MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EVENT BRIEFING

Meeting with Utilities Disputes Limited

Date:	9 April 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2581

Action sought		
	Action sought	**Deadline**
Hon Simeon Brown **Minister for Energy**	**Note** the contents of this briefing, to support your meeting with Utilities Disputes Limited on 11 April 2024 at 11am.	11 April 2024

Contact for telephone discussion (if required)			
Name	**Position**	**Telephone**	**1st contact**
Scott Russell	Acting Manager, Energy Use Policy	s 9(2)(a)	✓
Lorenz Magaard-Romano	Policy Advisor, Energy Use Policy	s 9(2)(a)	

The following departments/agencies have been consulted

Minister's office to complete:

- ☐ Approved
- ☐ Noted
- ☐ Seen
- ☐ See Minister's Notes
- ☐ Declined
- ☐ Needs change
- ☐ Overtaken by Events
- ☐ Withdrawn

Comments

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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EVENT BRIEFING

Meeting with Energy Disputes Limited

Date:	9 April 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2581

Purpose

To provide background information and talking points for your meeting with Utilities Disputes Limited on 11 April 2024 from 11 am to 11:30 am.

Recommendations

The Ministry of Business, Innovation and Employment (MBIE) recommends that you:

a **Note** the contents of this briefing, to support your meeting with Utilities Disputes Limited.

Noted

Acting Manager, Scott Russell
Energy Use Policy
Building, Resources and Markets, MBIE

09/04/2024

Hon Simeon Brown
Minister for Energy

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Meeting purpose and logistics

Date:	11 April 20204	**Time:**	11:00am-11:30am
Location:	EW 5.1		
Attendees:	Hon Heather Roy, Chair, Utilities Disputes Limited Neil Mallon, Commissioner, Utilities Disputes Limited Attendee biographies are included at **Annex One**.		

1. Utilities Disputes Limited (UDL) have requested this meeting to discuss the five-year independent review of the complaints scheme for electricity and gas providers. They have indicated they would like to discuss the following topics specifically:
    - the UDL Board's response to the recommendations from the review
    - matters from the report that are relevant to the energy portfolio, in particular the expansion of the complaints scheme jurisdiction to include new energy sources such as solar.
2. UDL is an important part of the energy market regulatory structure, and this meeting provides you with an opportunity to discuss how UDL can help you achieve your goals in this space.
3. UDL runs an independent energy disputes resolution scheme, the Energy & Gas Complaints Scheme, approved under the Electricity Industry Act 2010 (the Act). There are 368 scheme participants. UDL, and its predecessor the Office of the Electricity and Gas Complaints Commissioner, has been handling energy complaints since 2001, operating as a free dispute resolution service for consumers. The number of energy complaints received by UDL is increasing. In 2023 they received 4,468, which is up 21% on the previous year. It is funded by a combination of membership and complaint fees levied on participants.
4. Under the Act, electricity retailers, distributors and Transpower are required to be members of the dispute resolution scheme. The Minister of Commerce and Consumer Affairs is the Minister responsible for the approval of UDL as the dispute resolution scheme provider under the Act, as well as approval of the scheme's rules.
5. The Minister of Commerce and Consumer affairs was also provided with a copy of the independent review. The Minister was not able to meet with UDL but provided a written response which can be found in **Annex Four.**
6. UDL also operates three other dispute resolution schemes:
    - the government-approved Broadband Shared Property Access Disputes Scheme
    - a voluntary Water Complaints Scheme
    - a voluntary Telecommunications Service for broadband and mobile services.
7. The remainder of this briefing provides background information and talking points to support your meeting with UDL in relation to your energy portfolio.

Independent Review of Energy Complaints Scheme

Out of scope

Out of scope

UDL's jurisdiction in relation to solar and other emerging technologies

15. Consumers do not have access to a free dispute resolution scheme for some emerging technologies. UDL has raised concerns regarding the scope of their jurisdiction in the evolving energy sector and believes this scope should be expanded for the scheme to remain fit for purpose.

16. For example, UDL cites that they are regularly contacted by consumers who have concerns about solar providers that they are often unable to consider. UDL is only able to consider these complaints if the company that sold and installed the solar is connected to the provision of traditional energy services (such as retail, distribution, and transmission services). Similar issues may exist with other emerging technologies.

17. Consumers have some options for addressing complaints in these areas: they may be able to complain to the Sustainable Energy Association of New Zealand (SEANZ) which can investigate claims made against its members, however, SEANZ is a voluntary industry body and not all solar installers are SEANZ members. If there have been general breaches under existing legislation such as the Fair Trading Act 1986, consumers can take their complaints to the Disputes Tribunal or District Court, or make a complaint to the Commerce Commission if appropriate. However, UDL sees these as unsatisfactory. They believe they are costly and time consuming for consumers and that most consumers are not well equipped to manage this process without advocacy support.

18. The number of consumers using new technologies such as solar is expected to increase as New Zealand further electrifies. Electricity Authority figures show more than 53,000 residential ICPs now have solar power behind the meter and that number is growing, with close to 600 new installs each month.

19. The Australian Energy Regulator has taken action in this area, publishing a consultation paper in 2022 seeking feedback on options to reform the National Energy Consumer Framework. However, we note that the Australian Government ran significant programs (such as subsidies) to push for the increased use of solar, which resulted in higher installation rates than we have seen in New Zealand to date.

20. The jurisdiction of the Energy Complaints Scheme and the wider regulatory regime is specified in the Act. Any changes to the jurisdiction would require amendment legislation.

s 9(2)(g)(i)

21. Suggested talking points:

- s 9(2)(g)(i) [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Risks and mitigations

22. We have not identified any specific risks associated with this meeting.

Annexes

Annex One: Attendee biographies

Annex Two: Suggested talking points.

Annex Three: Copy of the UDL Independent Review

Annex Four: Minister of Commerce and Consumer Affairs response to UDL

Annex One: Attendee biographies

	**Hon Heather Roy, Independent Chair** Heather has served on the Board since 2014. She was a Member of Parliament from 2002 – 2011, including Minister of Consumer Affairs (2008-2010). She is a professional director, chairing several boards, and principal and director of boutique consulting company TorquePoint Ltd. Heather is also invited to commentate on political forums on radio and TV. Heather is also Chair of the Electricity Authority's Security and Reliability Council which provides independent advice on reliability of supply issues, the performance of the electricity system and the system operator.
	**Neil Mallon, Commissioner** Neil became UDL's commissioner in December 2023 after 3 years as deputy commissioner. He is a lawyer with extensive experience in complaints and regulation. Before joining UDL, Neil worked in Senior and General Manager roles and at executive team level for national regulatory organisations.

Annex Two: Suggested talking points

Independent review of Energy Complaints Scheme

Out of scope

UDLs Jurisdiction in regards to Solar and other emerging technologies

- s 9(2)(g)(i)
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Annex Three: Copy of the UDL independent review

Out of scope

Annex Four: Minister of Commerce and Consumer Affairs response to UDL

Out of scope

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EVENT BRIEFING

Meeting with solarZero and Aurora Energy

Date:	16 May 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2597

Action sought		
	Action sought	**Deadline**
Hon Simeon Brown **Minister for Energy**	**Note** the contents of this briefing ahead of your meeting with solarZero and Aurora Energy on 23 May 2024	23 May 2024

Contact for telephone discussion (if required)			
Name	**Position**	**Telephone**	**1st contact**
Tamara Linnhoff	Manager, Electricity Generation, Infrastructure and Markets Policy	9(2)(a)	✓
Maryam Bukhari	Policy Advisor, Electricity Generation, Infrastructure and Markets Policy	–	

The following departments/agencies have been consulted

Minister's office to complete:

- ☐ Approved
- ☐ Noted
- ☐ Seen
- ☐ See Minister's Notes
- ☐ Declined
- ☐ Needs change
- ☐ Overtaken by Events
- ☐ Withdrawn

Comments

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EVENT BRIEFING

Meeting with solarZero and Aurora Energy

Date:	16 May 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2597

Purpose

This briefing provides you with background information and suggested talking points ahead of your meeting with solarZero and Aurora Energy on 23 May 2024 at 4:00pm.

Recommendations

The Ministry of Business, Innovation and Employment recommends that you:

a **Note** the contents of this briefing ahead of your meeting with solarZero and Aurora Energy on 23 May 2024.

Noted

Tamara Linnhoff
Manager, Electricity Generation, Infrastructure and Markets Policy
Building, Resources and Markets, MBIE

16 / 05 / 2024

Hon Simeon Brown
Minister for Energy

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Meeting purpose and logistics

Date:	23 May 2024	**Time:**	4:00 pm
Location:	Your office		
Attendees:	Andrew Booth, Founder and Chair, solarZero Matt Ward, Chief Executive Officer, solarZero Eric Pyle, Director Public Affairs and Policy, solarZero Richard Fletcher, Chief Executive Officer, Aurora Energy Mark Pratt, General Manager Customer and Connections, Aurora Energy Glenn Coates, General Manager Asset Management and Planning, Aurora Energy Attendee biographies are included at **Annex One**.		

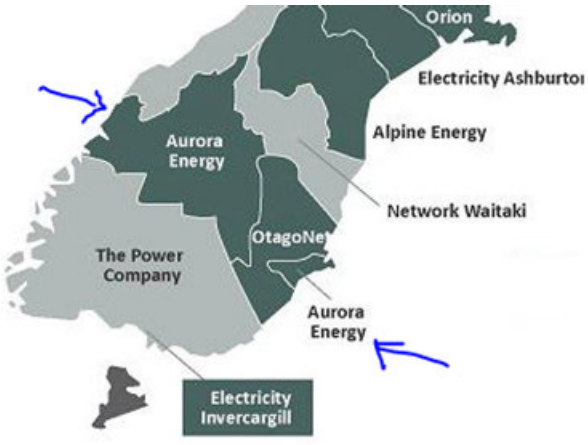
1. solarZero and Aurora Energy (Aurora) requested this meeting to discuss:
   - Their joint non-network solar and battery capacity projects in Queenstown and Upper Clutha area, opportunities for further cost savings by networks and related electricity issues
   - international examples of non-network solutions, from the United States of America (USA) and Australia, where distributed energy resources (DER) were utilised to defer network upgrades
   - their request for government agencies to support innovation and collaboration.

