It is a state-backed program designed to expand access to affordable energy upgrades with credit enhancements supported by electricity payers funds authorized by the California Public Utilities Commission (CPUC). The program partners with private lenders to reach participants. They offer low interest rates to disadvantaged communities.
      - These loan programs like GoGreen using electricity-payers (in California these are called rate-payers) are combined with tax-payers (California state funds) to support this transition. Loan programs should also attract private capital and other financial actors to provide guarantees / loan loss reserves when needed.[3]
      - GoGreen has been used to provide access to cooling systems, cool roofs, windows, HVAC ductwork and insulation. This is very important because DERs need to be additive to.combined with an energy efficient home to

[1] Bloomberg New Energy Finance (2024). https://about.bnef.com/insights/commodities/lithium-ion-battery-pack-prices-see-largest-drop-since-2017-falling-to-115-per-kilowatt-hour-bloombergnef/
[2] Go Green (2025). Website. https://www.gogreenfinancing.com/
[3] Go Green (2024). Quarterly Report and Program Status Summary. First Quarter 2024. https://www.treasurer.ca.gov/caeatfa/cheef/quarterly/2024/20240331.pdf

ensure optimisation of resources.[4] And more kiwi home owners are still in need for homes to be more efficient.

- In **North Carolina**, Roanoke Rural Electric Cooperative has pioneered a programme for people in their service territory to access clean energy: **Upgrade to Save.**[5] This program implemented by this rural co-op as electricity distributor eliminates the up front cost, and uses a payment mechanism in the electricity bill to recover all the costs.[6] This payment mechanism is known as Tariffed on-bill (TOB) or Inclusive Utility Investment.[7] It allows participants to procure efficient lighting, new heating and air conditioning systems as well as insulation projects to improve energy efficiency.

- **Regulatory Structure and Governance**

  The regulatory structure and governance of the current energy system will need to be modified to adapt to bring DERs fully. It is encouraging to see that there are already pilots in New Zealand that will inform the new structure for how the existing market will work with decentralised systems behind the meter (or in the customer side of the meter).

  There are many implications, but I will mention a few in particular:

  - **Modification of the regulated business models**

  All the incumbent actors in the current energy system operate to maximize their operations and value generated under the current rules. When new actors with DERs emerge they will compete with incumbents (generating on site or adding more flexibility) and will change the compensation for others (avoiding costs for new transmission projects or adding costs for new upgrades to local distribution infrastructure). These changes make necessary new business models rules so that there is buy-in from all actors and lower resistance for the integration.

  DERs will co-exist with existing energy sources and need to align with the grid and its needs (exporting when most needed to reduce peaks, winter rising costs for example). The integration is key to ensure a win-win-win (national / regional / local).

  - **New rate structures for the integration of new services**

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[4]Go Green (2024). Fiscal Year 2023-2024 Summary.
https://www.treasurer.ca.gov/caeatfa/cheef/fiscal-year-summary/fy-23-24.pdf

[5] Roanoke Cooperative (2025). Upgrade to Save Program. *This website is down currently*
https://www.roanokecooperative.com/faqs/upgrade-2-save/

[6] EETility (2019). With No Upfront Costs, This Innovative Financing Tool Makes Energy Efficiency Affordable To All
https://www.eetility.com/single-post/with-no-upfront-costs-this-innovative-financing-tool-makes-energy-efficiency-affordable-to-all

[7] U.S. EPA Inclusive Utility Investment. Under Energy Resources for State and Local Governments (2025) https://www.epa.gov/statelocalenergy/inclusive-utility-investments-tariffed-bill-programs This page can be discontinued under the current administration (June 2025).