2. This meeting also provides an opportunity for you to discuss the opportunities for better use of DER to support security of supply and manage winter peaks, such as the tight supply situation that occurred on 10 May 2024.

3. solarZero is an installer (and owner) of residential solar photovoltaic panels (solar) and batteries with approximately 12,000 residential customers in New Zealand. solarZero provides the technology in partnership with Panasonic and it is owned by BlackRock Real Assets (BlackRock).

4. solarZero has two non-network solutions in Upper Clutha and Coromandel Peninsula. It is the world's first solar and battery storage provider to offer into the reserve market its batteries operating as a virtual power plant (VPP)[1]. Its batteries can be dispatched by Transpower as a peaker plant.

5. Aurora is one of New Zealand's largest electricity distribution business (EDB) with over 200,000 customers across Dunedin, Central Otago, Wānaka and Queenstown. Aurora comprises two separate distribution networks as shown below:



[1] A VPP is aggregation of solar panels and batteries located in different places connected to the grid to generate, store, and provide energy as and when needed.

6. Aurora is owned by Dunedin City Council (DCC), through Dunedin City Holdings Limited. DCC is considering the possibility of selling Aurora and is currently consulting publicly before making a final decision in May or June this year.

7. The remainder of this briefing provides background information and suggested talking points on these topics are included in **Annex Two**.

8. In the context of the Electrify NZ work programme, your office recently asked for information on solar / battery tech and how it works in the NZ market, and in particular background information on solar and battery uptake, trials and market arrangements. This information is included in **Annex Three**.

solarZero's non-network (solar and battery capacity) projects

solarZero's non-network (solar and battery capacity) project in Queenstown and Upper Clutha

9. In 2020, after a tendering process, Aurora partnered with solarZero to provide non-exclusive, non-network capacity support in the Upper Clutha region. This was the first time that Aurora had tendered via an open market for non-network solutions.

10. Under this partnership, solarZero is installing solar and battery storage on Aurora's customers' properties in Queenstown and Upper Clutha. solarZero's system enables it to coordinate the charging and discharging of individual batteries to manage peak network demand in those areas. Managing individual consumers' demand in this way is called a 'non-network alternative'. It avoids or defers the network investment otherwise needed to meet Aurora's growing peak demands in those areas driven largely by tourism and irrigation.

You could ask:

- *How much does a typical customer save if they have a solar and battery through solarZero?*

Trial with Ara Ake for virtual power plant to manage winter peak

11. Last winter, Ara Ake and solarZero developed the Winter Peak Innovation Pilot to trial aggregating solarZero's 10,000 residential batteries as a VPP to contribute to the national grid during winter peak. They worked with Transpower and the Electricity Authority to successfully onboard into Transpower's system. Ara Ake provided funding of up to $4 million and SolarZero contributed $10 million (MBIE is the funding source for Ara Ake).

12. Up to 30 MW of controllable load was made available by solarZero as part of its Ara Ake-funded trial. On Friday 10 May 2024, solar Zero also contributed 30MW via the VPP to national electricity supply.

13. During the 2023 trial, solarZero faced challenges in controlling and aggregating batteries located at multiple grid exit points (GXPs) due to the need to comply with the Electricity Industry Participation Code 2010 (the Code), grid voltage regulations, aggregation constraints, and customer enquiries.

14. As a result of the pilot, the Electricity Authority amended the Code to reduce barriers to participation for services that aggregate such resources.

You could ask:

- *What insights did you gain from last Winter Peak Innovation Pilot, and will solarZero offer it or trial it again in winter 2024?*
- *Are there any outstanding barriers to the use of solarZero's VPP to help manage tight supply situations?*
- *What did solarZero do with its DER systems on the morning of 10 May?*
- *As the electrification of the New Zealand transport fleet increases, what role do you see for EVs to support electricity supply in periods of high demand?*

International examples of non-network solutions

15. solarZero would like to talk to you about the following international examples of non-network solutions, where distributed energy resources (DER) were utilised to defer network upgrades.

Brooklyn-Queens Demand Management program in USA

16. The Brooklyn-Queens Demand Management Program began as a trial in 2014. It used aggregated distributed energy resources (DER) – for example, solar, batteries and electric vehicles – to manage anticipated shortfall in two substations in densely populated areas of Brooklyn and Queens, New York.

17. It deferred a $1.2 billion substation upgrade. By the end of September 2023, 61 MW of peak hour load relief was achieved, using approximately $131 million of an approved $200 million budget.

18. New Zealand's first similar DER project was undertaken by Vector in 2015/16 using batteries at its Epsom Zone Sub-Station. It was designed to delay upgrades to the substation to meet increased consumer demand. It proved to be a cost-effective alternative to delay network expenditure.

Australia's Project EDGE

19. Project EDGE (Energy Demand and Generation Exchange) was a research trial funded by the Australian Renewable Energy Agency. It provided insights into opportunities and barriers to DER integration and key considerations for policy development and reforms.

20. The Project highlighted that consumer-centric approaches are crucial for successful integration of DER. This includes communication and data transparency, helping consumers understand how VPP works, providing incentives to consumers to join VPPs, and providing consumers choices to join various programmes.

Funding for distributed flexibility resources

21. It is likely that solarZero may ask about funding opportunities from the Government. Possible funding options from the Ministry of Business, Innovation and Employment (MBIE) are the Community Renewable Energy Fund and Distributed Flexibility Innovation Fund. This latter fund was announced by the last government but has not been launched, pending Budget 2024 decisions.

Community Renewable Energy Fund

22. MBIE's $46 million Community Renewable Energy Fund (CREF) was launched in 2022 to enhance energy resiliency in communities and trial innovative ways to store and distribute locally generated electricity.

23. The design and delivery of the CREF was announced in September 2023. It included $6.5 million for solar and battery systems on approximately 60 community buildings in regions affected by Cyclone Gabrielle and other severe weather events.

24. These community resilience sites will receive grant funding to install solar and battery systems to support their resiliency and recovery. Officials are currently working with the selected site owners to execute contracts for the solar and battery. Some sites are already operating and most systems are expected to be installed and operational by mid-2024.

25. Post-confirmation of Budget 2024 decisions, officials will provide you with advice on the future delivery options of the remaining CREF funding in line with your priorities.

You could say:

- *I have already approved up to $6.5 million of funding for community resilience sites in regions affected by 2023 severe weather. I am continuing to take advice from officials on delivery options of the Community Renewable Energy Fund.*

You could ask:

- *Keeping the lights on is a top priority and I am interested in the potential of distributed energy resources to support security of supply during winter peaks. What are your views on how the Community Renewable Energy Fund could best support the development of distributed energy resources?*

Distributed Flexibility Innovation Fund

26. The Distributed Flexibility Innovation Fund (DFIF) was announced in September 2023 by the previous government to support DER trials. The fund was allocated a total of $20 million over 4 years via Budget 2023, was to be run by Ara Ake, and attracted substantial stakeholder interest including from solarZero and electricity networks.

27. The DFIF was designed to co-fund innovative industry-led and collaborative trials to show the benefits of DER in enhancing both security of supply and affordability. DER can help balance the wholesale electricity market (shifting demand away from peak periods) and avoid or defer costly network investment (lowering costs for all consumers).

28. In December 2023 we briefed you on the role of the DFIF [refer 2324-1128] seeking your agreement to open the fund to expressions of interest for its first funding year (starting in early 2024). The DFIF work remains paused pending confirmation of Budget 2024 decisions.

If solarZero mentions DFIF, you may like to note:

- *Any statements about the Distributed Flexibility Innovation Fund will need to wait until after Budget Day.*

2025 reset of default price-quality path regulation

29. Aurora is one of the 16 EDBs subject to a default or customised price-quality path (DPP/CPP). A price-quality path determines the maximum revenue EDBs can recover from its consumers and the required quality standards. Aurora is currently the only EDB on a CPP, which it applied for to address historic under-investment that was evidenced by numerous pole failures (including one causing a fatality). Aurora's CPP runs from 1 April 2021 to 31 March 2026, and it will return to a DPP from 1 April 2026 unless it applies for a new CPP before then.

30. In December 2023, Aurora applied to the Commerce Commission (Commission) for a 're-opener' - to re-open its CPP for the period to April 2026 - for reasons including '[t]*he first two years of our CPP has demonstrated that demand for electricity has continued unabated, as has the demand for new connections*.'

31. Aurora's application seeks to cover an additional $46.3 million in capital spending, across the remainder of the CPP period (to 2026). This is to enable extra capacity-related investments that were not forecast when the CPP was initially determined in 2021. $26 million of the extra spending sought is earmarked for consumer connection capex. Aurora says this is necessary to keep up with connections and upgrades driving network growth, while avoiding an "inequitable wealth transfer" from existing to new customers.

32. In its application, Aurora noted that reconsideration of their CPP is not expected to have any impact on consumer prices before 31 March 2026.

33. Aurora runs three pricing regions to recover its allowable revenue. Aurora's approach aims to allocate the cost of investments to the pricing region in which the investment is required. On this basis, with four of the five reconsideration projects occurring within the Central Otago/Wānaka pricing region, along with a substantial share of consumer connection investments, the incremental price impact would be highest in that pricing region.

You could ask:

- *What insights has Aurora gained from the non-network solutions implemented in Queenstown and the Upper Clutha areas, and do you have plans to seek non-network solutions to avoid or defer network expenditure in other areas?*
- *Has Aurora explored accessing the innovation investment pathways for greater use of non-network solutions with the Commerce Commission?*
- *Aurora has applied to the Commerce Commission for the customised price-quality path (CPP) to be re-opened. How will this requested additional funding contribute to using DER to support security of supply?*
- *How does Aurora plan to mitigate the impact or step changes of price increases for customers?*

Risks and mitigations

34. We have not identified any specific risks associated with this meeting.

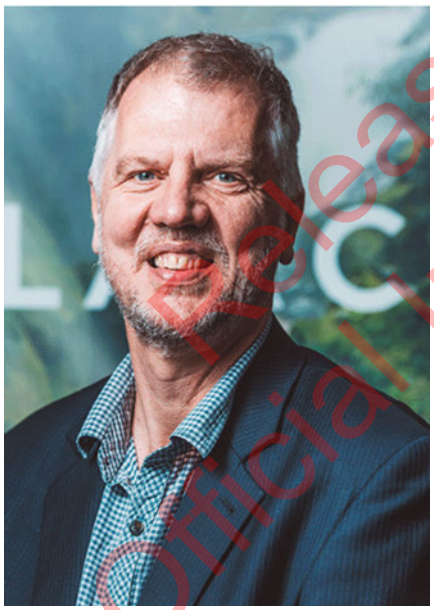
Annexes

Annex One: Attendees' biographies

Annex Two: Suggested talking points

Annex Three: Background material on solar and battery uptake, trials and market arrangements

Annex One: Attendees' biographies

	**Andrew Booth, Founder and Chair, solarZero** Up until 2019, Andrew was CEO of solarZero. In 1991, Andrew founded World Television which is Europe's longest established virtual and hybrid events technology agency in Europe and Asia, and he was the Director of the company. Prior to this, Andrew was the International Board Director for Greenpeace International.
	**Matt Ward, CEO, solarZero** Before becoming CEO in August 2023, Matt was Chief Financial Officer and Chief Operations Officer. Prior to that, Matt was CFO at Oceania Healthcare – retirement village.
	**Eric Pyle – Director Public Affairs and Policy, solarZero** Eric Pyle has been working as a Director Public Affairs & Policy at solarZero since August 2018. Eric has worked in a wide range of sectors including environmental management (water, biodiversity, and climate change), energy, outdoor access, policy, science, external relations, and communications. Eric was Chief Executive Officer (CEO) at New Zealand Walking Access Commission Ara Hīkoi Aotearoa (2016-2018) and also at NZ Wind Energy Association (2011-2018). He was also a Director of Environmental and Social Development at Ministry of Research, Science and Technology (2003-2011). Eric's career spans government, industry, business, research and NGO sectors. Eric had roles with Forest & Bird, WWF and the central government natural resources sector.

	**Richard Fletcher, CEO, Aurora Energy** Before becoming CEO at Aurora Energy Limited in January 2018, Richard was General Manager Regulation and Corporate Affairs at Powerco. Prior to that, Richard was Regulatory Strategy Manager at Transpower. From 2000 to 2005, Richard was Head of Economic Regulation at Welsh Water, UK. Richard has extensive international experience in engineering and management consulting. He has advised on energy regulation, asset management, due diligence studies for mergers and acquisitions, as well as engineering investment plans.
	**Mark Pratt, General Manager Customer and Connections, Aurora Energy** Mark joined Aurora Energy in 2018 and was appointed General Manager Works Programming and Contracts in December 2018. Before joining Aurora Energy, Mark was Electricity Contracts and Performance Manager at Powerco. Mark has more than 30 years' experience in contract management and service delivery.
	**Glenn Coates, General Manager Asset Management and Planning, Aurora Energy** Glenn joined Aurora Energy in March 2018, leading Aurora's design and engineering teams supporting the delivery of Aurora's network and customer related projects. With over 25 years' experience in the electricity industry Glenn held senior management positions at Orion and Transpower. Glenn brings broad experience in asset management strategy, planning and operations.

Annex Two: Suggested talking points

solarZero's non-network (solar and battery capacity) project in Queenstown and Upper Clutha

You could ask:

- *How much does a typical customer save if they have a solar and battery through solar Zero?*

Trial with Ara Ake for virtual power plant to manage winter peak

You could ask:

- *What insights did you gain from last Winter Peak Innovation Pilot, and will solarZero offer it or trial it again in winter 2024?*
- *Are there any outstanding barriers to the use of solarZero's virtual power plant (VPP) to help manage tight supply situations at time of peak demand or when generation suddenly falls below forecast levels?*
- *What did solarZero do with its DER systems on the morning of 10 May?*
- *As the electrification of the NZ transport fleet increases, what role do they see for EVs to support electricity supply in periods of high demand?*

Community Renewable Energy Fund

You could say:

- *I have already approved up to $6.5 million of funding for community resilience sites in regions affected by 2023 severe weather. I am continuing to take advice from officials on delivery options of the Community Renewable Energy Fund.*

You could also ask:

- *Keeping the lights on is a top priority and I am interested in the potential of distributed energy resources to support security of supply during winter peaks. What are your views on how the Community Renewable Energy Fund could best support the development of distributed energy resources?*

Distributed Flexibility Innovation Fund

If solarZero mentions DFIF, you may like to note:

- *Any statements about the Distributed Flexibility Innovation Fund will need to wait until after Budget Day.*

2025 reset of default price-quality path regulation

You could ask:

- *What insights has Aurora gained from the non-network solutions implemented in Queenstown and the Upper Clutha areas, and do you have plans to seek non-network solutions to avoid or defer network expenditure in other areas?*
- *Has Aurora explored accessing the innovation investment pathways for greater use of non-network solutions with the Commerce Commission?*

- *Aurora has applied to the Commerce Commission for the customised price-quality path (CPP) to be re-opened. How will this requested additional funding contribute to using DER to support security of supply?*
- *How does Aurora plan to mitigate the impact or step changes of price increases for customers?*

Annex Three: Background on solar and batteries in New Zealand

Installed small-scale solar and batteries

1. There are 317 megawatts of small-scale solar capacity on homes and small and medium enterprise. Around 9 percent of these solar installations also have batteries.[2]

2. Uptake of solar with batteries for residential customers is increasing more quickly in recent years.[3]

Selling solar generation to the New Zealand market

3. Households that export surplus solar generation back to the grid receive payment set by their retailer. This payment should reflect the cost to the retailer of procuring less generation from the wholesale market, but some stakeholders like Rewiring Aotearoa say that the payments aren't high enough to compensate them for this.

4. Consumers with solar benefit most by maximising their own use of generation by reducing what they purchase. This is because they offset their variable electricity retail tariff which is typically more than double the feed-in rate they would get from selling it back to the grid.

5. Customers with solar and batteries can also sell "flexibility" to a flexibility aggregator such as a VPP. In New Zealand solarZero is currently the only VPP operating. solarZero work with the retailer Ecotricity to provide its customers with a VPP credit for allowing a small amount of their battery capacity to be on call to be used to provide flexibility.

6. Currently VPPs gain value from this flexibility by:

   - offering it as "ancillary services" to help the System Operator maintain grid stability
   - contracting with distribution networks to make flexibility available to avoid congestion and offset lines upgrades.

7. VPP also can utilise the new "dispatch notification" mechanism that was set up by the Authority in mid-2023 to bid into the wholesale electricity market directly with the amount of demand they can reduce. This doesn't result in a payment for that reduced demand. The benefit in this case is the avoided cost of demand.

8. This means the VPP can benefit from providing flexibility to the wholesale market if they also have a contract to provide this flexibility to a large electricity consumer/retailer that is exposed to wholesale market prices.

9. By comparison, grid connected solar (and large distribution network connected solar generators) offer generation into the spot market. Large scale electricity consumers are also entering into "demand response" contracts with retailers to reduce their electricity usage when supply is scarce.

[2, 3] Electricity Authority EMI data set sourced at: Electricity Authority - EMI (market statistics and tools) (ea.govt.nz)

International small-scale solar market participation and feed-in tariffs

10. Government mandated support for solar panels reduced in Australia once the solar market took off. Some states that have mandatory minimum solar feed-in-tariffs include:

    - Victoria has Government mandated minimum feed in tariffs (4.9c/kWh flat minimum, or time-varying rate between 3.9c/kWh and 11.3c/kWh)
    - Northern territories has a buy-back rate set by PowerWater (around 8.3 c/kWh)
    - Regional Queensland has a mandatory minimum, but southeastern Queensland doesn't.

11. Other states still have solar feed-in tariffs which are determined by the electricity retailers and the wholesale cost of power in Australia.

12. Rewiring Aotearoa has suggested two-way distribution pricing should be mandated in New Zealand which would provide a payment for supply provided back to the network to offset network congestion at peak times. This would be the responsibility of the Authority and Commerce Commission to consider. The Authority has said there are both benefits and costs to consumers of mandating this type of pricing.

13. Following the 10 May tight supply situation Octopus (independent retailer) has suggested New Zealand adopt more specific market measures for rewarding solar with flexibility, modelled on the UK "Demand Flexibility Service" which was introduced in winter 2022/23. Under this the system operator issues a request a day ahead of potential tightness, then aggregators or retailers notify their customers asking them to reduce demand. Those customers that do are then rewarded by providers (who receive a payment from the system operator that is outside of the wholesale market).

14. We will investigate further what differences there are between this approach and the current market mechanisms available for flexibility in New Zealand outlined in this paper. The UK market generally features a number of differences that may not make this approach relevant for a New Zealand context.

Current New Zealand solar trials

solarZero and Ara Ake Winter Peak Innovation Pilot

15. The pilot demonstrated that distributed energy resources in the form of residential solar batteries can be dispatched into the wholesale electricity market, via a VPP, to address winter peak events.

16. Under the eight-month trial, 10,000 batteries were aggregated as a VPP at one GXP per island and onboarded into Transpower's systems. These batteries could:

    - be triggered to charge on the issuing of a low residual Customer Advisory Notice (CAN) (eg in preparation for being utilised to respond to a tight situation)
    - then be available for dispatch into the wholesale market if needed.

17. During the course of the eight-month pilot, there were no actual winter peak events that progressed past the CAN stage where the system would have been dispatched, however testing proved that VPP could be triggered to charge and be available to be dispatched. The system was dispatched to the electricity grid four times as part of the pilot deliverables. On the fourth dispatch the system provided 26.5 MW over a two-hour period on the final test.

18. The trial report produced by participants identified several challenges for implementing such a system, such as:

- Aggregating 10,000 devices across the country and making them respond at the same time is difficult from the perspective of meeting the relevant technical standards required by the Authority and the System Operator.
- The System Operator's rules about where and how resources are aggregated at grid exit points for the purpose of dispatch may be challenging for a system like this.
- The new dispatch market mechanism put in place by the System Operator in 2023 enabled the activity but may not be fully fit for purpose. Other new mechanisms that might be available for a VPP would have required a code exemption.