There have been tariffs and rate structures that integrate solar from residential applications: Net Metering (NEM)[8] in the US is one of them, which in California is in the third iteration (NEM 3.0) from 2016. These regulations and rate structures are important because they determine pay back periods for investments in DERs (solar PV and now batteries) which could be a number of 10 or 20 years. Two of the main concerns with NEM are:

- NEM rate originally compensated customers at the retail electricity price but did not reflect true time-based or locational value of the solar generation. As a result solar export midday was too high and elevated the peak in the evening. New NEM 3.0 includes battery storage and smart rates for avoided costs (not just generation costs).[9]
- NEM rate (alone without inclusive financial support for solar) mostly benefited high income customers with single family homes who were able to take advantage of this rate to invest and install their own system. While non-solar customers (often lower income folks) have to bear a large share of the fixed costs of the grid (transmission and maintenance).[10]

New Zealand can learn from this evolution of these regulated rate structures and create certainty for investment not only to high income consumers but all types of customers. Two main ways to do this:

- **Integration and community approach:** Solar + battery applications (along with other DERs) need to be integrated in community projects where lower income households can benefit from high income households. Data management would be key. The solution has to include renters and households in multifamily units.
- **Smart rate structures:** rates for DERs that are attuned to time of use, aligned with the grid needs, are dynamic in nature, that reward flexibility and that account for avoided costs. These types of rates will create certainty to all investors, even community-owned residents as investors in their new DERs.

- **Access to data**

Access to data would be fundamental for DERs, community led projects will need to have the same savvyness, technical tools, and software platforms to participate in the market. Virtual Power Plans are actually improved data management systems with real time responses and those systems have lots of benefits but extra costs.

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[8] National Academy of Sciences. The Role of Net Metering in the Evolving Electricity System. (2023) https://nap.nationalacademies.org/catalog/26704/the-role-of-net-metering-in-the-evolving-electricity-system

[9] Haas School of Public Policy. Severin Borenstein. Guess What Didn't Kill Rooftop Solar. (2025) https://energyathaas.wordpress.com/2025/05/19/how-to-fix-the-solar-cost-shift

[10] California Public Utility Commission (2021). https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-modernizes-solar-tariff-to-support-reliability-and-decarbonization.

- **Governance of DERs**

This shift of governance: who makes decisions and how for DERs and community led projects is an important aspect of this transition. Shared ownership models, cooperative models, non-for profit models, and of course for-profit small enterprises should all be evaluated with pros and cons. Community grassroots groups know their communities best but they will need support in how to interact with the market and incumbent actors. Local governments (city councils, district councils in New Zealand) are best to support these local energy initiatives. At the same time, New Zealand has a long standing tradition for cooperatives to work and in the U.S. we have seen rural electric cooperatives, led by the cooperative principles, be innovative on DERs. Here are two cases for your information.

- **Community Solar Projects by Kit Carson Electric Cooperative (New Mexico):** Kit Carson Electric Co-Op achieved its goal of providing 100% of its daytime power with solar energy, marking a significant milestone in its commitment to renewable energy. Kit Carson Electric Coop collaborated with the Rio Costilla Cooperative Livestock Association (RCCLA), exemplifying the importance of community engagement in shaping renewable energy projects. The Community Solar project was planned with input from local stakeholders to ensure it aligned with community values and environmental considerations.[11]

- **Great River Energy (Minnesota):** Great River Energy - a generation and transmission co-op - partners with member co-ops to co-develop programs on Distributive Energy Resource (DER) integration, electric transportation, and cybersecurity, using a cooperative planning council made up of representatives from each member co-op to align on major investments and strategic initiatives.[12]

Final consideration

This transition to DERs is exciting. It offers many possibilities and benefits, while the complexities or challenges (regulatory structures, ownership, governance and equitable access) need to be explored further. A just energy transition provides the necessary options to reach all New Zealanders regardless of income, house ownership or rental status, living in farms, apartments or single houses, and at the same time a transition that provides economic development opportunities for all actors, incumbent and new.

Warmly,

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[11]Questa del RioNews. RCCLA and Kit Carson Electric Cooperative partner to build a storage facility. (2024) https://questanews.com/rccla-and-kit-carson-electric-cooperative-partner-to-build-storage-facility

[12]Great River Energy. (n.d.). Integrated resource plan https://greatriverenergy.com/electricity-sources/integrated-resource-plan/