19. During the tight supply situation on 10 May 2024, solarZero offered around 30 megawatts of capacity into the market. Officials are meeting with solarZero shortly to get further details.

Ara Ake and Kāinga Ora Multiple Trading Relationship Trial

20. The trial aims to test processes to allow consumers to buy electricity from their own retailer and sell generated electricity to a different retailer. Under this trial Kainga Ora is acting on behalf of the homeowners to aggregate and sell the electricity, while homeowners continue to deal with their retailer of choice for consumption. Undertaking these two tasks requires each customer to have two installation control point (ICP) identifiers - one linked to generation (export) and the other to consumption – and currently the code requires a single ICP. To proceed with the trial the Authority approved exemptions to clauses in the Electricity Industry Participation Code 2010, which allowed two ICPs identifiers for a single connection. To enable multiple trading relationships outside of this trial the Authority would need to make changes to the Code.

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EVENT BRIEFING

Meeting with Rewiring Aotearoa

Date:	20 June 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2935

Action sought		
	Action sought	**Deadline**
Hon Simeon Brown **Minister for Energy**	**Note** the contents of this briefing to support your meeting with Rewiring Aotearoa on 27 June 2024 at 4:00pm.	27 June 2024

Contact for telephone discussion (if required)			
Name	**Position**	**Telephone**	**1st contact**
Peter Bartlett	Director, Sector Engagement, Energy Markets	s 9(2)(a)	✓
Catherine Schofield	Team Leader, Networks & Demand, Electricity Markets Policy Team		

The following departments/agencies have been consulted
NA

Minister's office to complete:

- ☐ Approved
- ☐ Noted
- ☐ Seen
- ☐ See Minister's Notes
- ☐ Declined
- ☐ Needs change
- ☐ Overtaken by Events
- ☐ Withdrawn

Comments

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EVENT BRIEFING

Meeting with Rewiring Aotearoa

Date:	20 June 2024	**Priority:**	Medium
Security classification:	In Confidence	**Tracking number:**	2324-2935

Purpose

To provide background information and talking points for your meeting with the Rewiring Aotearoa Chair and team members on 27 June 2024 at 4:00pm.

Recommendations

The Ministry of Business, Innovation and Employment (MBIE) recommends that you:

a **Note** the contents of this briefing, to support your meeting with Rewiring Aotearoa.

Noted

Peter Bartlett
Director, Sector Engagement
Energy Markets, MBIE

20 / 06 / 2024

Hon Simeon Brown
Minister for Energy

..... / ..... / .....

Meeting purpose and logistics

Date:	27 June 2024	**Time:**	4:00pm – 4:45pm
Location:	Your office (EW 5.1)		
Attendees:	Mike Casey, Chief Executive Michelle Pawson, Policy Advisor Josh Ellison, Research and Development Specialist David Karl, Chief Operating Officer Attendee biographies are included at **Annex One**.		
Rewiring Aotearoa proposed Agenda:	1. Costs savings, improved energy security and resilience, and emissions reductions can be achieved by making energy a core climate change issue. 2. Rethinking the energy and economic assumptions New Zealand is using - household solar generation is now the lowest cost energy option. 3. Opportunities to fix the finance – every home and farm financed into solar and batteries removes them from peak demand and increases New Zealand's energy security.		

Background

1. Rewiring Aotearoa (Rewiring) requested this meeting to discuss ways to improve energy policy and regulatory settings to make the future energy system fair for customers. They have provided an agenda (as above). A letter to you from Rewiring includes more details on the actions they would like to see from this government and is included in **Annex Three**.

2. Rewiring is non-profit group funded by donations. Its mission is to electrify New Zealand homes and businesses so every Kiwi saves money on energy bills, reduces their carbon emissions and has the resilience to keep their lights on and homes warm. It is delivering this through "research, communication, and demonstration". Mike Casey is very publicly active on these issues and is regularly interviewed in radio, print and television media.

3. Rewiring has recently met with Hon Shane Jones in his capacity of Minister for Regional Development on a proposed project *Rewiring Rakiura/Steward Island* and on renewable energy options to electrify New Zealand.

4. Rewiring recently released its *Electric Homes* technical report which suggested that an average home could save $1500 per year by investing in household electrification and solar and batteries financed at current interest rates, and $4,500 per year when financed with a 1 per cent loan.

5. Rewiring will raise a series of policy suggestions they consider necessary to enable household electrification with smart devices, rooftop solar and batteries to "significantly reduce energy bills, mitigate 30% of New Zealand's energy emissions and improve energy security and resilience".

6. Rewiring has also recently released the report *Electric Farms - the role of farms as future power stations* setting out the potential for farms to save money on energy bills, and feed power back into the network. This builds off lessons from Mike Casey changing his cherry farm to use more renewables.

7. Consumers can use Distributed Energy Resources (DER) like rooftop solar, and smart devices like smart electric vehicle (EV) chargers to shift when electricity is used or provide electricity back to the grid to both reduce their own bills, and help meet peak demand or reduce network congestion. Rewiring suggests that the current regulatory system is not set up to incentivise homes and businesses to adopt these devices.

8. We understand Rewiring's advocacy is less concerned with enabling aggregator business models to access the electricity market, as they consider individual consumers themselves can benefit more without the need for aggregation.

Energy in climate change policy

9. Rewiring consider the Government isn't providing enough strategic direction, including to regulators, to allow consumers to reduce emissions with DER. They argue this should feature more in the Government's climate change policy.

10. Rewiring consider this is important because its analysis shows that 31 per cent of domestic emissions come from household energy and vehicle use, and that electrification of homes including EVs provides a significant opportunity to reduce domestic emissions.

11. Greater uptake of solar panels and batteries will:

    - offset coal and gas generation in times of peak electricity demand
    - encourage other fuel switching (like diesel generator use on farms or businesses, and diesel and coal use by industry).

12. You may wish to discuss how you see Electrify NZ, Supercharging EV Infrastructure and a strong and stable Emissions Trading Scheme being key planks of the Government's climate change approach, as well as flag the upcoming Emissions Reduction Plan (ERP) consultation.

Suggested talking points:

- *I can assure you that the Government considers energy policy is a key tool to reduce emissions and achieve our climate change targets.*
- *The Second Emissions Reduction Plan is due at the end of this year. We will be publicly consulting on this plan shortly and I encourage you to participate.*

Questions you may wish to ask:

- *How would you like to see the government providing strategic direction around distributed energy resources within our climate change policy and Emissions Reduction Plan?*
- *Where in a household would you say the largest emissions reductions can come from?*

Rethinking assumptions about energy policy

13. Rewiring is concerned that energy policy, and actions of independent regulators and the sector, are focusing only on the traditional supply side (scaling up new large scale generation and building new distribution and transmission poles and wires) rather than focusing on how consumer owned DER on the demand side can instead be used to solve system challenges (like reducing winter peaks, and affordability challenges coming from distribution network investment).

14. For example, Rewiring's recent report *Electric Homes* report suggested that:

    - Rooftop solar is the lowest cost delivered energy for homes at less than half the cost of grid electricity. The report estimates a cost for financed rooftop solar generation at around 6c/kWh.
    - Battery prices are falling in New Zealand. Batteries can add significant community resilience and reduce peak loads while reducing household energy bills.

15. Rewiring would like to see a "level playing field" for consumer energy under electricity regulation. It considers this would allow households and businesses to be part of the energy system, be rewarded for the part they play, and only pay for the legitimate extra costs (or constraints) they impose on the system. It considers the Government should:

    - Ask the Office of the Auditor General to examine whether the Electricity Authority (the Authority) and the Commerce Commission are meeting their statutory objectives with respect to DER being able to compete with supply side generation and flexibility.
    - Direct MBIE to review the *Electricity Act 1992* to ensure the interests of consumers who may export electricity to the network are enabled and protected.
    - Direct the Authority to provide cost-reflective electricity pricing (including incentives for consumers to provide flexibility back to the system through mandatory feed in tariffs) and mandatory time of use pricing for distribution network access.
    - Direct the Commerce Commission to provide assurances that Part 4 of the *Commerce Act 1986* (that regulates electricity distribution networks) avoids risk of infrastructure overbuild.

MBIE comment

16. We do not consider that an investigation by the Office of the Auditor General or amendments to the *Electricity Act 1992* are warranted. Both regulators are required to consider the long-term interests of consumers, and regularly outline how their decision making considers this issue.

17. In respect of sufficient feed in tariffs and to enable favourable pay-back periods for residential and businesses to purchase solar and batteries, MBIE is closely monitoring the work of the Authority. In general, we understand the Authority considers that retailers are currently beginning to offer better deals to consumers, and that there is not sufficient justification to mandate such tariffs. We also understand the Authority may consult on this issue shortly (this is not public but may have been communicated to Rewiring).

18. In respect of distribution pricing, the Authority's paper of 7 May 2024, *Distribution Pricing Report: Next steps*, outlined next steps in this area. The Authority has run a campaign of writing to distributors to ensure they put retailers onto time of use pricing.

19. While not specifically raised by Rewiring, there may also be value in a wholesale market mechanism that allows aggregators of DER and flexibility to bid into the wholesale market. Currently, there is not a clear paid mechanism for this to happen in New Zealand. The United Kingdom has recently put one in place. We intend to investigate this issue further with the Authority.

Questions you may wish to ask:

- *Has Rewiring Aotearoa undertaken analysis of the change in electricity networks' requirements for investment, with increasing levels of DER? What would the impact of this reduced network expenditure be on consumers' bills?*
- *How do the costs of rooftop solar (plus batteries) compare to grid scale solar farms (plus batteries) feeding into the grid?*
- *Does the Australian experience of high rooftop solar penetration have any lessons for New Zealand, in terms of risks as well as advantages?*
    - *Has it reduced the investment needed from network owners to accommodate electrification?*
    - *Are Australian governments still promoting subsidised feed-in tariffs?*
- *The Commerce Commission and the Electricity Authority have work programs and regulatory initiatives underway to promote greater use of DER – what are your reservations about their approaches?*

Financing for DER

20. To enable household electrification through DER, Rewiring consider the Government should investigate financial mechanisms that will allow New Zealanders of all income levels and home ownership situations to pay the upfront capital costs. While some banks are beginning to offer low interest loans linked to mortgages, access to finance can be a barrier for households to invest electrification or rooftop solar and batteries.

21. Rewiring would like you to direct the Reserve Bank of New Zealand to consider barriers and opportunities to improve access to lending for household electrification.

22. Further, Rewiring highlight two ways to make it easier for households to install DER:
    - Firstly, by updating the *Electrical Safety Regulations 2010* and regulations related to the installation of DER.
    - Secondly, by supporting demonstration projects of community-generated or demand-side electrification via the Regional Development Fund.

23. MBIE Health and Safety Policy is working with WorkSafe to finalise the proposed updates to the standards references across these regulations. They will brief you in July/August (Q3 2024) on these proposals and develop a draft Cabinet paper for your consideration seeking policy approval to the updated standards. References to about 400 standards are proposed for amendment across the two sets of regulations.

24. Ara Ake has funded several trials relating to DER and is likely to continue looking at this area in future.

Suggested talking points with regards to financing:

- *In general, the Government is of the view that households and business should determine for themselves how to reduce emissions, rather than us dictating particular technology options.*

Questions you may wish to ask with regards to financing:

- *What sort of responses have you received from commercial sources of finance to your proposals for residential and small businesses?*
- *In your recent Electric Farms report, you called for the development of farm-focused finance for electrification, and I understand that you raised this with farmers at the recent Mystery Creek Field Day. What sort of response did you get from farmers and from people who provide finance for farms?*

Suggested talking points with regards to standards:

- *I am aware of the electrical safety standards issue and there is work underway to both update the regulations and make it easier for new standards to be adopted in future. I expect to be able to announce further details about this later this year. This includes the solar inverter safety standard.*

Question you may wish to ask with regards to standards:

- *Are there any other technical regulations related to installation of DER that need consideration?*

Risks and mitigations

25. We have not identified any specific risks associated with this meeting.

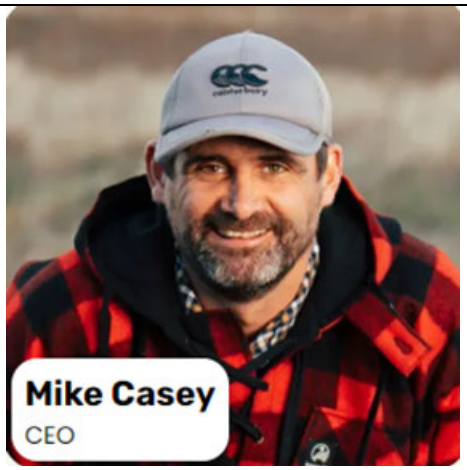
Annexes

Annex One: Attendees' biographies

Annex Two: Suggested talking points

Annex Three: Letter from Rewiring Aotearoa

Annex One: Attendees' biographies

	**Mike Casey, Chief Executive Rewiring Aotearoa** Mike Casey is the owner of the world's first zero fossil fuel orchard located in Central Otago. He took up the role of Chief Executive of Rewiring Aotearoa in 2023. Mike is cofounder of NZ0.com where he sells zero emissions cherries. He previously cofounded an online tech startup community Fishburners and GradConnection in Sydney, which was acquired by Seek.
	**Michelle Pawson, Policy Advisor Rewiring Aotearoa** Michelle Pawson has worked for Rewiring Aotearoa since August 2023. Prior to this, Michelle worked as a Public Policy Fellow at the Institute of Innovation and Public Purpose at the University College London. She has also held Principal Advisor roles at the New Zealand Productivity Commission and the Ministry for the Environment.
	**Josh Ellison, Research and Development Specialist Rewiring Aotearoa** Josh Ellison leads research, designing and development work at Rewiring Aotearoa and Rewiring Australia. He has co-authored Rewiring Australia's research papers and models since its establishment. He also works with industry and communities to design and implement on the ground electrification.
No picture available	**David Karl, Chief Operating Officer, Rewiring Aotearoa** David Karl joined Rewiring Aotearoa in May 2024. David has previous experience working in Government as a Chief Advisor at the Ministry for the Environment, having worked at the Ministry for over 14 years.

Annex Two: Suggested talking points

Energy in climate change policy

Suggested talking points:

- *I can assure you that the Government considers energy policy is a key tool to reduce emissions and achieve our climate change targets.*
- *The Second Emissions Reduction Plan is due at the end of this year. We will be publicly consulting on this plan shortly and I encourage you to participate.*

Questions you may wish to ask:

- *How would you like to see the government providing strategic direction around distributed energy resources within our climate change policy and Emissions Reduction Plan?*
- *Where in a household would you say the largest emissions reductions can come from?*

Rethinking assumptions about energy policy

Questions you may wish to ask:

- *Has Rewiring Aotearoa undertaken analysis of the change in electricity networks' requirements for investment, with increasing levels of DER? What would the impact of this reduced network expenditure be on consumers' bills?*
- *How do the costs of rooftop solar (plus batteries) compare to grid scale solar farms (plus batteries) feeding into the grid?*
- *Does the Australian experience of high rooftop solar penetration have any lessons for New Zealand, in terms of risks as well as advantages?*
    - *Has it reduced the investment needed from network owners to accommodate electrification?*
    - *Are Australian governments still promoting subsidised feed-in tariffs?*
- *The Commerce Commission and the Electricity Authority have work programs and regulatory initiatives underway to promote greater use of DER – what are your reservations about their approaches?*

Financing for DER

Suggested talking points with regards to financing:

- *In general, the Government is of the view that households and business should determine for themselves how to reduce emissions, rather than us dictating particular technology options.*

Questions you may wish to ask with regards to financing:

- *What sort of responses have you received from commercial sources of finance to your proposals for residential and small businesses?*
- *In your recent Electric Farms report, you called for the development of farm-focused finance for electrification, and I understand that you raised this with farmers at the recent Mystery Creek Field Day. What sort of response did you get from farmers and from people who provide finance for farms?*

Suggested talking points with regards to standards:

- *I am aware of the electrical safety standards issue and there is work underway to both update the regulations and make it easier for new standards to be adopted in future. I expect to be able to announce further details about this later this year. This includes the solar inverter safety standard.*

Question you may wish to ask with regards to standards:

- *Are there any other technical regulations related to installation of DER that need consideration?*

Annex Three: Letter from Rewiring Aotearoa

Tuesday 7th May 2024

Dear Minister Brown

Purpose

As requested by your office below is an overview of what we would like to discuss with you in our Thursday 27 June 2024 meeting.

Key objectives

Some of the Rewiring team attended the Tuesday 30th April 2024 Electricity Networks Aotearoa and Energy Retailers' Association of NZ event. We heard Ministers speak to a vision for New Zealand's energy future based largely on scaling up supply-side solutions.

We have concerns this thinking relies on energy and economic assumptions that we think are outdated and need to be revisited. Using updated assumptions that more realistically represent the demand side, or distributed energy, unlocks a yet to be considered cost of living reduction and energy resilience opportunity, and avoids unnecessary investment debt.

The energy transition is happening now. It is critical the Government provides strategic direction and directs regulatory and policy settings so that customers, communities, businesses and farms can fully realise this opportunity - electrification and distributed energy are a real win-win-win that ensures cost savings, improves energy security and resilience while also delivering emissions reductions.

Now is the time to seize this opportunity to electrify our economy with existing technology, which is the biggest emissions reduction and counter-inflationary investment opportunity for the Government and country for the next three to five years. The country could vastly improve our energy productivity and go from importing $20 billion[1] worth of some of the world's most expensive fossil fuels per year to saving billions and reducing emissions by instead using locally produced electricity in more productive, effective homes, businesses, farms and industries. We would like to discuss the following:

1. Costs savings, improved energy security and resilience, and emissions reductions can be achieved by making energy a core climate change issue
2. Rethinking the energy and economic assumptions NZ is using as shown in the 'Electric Homes' report[2]: energy produced by customers on their roofs is now the cheapest energy in NZ
3. Opportunities to 'fix the finance': Every home and farm financed into solar and batteries removes them from peak, greatly increasing NZ's energy security.

Next steps

We are keen to discuss the above issues with you, and our recent 'Electric Homes' report - https://www.rewiring.nz/electric-homes-report.

Regards
Mike Casey
CEO Rewiring Aotearoa

[1] Refer Appendix, page 3, for calculations
[2] https://www.rewiring.nz/electric-homes-report

Appendix - Recent advice provided to Minister Watts on what Rewiring Aotearoa think needs to be done to unlock the decarbonisation via electrification in NZ

What needs to be done

Ensuring a level 'playing field' from a regulatory and legislative perspective requires Government to:

A. Ask the Office of the Auditor General to examine whether the Electricity Authority and Commerce Commission are meeting their statutory obligations in the energy sector with regards to competition, reliability and efficiency, specifically with respect to customer resources being able to compete with supply-side resources.
B. Direct MBIE to review the Electricity Act 1992 to ensure the interests of consumers who may export electricity to the network are enabled and protected.
C. Direct the Electricity Authority (EA) to use its powers under section 32(1) of the Electricity Industry Act (EI Act) to ensure adequate settings for cost-reflective pricing (including incentives for customers to provide services back to the system): where the Authority may set Code requirements that are necessary or desirable to promote one or more of its statutory objectives, the performance of its functions, and/or any other matter specifically referred to in the EI Act as a matter for inclusion in the Code. This includes under section 32(4) of the EI Act: "20.2 setting pricing methodologies for Transpower or one or more electricity distributors".
D. Direct the Commerce Commission to give relevant Ministers and customers public assurance that the current Part 4 incentive framework for electricity distribution businesses (EDBs) avoids the risk that infrastructure will be overbuilt and properly accounts for their move to cost-reflective pricing.

Fixing the Finance requires:

E. Direct the Reserve Bank of NZ to examine what it sees as the barriers and opportunities for improving accessibility of lending to support the domestic electrification (or the distributed energy transition).

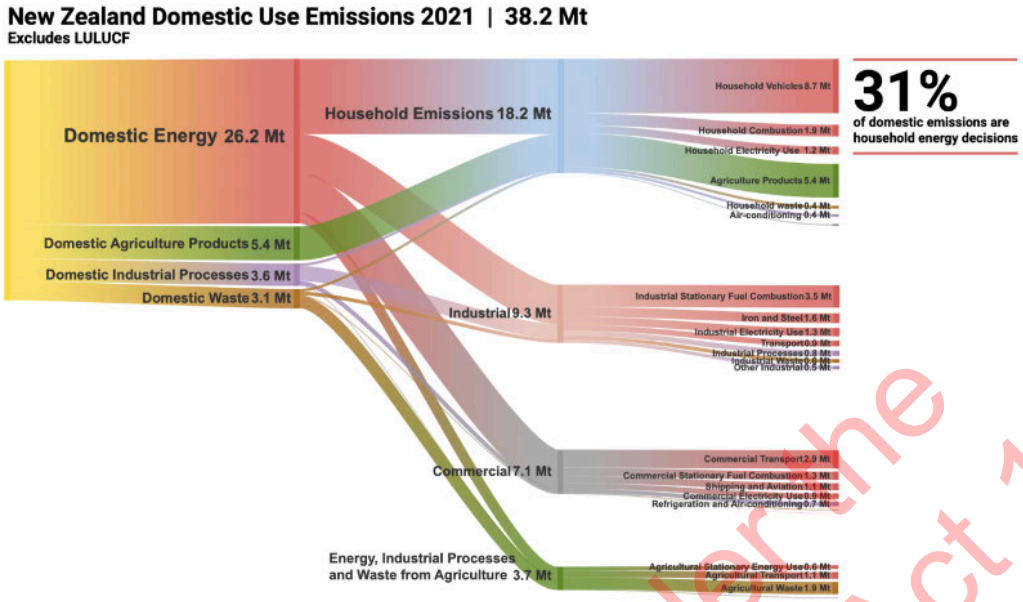
Making it easier for households to install customer energy resources requires the Government to:

F. Direct MBIE and other agencies to comprehensively review and streamline decade-old standards (e.g. Electrical (Safety) Regulations 2010) and regulations relating to the installation of customer energy resources.
G. Support demonstration projects of community-generated or demand-side electrification via the Regional Development Fund.

NZ needs to focus on the win-wins - using electrification to reduce emissions and reducing the cost-of-living burden at the same time

As our recent 'Electric Homes' Report demonstrated, electrification is the lowest cost pathway to a net zero carbon economy. It will not only save the government money on investing in poles and wires, but a key point is that this transition can be made right now using existing technology in people's homes, businesses and farms. This means we can move with pace and scale up quickly if the right conditions are created.

Decisions made by households account for 31% of emissions in our domestic economy, and are an underappreciated opportunity for the country to reduce emissions.



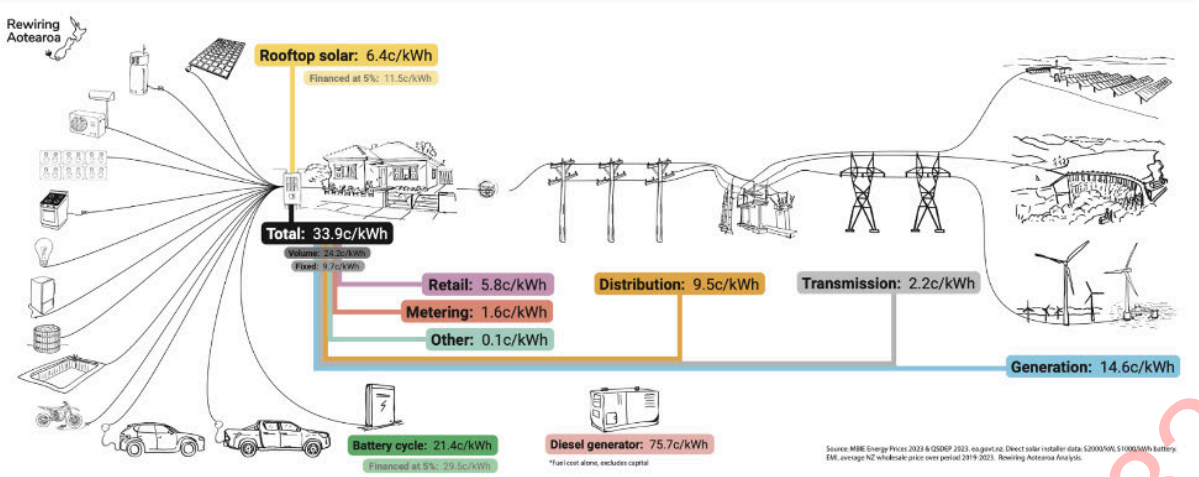
We recently ran the numbers to understand the scale of NZ's fossil fuel energy consumption - in 2023 New Zealand consumed about 101 Petajoules (PJ) of Petrol, and 146 PJ of Diesel, most of which were either imported, or refined from imported oil.[3] At retail prices seen at the pump, this equates to about $7.6 billion in petrol, and $8.5 billion in diesel.[4] Retail prices have increased significantly this year and are expected to keep rising.

A further 66.8 PJ of Natural Gas is consumed, and another 46.7 PJ used for energy transformation - mostly to generate electricity. Adjusting for consumption at different prices for industrial, commercial, and residential use, this is about $2 billion of Natural Gas purchases per year by New Zealand homes and businesses.

9.66 PJ of LPG (Liquified Petroleum Gas) is consumed, at retail prices worth about $650 million. 42.7 PJ of coal is consumed, mostly for industrial heat and electricity production. Another 57.4 PJ of aviation fuel is imported, with 39 PJ used for international flights and 18 PJ used for domestic flights, totalling around $1.7 billion. Combined this is around $20 billion worth of fossil fuels per year.

To meet our international climate obligations, NZ needs to move away from relying on increasingly expensive carbon offsets and focus on reducing emissions through electrification. As the price of solar and batteries continues to drop, it's important to recognise that the cheapest renewable energy will come from rooftops and batteries - and the second cheapest will likely come from neighbours' rooftops and batteries.

[3]https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/oil-statistics/
[4]https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/energy-prices/



New Zealand can no longer look at climate change solutions as a cost problem. It must make the investment in customer generated energy. What we know is climate solutions don't cost more, but delaying implementation of the decarbonisation opportunity that electrification presents will cost the economy for generations to come.

As we have outlined previously, part of this is ensuring the energy system values customer generation and understands the cheapest delivered energy will come from communities.

Ensuring the electricity market 'playing field' is level, allowing competition between customers and large-scale generators:

A core characteristic of the future electricity system, one that strikes the best tradeoff between affordability, resilience and decarbonisation, needs to be that households and businesses become part of and are rewarded for the part they play as system infrastructure, and only pay for the legitimate extra costs (or constraints) they impose on the system.

New Zealand's electricity market design has been based on the philosophy that competitive markets, with appropriate 'rules of the game', will deliver the lowest cost system to the customer.

Acknowledging that NZ will need some grid-scale renewable generation to meet the needs of large commercial and industrial consumers, our analysis shows that customer-generated energy (rooftop solar and batteries) will be a significant part of the lowest-cost pathway to the cheapest, cleanest and most reliable energy system. However, at present there is not a level playing field between customer resources and grid-scale resources, and hence, we are not delivering effective competition. Electricity prices - and, therefore, the cost of electrifying homes and businesses - will remain above what they should be until we deliver a truly competitive market.

As discussed previously, the key issue here is today the electricity market is neither fair nor cost reflective. A battery in a consumer garage is a competitor, but the regulatory playing field is not level for all competition. The electricity market is not working as well as it could, and is currently penalising customers.

This situation has snuck up on us as a country; when the market was designed in the 1990s, and for the majority of the 25 years since, customer resources (such as rooftop solar) have been substantially more expensive than large-scale, grid-based generation. This is no longer the situation today, and we are left with a set of regulations, standards and market practices that are outdated.

A solar panel on a household rooftop in Wellington should be able to compete in the market with a hydro generator in the Waitaki. A battery in a cupboard that can provide energy should compete in the market with a network line upgrade. And if it is cheaper to install and provide the service required by the system, the battery should 'win'.

At the moment, the market is not set up for this degree of competition. Despite customer resources being able to provide the same, or very similar service to large-scale infrastructure, these resources can't always access the market and the revenue streams that the market provides.

But the Government could smarten up the rules to allow it to happen. Customers need to have the choice of retail tariff options which are 'cost and value reflective', which includes paying customers fairly for their contributions to the energy system - contributions which reduce the need for more expensive generation, and help defer or avoid expensive network upgrades.

New Zealand is falling behind international progress on tariffs. This is most acute in the arena of network pricing, which is under the control of EDBs (and passed through to retailers). The Electricity Authority has publicly reported that progress towards cost-reflective tariffs has been slow, especially where households and businesses are providing services back to the electricity system.

Yet this is unsurprising, because there is no piece of electricity industry code or regulation that requires EDBs to adopt 'cost reflective pricing'. However, despite the Authority having the power under the Electricity Act to introduce standards for pricing, it appears to be reluctant to move quickly and be directive about the outcome that is in the best interests of consumers.

However, today, the incentives on EDBs to genuinely consider customer resources as a way of deferring or avoiding the need to build new lines are relatively weak. Further, when making their case for investment to the Commerce Commission, we believe EDBs have underestimated the speed at which customer resources - especially batteries - will be deployed. This is closely linked to EDBs reluctance to pay customers for well-time export from collar and battery systems. Again, this appears to be a failure of the market design. If batteries were rewarded appropriately for their ability to defer or avoid infrastructure, the incentives for customers to invest in batteries would improve, more batteries would become available, and less infrastructure would be required.

Without these incentives, and the skewed incentives faced by EDBs to anticipate future increases in customer resources, there is a high risk that EDBs, at the expense of the consumer, begin building infrastructure for a future that never eventuated. The only way we

can reduce these costs for the customer is to efficiently defer or avoid those investments (dynamic efficiency). Once they are built the customer pays.

Data democratisation is another issue NZ has lagged behind on, our systems for making customer data available to customers, as well as other third parties who could use it to improve asset management and innovate. For example, under current regulations, a customer will have to wait up to 5 days to get their own smart meter data from their retailer. And there is no requirement to provide the full smart meter dataset, and/or in a form that is usable by the customer (e.g., a spreadsheet). These regulations are out of sync with the rest of the world and are stymying innovation in the sector.

Solving climate change doesn't necessarily need to be a future burden. With smart regulation and incentives in place, it can be an opportunity to change behaviour, reduce domestic emissions and create economic growth by scaling up industries. But as identified above there are 'pre-conditions' this Government can realise now to enable a distributed energy system that does not penalise customers, and levels the playing field.

As previously noted, we have recently raised concern about whether the Electricity Authority (EA) and Commerce Commission are meeting their statutory obligations[5], as it is clear that the objectives of both the EA and Commission is to provide a competitive, fair and cost-reflective electricity market for consumers.

Fixing the finance

As Australian inventor and founder of Rewiring America and Rewiring Australia Dr Saul Griffith says, climate change is basically a machines problem and to solve it we need to find a way to swap fuel for finance. Rather than pay for subsidies (like the previous Government's Clean Car Discount) we are currently exploring innovations in how the Government could facilitate finance so public money could be put to use to achieve public good outcomes, simultaneously addressing cost of living pressures and reducing carbon emissions.

In Australia, the Government is exploring an 'Electrify Everything' loan scheme where the cost of electrification can be tied to property contingent loans and debt can be slowly paid off or paid off in full when the property sells. That means that it should also appeal to landlords, climate action can be funded with future capital gains and it will be low-cost for the Government as the funds are repaid.

We believe there is a golden opportunity for this Government to develop a cost-of-living reduction policy based on providing access to electrification that also significantly reduces the country's emissions. This will require a focus on developing financial mechanisms that will allow New Zealanders of all income levels and home ownership situations to pay the upfront capital costs associated with electric machines, swap fuel for finance and access the

[5] **Statutory objective of the EA:** (Section 15, of the Electricity Industry Act 2010) **: "**To promote **competition** in, reliable supply by, and the **efficient** operation of, the electricity industry for the **long-term benefit of consumers**". Additional objective is "**to protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers**"
Objectives of Commerce Commission: "consumers are protected, and clear and accurate information is provided to them; there is a **level playing field for competitors** – the rules are known and players are monitored… poor, misleading or unbalanced information affecting competition in the market is addressed; **regulated businesses face incentives to provide long-term benefits for consumers."**

long-term savings. While finance itself is important, removing regulatory and other barriers to novel (to New Zealand in this context) financing mechanisms such as on-bill finance and property contingent loans will also be important.

Testing this finance thinking in demonstration projects of community electrification in places like Rakiura / Stewart Island and Pacific Islands like Tokelau will help create a model that can be rolled out nationally and across the Pacific, creating long-term cost savings for energy users, reducing emissions and creating a more resilient energy system.

Making it easier for households to install consumer energy resources

There is also a lot of clumsy regulation and standards when it comes to installation of solar and batteries. This increases the cost to New Zealanders of installing their own generation and storage resources.

Standardisation and some regulatory changes would help to address these issues. These actions have been on the industry work plan for years but very little progress has been made. Australia offers a wonderful blueprint for how this can happen; solar installation efficiencies were brought about 15 years ago, and now Australia boasts the lowest cost rooftop solar in the world (even removing the effect of subsidies).

Excerpts from Briefings and Weekly Reports

Excerpts from Weekly Report entries 4 March - 19 August 2024

Weekly report week of 4 March 2024:

Report on solarZero winter peak trial Tamara Linnhoff s 9(2)(a)	A new report highlights the role for distributed energy resources (DER), such as household solar and batteries, to help manage security of supply risk during winter peaks. Ara Ake part-funded last year's eight-month trial of solarZero's aggregation of 10,000 home batteries - stored power which was used to feed back onto the grid in response to tight supply events, when notified by the System Operator. The Electricity Authority also played a critical role in enabling the trial. When called on, solarZero contributed supply deemed significant by both the System Operator and Authority (e.g., tests saw 26.5MW discharged over 2 hours, and solarZero was able to demonstrate capacity of up to 30MW). The report highlighted a number of technical and market considerations needed to support this and other new services potentially enabled by DER.

Weekly report week of 18 March 2024:

The Electrified Home **report by Rewiring Aotearoa** Scott Russell s 9(2)(a)	Two versions of the report are being published on 18 March: • a technical report (published by EECA, with contributing acknowledgments) • a full policy-focused report with Rewiring Aotearoa's own analysis and recommendations (published by them, which will include the technical report and findings).

	The technical report models the cost, efficiency, and emissions impact of household electrification both at a household and national level across three key investment appliances, plus electric vehicles and solar (with and without batteries). It shows it can be cheaper to run an electric household than use fossil fuels on lifecycle basis. While average consumer bills are expected to increase over the coming years, the technical report suggests petrol and gas homes that electrify their appliances can receive significant long-term relief – with estimated household savings of over $1,000 per year (or $4,000 if supported by low-interest loans). Household electrification is also likely to support a smarter and more responsive electricity system – helping drive the uptake of flexible devices like EVs and home batteries, which can help shift peak load and reduce the need for costly network investment. Rewiring Aotearoa is an independent registered charity working on energy, climate, and electrification research and advocacy. EECA part-funded the technical analysis in line with its mandate to promote energy efficiency and renewable energy, including through research and information provision. EECA was not involved in the policy report and will not endorse any recommendations.

Weekly report week of 17 June 2024:

ERP2 – updates to Energy chapter Scott Russell s 9(2)(a)	Out of scope Feed-in-tariffs (FiT) for rooftop solar and battery systems: Feed-in-tariffs could be effective in enhancing uptake of household systems, and the Authority plans to consult on potential amendments to the Code to support FiT shortly. We will add some additional detail to the chapter in relation to a smart electricity system, including seeking feedback on options for progressing a smarter electricity system more broadly. Out of scope Out of scope

	Out of scope

Consumer Data Right Scott Russell s 9(2)(a)	As previously mentioned to you, officials have been conducting targeted engagement with key stakeholders in the electricity sector regarding a potential electricity CDR designation. This targeted engagement will inform our preparation of policy papers and a public discussion document. We have so far met with the following stakeholders: **Retailers**: s 9(2)(ba)(i) **Lines companies**: s 9(2)(ba)(i) **Consumer agencies and advocates**: s 9(2)(ba)(i) **Flexibility and innovative organisations**: s 9(2)(ba)(i)

	Metering Equipment Providers: s 9(2)(ba)(i) We have also been engaging with relevant government agencies, such as the Office of the Privacy Commissioner, and our counterparts in the Australian Treasury. Some of the key themes from targeted engagement so far have included: A CDR for the electricity sector could potentially deliver significant benefits to consumers, particularly in helping them find the best electricity plan for their circumstances more easily, more quickly and with more confidence. Unlocking half hourly consumption data and retail tariff data appears to be where the most gains could be made. Better data access and provision could also enable consumers to make more informed decisions regarding electrification e.g. purchasing an EV or solar PV for their household. It could also help more generally with household energy management. A CDR will not solve every issue – for example, consumer advocates thought that a CDR could help some households, however complementary measures are required particularly for those struggling with energy affordability. For regulated stakeholders such as retailers it is will be important to clarify how a CDR regime would interact with the Electricity Industry Participation Code 2010 (Code) that the Authority administers. Sector readiness for implementing a CDR appears to be variable and implementation costs could potentially be high. We are continuing to work closely with the Electricity Authority as we progress this CDR work, and they progress their data work programme.

	We have planned a few more targeted engagements, including with other government agencies and will begin drafting a discussion document for consultation. We are also working with our Commerce and Consumer Affairs colleagues to coordinate the respective timelines for consulting on electricity and banking designation discussion documents.

Weekly report week of 12 August 2024:

Review of the voltage range Tamara Linnhoff s 9(2)(a)	We are reviewing whether a wider range of voltages should be allowed on low voltage networks (lines supplying households and businesses). This would align with some Australian states. Research is underway into the potential limitations that voltage regulations could place on distributed generation, like rooftop solar. We are on track to provide a draft discussion document, briefing and cabinet paper in early September, as per the Energy Output Plan.

Weekly report week of 19 August 2024:

Further NZGIF investment in solarZero's Scott Russell s 9(2)(a)	Media have reported this week that solarZero has now secured a total of $365m of debt finance through the government's New Zealand Green Investment Finance Limited (NZGIF). The debt facility iexpansion comes from participation by European investment firm, Societe Generale. This will finance solarZero's business expansion of owning more Distributed Energy Resources (DER) on rooftops of homes. We

	understand solarZero will use that funding to extend their offering to approximately 20,000 households. The business model involves offering households long term contracts (25 years) to buy power generated from solar and battery systems installed on their property, but owned by solarZero. The solar systems cost nothing to the household upfront, but the contract gives households a fixed monthly fee for their solar consumption, and access to a retail plan for any additional consumption required.

Excerpt From Briefing 2425 – 0611: ERP2 – Submissions analysis and proposed approach to developing final ERP2 content 5 September 2024

Annex One: Summary of energy stakeholder submissions

Demand side

Feedback on high level approach

s 9(2)(f)(iv) [redacted]

From Briefing 2425 – 0984: Delivering energy security of supply and cost savings through energy efficiency and demand-side measures
13 September 2024

Recommended action

c. Indicate which of the following **potential new levers**, if any, you would like us to prepare further advice on, noting they have financial implications and would take longer to implement:

Innovative loan or financing facilities to increase the uptake of solar PV and/or battery	*Yes / No*

energy systems and electrification options for households and businesses	

Out of scope

Further options to alleviate energy costs using new levers

40. The Energy Competition Task force will investigate measures to ensure that consumers installing DER and providing demand flexibility can receive fair value from the electricity system. These measures could both increase the value existing device owners receive and provide a better financial incentive for more households to purchase devices like rooftop solar with batteries or smart EV chargers.

41. It is too early to tell the extent to which these measures will ensure that the market provides a sufficient incentive to uptake, and whether improved incentives might encourage more financing options for businesses or households to develop.

42. Noting the current tight fiscal environment and the longer timeframes for benefits to be realised, you could also consider exploring other options that would help households or businesses access more innovative or lower cost financing options for switching to these devices. These could include innovative loan or financing facilities to increase the uptake of solar PV and/or battery energy systems and electrification options for households and businesses. Out of scope

43. If you wish to explore these options, we can provide you with further advice by December 2024.

Briefing 2425 – 0443: Next Steps for the Community Renewable Energy Fund
9 August 2024

Table 1: Summary of three preferred options

Option	Out of scope	**Option 3: Addressing Finance Barriers for Small DER**
Primary objectives		Increase adoption of DER (solar PV and batteries) in the private market.
Target recipients		Private households, farms and small businesses.
Approximate cost per project		TBC
Projects delivered (with 100% CREF funding allocation)		TBC

Likely co-funding rate	Out of scope	TBC
Capital recycling		Possibly (depending on design)
Timeframe for deployment		TBC
Delivery Risk		TBC

Option three: Addressing finance barriers for small DER
Description

28. This option would seek to support the uptake of new battery and solar PV systems on houses, farms and small businesses throughout New Zealand by addressing the financing barriers limiting their uptake currently.

29. Small scale DER has a low penetration in New Zealand. Currently, only 2.7 per cent of households (approximately 55,000 in total) have solar and/or batteries. In comparison, Australia has 37 per cent penetration, the United Kingdom has 4.7 per cent penetration and the Netherlands has 33 per cent penetration. New Zealand is significantly behind the curve in adopting small scale DER.

30. Our advice in briefing 2425-0591 covers the range of DER interventions across these barriers. This option is targeting financing barriers.
31. We would need to do further work to establish the right mechanism for lowering the financing barriers, while maximising crown value for money and additionality (i.e., ensuring lending support would not have been likely to occur anyway). Mechanisms could range from concessionary loans like the approach being developed to support the Supercharging EV Infrastructure policy, through to underwriting private sector lending for particular types of projects to share risk and bring down interest rates, akin to the government's Welcome Home Loan programme, which supports access to finance for eligible low-income first home buyers. 3[1]

32. Our initial thinking is that government could use CREF funding to pilot a concessionary loan programme by private lenders to eligible individuals (i.e., low-income owner-occupiers) or a community organisation. The primary advantage of this model is that the private lenders

[1] 3 First Home Loan :: Kāinga Ora – Homes and Communities

provide all or a majority of the capital, are appropriately incentivised to manage credit risk and manage the loans on their books. A longer-term benefit of this option is that it would provide lessons for the finance sector and build familiarity with lending on these types of assets.

33. This option would take more time to scope and implement and would also require changes to the appropriation, which may require Cabinet decisions. We have considered this option as it has potential to unlock more market transformation and widespread impact than the others.

Intervention logic / assessment of the option

34. By supporting access to low interest finance, households, small businesses and farms can access financially viable finance to adopt small scale DER. Those with solar PV and batteries would have significantly cheaper power bills, be resilient to emergencies and be able to sell excess generated electricity to the grid at peak times.

35. Technical analysis by Rewiring Aotearoa has estimated that with rooftop solar at 5.5% finance, the delivered energy cost for a home could be $0.12/kWh compared to $0.34/kWh (using the grid average). With a 0% interest rate this could drop even lower to $0.06/kWh.

36. The economics appear to support many households, SMEs and farms adopting solar PV over continued reliance on grid electricity, other barriers appear to be limiting uptake, one of which is suitable access to finance [briefing 2425-0591 refers]. Finance barriers will be more acute for low-income owner-occupiers who would benefit most from access to lower cost electricity.

37. Commercial banks have begun some limited lending in this space, though the range of products available are limited (most offer low interest for only 3 - 5 years at most). It is not clear how well aligned they are with payback horizons of the assets or the needs of low-income households that would benefit most from lower electricity bills.

38. Additionally, most existing solar PV installations and most new residential solar PV installations do not include batteries. Batteries can reduce congestion, defer network investment and increase resilience. However, batteries are costly and have long payback times. Without suitable financing mechanisms to spread the cost over their lifetimes most households will struggle to justify investing in batteries.

39. This option requires the majority of investment to come from private sources and is a clear pathway for integrating private investment into emissions reduction opportunities.

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

BRIEFING

Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply

Date:	13 September 2024	**Priority:**	Medium
Security classification:	Unclassified	**Tracking number:**	2425-0910

Action sought		
	Action sought	**Deadline**
Hon Simeon Brown **Minister for Energy**	**Note** that amending the permitted voltage range could defer or reduce network investment and support solar PV uptake **Note** the proposed increase in upper voltage limit is considered low risk, would be consistent with existing standards for appliances, and would align with Australia **Agree** to begin ministerial and departmental consultation on the attached Cabinet paper (Annex One) and discussion document (Annex Two) **Forward** to the Minister for Workplace Relations and Safety	19 September 2024

Contact for telephone discussion (if required)			
Name	**Position**	**Telephone**	**1st contact**
Tamara Linnhoff	Manager, Electricity Markets Policy	s 9(2)(a)	
Gareth Wilson	Strategic Advisor, Electricity Markets Policy		✓
Ed Smith	Principal Advisor, Electricity Markets Policy	04 901 8248	

The following departments/agencies have been consulted
The attached discussion document was prepared by MBIE with input from the Electricity Authority, Energy Efficiency and Conservation Authority, and WorkSafe New Zealand. We are currently consulting with the Treasury and Ministry for the Environment. The Department of the Prime Minister and Cabinet have been informed.

Minister's office to complete:

- ☐ Approved
- ☐ Noted
- ☐ Seen
- ☐ See Minister's Notes
- ☐ Declined
- ☐ Needs change
- ☐ Overtaken by Events
- ☐ Withdrawn

Comments

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

BRIEFING

Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply

Date:	13 September 2024	**Priority:**	Medium
Security classification:	Unclassified	**Tracking number:**	2425-0910

Purpose

This briefing seeks your approval to begin ministerial and departmental consultation on a Cabinet paper seeking agreement to consult on a proposed amendment to the Electricity (Safety) Regulations 2010 to widen the permitted voltage range for electricity supply on low voltage electricity networks.

A draft cabinet paper is at **Annex One**, and a discussion document at **Annex Two**.

Executive summary

Most homes and businesses connect to the electricity system through low voltage distribution networks. The Electricity (Safety) Regulations 2010 require low voltage electricity to be supplied within six per cent of 230 Volts.

Uptake of distributed energy resources (DER) including solar photovoltaic panels (solar PV) is, and expected to continue, increasing. To keep voltage within the regulated limit of six per cent above or below the specified level, networks may need to curtail the use of DER or invest in significant network upgrades.

We propose to expand New Zealand's regulated voltage range: from 230 Volts plus or minus six per cent, to align with Australia's wider voltage range (230 Volts plus 10 and minus six per cent). This should enable a significant increase in peak output from DER including rooftop solar PV, without requiring additional network expenditure.

The proposed wider voltage range is considered low risk. New Zealand's appliance standards have been aligned with international standards for many years, including designing for voltage ranges of 230 Volts plus or minus 10 per cent. It is also possible that older appliances can tolerate higher voltages, as they are likely to have been designed to accommodate the higher nominal voltage of 240 Volts that was historically used in parts of Australia.

However, there is a risk that allowing higher or lower voltage could result in some appliances depreciating or failing prematurely, leading to inconvenience, replacement costs and potentially harm to consumers. We expect consultation on the proposal to enable a better assessment of the potential size of such risks.

Subject to feedback from the consultation and your approval, we will draft policy proposals and the necessary amendments to the Electricity (Safety) Regulations in preparation for a final Cabinet decision in February 2025, in line with your Ministerial Priorities Output Plan.

Recommended action

The Ministry of Business, Innovation and Employment recommends that you:

a. **Note** that amending the permitted voltage range could defer or reduce network investment and support solar PV uptake

Noted

b. **Note** the proposed increase in upper voltage limit is considered low risk, would be consistent with existing standards for appliances, and would align with Australia

Noted

c. **Agree** to begin ministerial and departmental consultation on the attached Cabinet paper (Annex One) and discussion document (Annex Two)

Agree / Disagree

d. **Forward** to the Minister for Workplace Relations and Safety

Forwarded

Tamara Linnhoff
Manager, Electricity Generation, Infrastructure and Markets Policy
Energy branch, MBIE

13 / 09 / 2024

Hon Simeon Brown
Minister for Energy

..... / ..... / .....

Additional infrastructure expenditure, or rooftop solar curtailment, may be required in future to keep voltage within the regulated range

Homes and businesses get power through low voltage networks

1. Most homes and businesses connect to the electricity system through low voltage distribution networks. The power they supply is sometimes called ‘mains supply’.

2. Most electricity is generated by large power stations connected to Transpower’s high voltage transmission network. High voltages in Transpower’s national transmission network allow large amounts of electricity to be transported over long distances with minimal losses. Lower voltages in sub-transmission and distribution networks allow electricity to be safely transported to homes and businesses, and at each point of supply, the low supply voltage enables electricity to be used by a wide variety of electrical appliances.

Current regulations require voltages remain within a tight +/- six per cent range

3. Current regulations require low voltage electricity to be supplied at a nominal voltage of 230 Volts, and except for momentary fluctuations must be kept within six per cent of that nominal voltage. It is not easy to maintain a very specific voltage at every supply as changes in demand decrease voltage and generation increases it (all other things being equal). New Zealand’s tight voltage range is now an outlier compared to most international counterparts.

The demands on low voltage networks are changing

4. The demands on low voltage networks as more homes and businesses are investing in rooftop solar PV generation and electric vehicles (EVs) – collectively termed DER. The uptake of DER is expected to accelerate in the years ahead as the costs of these resources fall and their performance improves. Electricity consumption may also increase as homes and business switch from using natural gas to electricity to heat their properties and hot water.

5. Large amounts of solar PV could raise voltage above the regulated range (overvoltage) if it coincides with low household demand. Similarly, many EVs charging during high demand could result in voltage on networks falling below the regulated minimum (undervoltage). Other things being equal, distribution networks would either need to curtail the utilisation of distributed energy resources or spend significant sums on network upgrades.

We propose consulting on modernising the regulated voltage range

We propose increasing the upper voltage limit to +10 per cent to allow increased peak output from solar PV, without additional network expenditure

6. We have investigated the potential benefits and costs of increasing the regulated supply voltage range. The discussion document notes that increasing the upper voltage limit from +6 to +10 per cent would:

    a. align New Zealand’s supply voltage range with that in Australia, giving consumers confidence that appliances designed for one market will also operate effectively in the other

    b. be consistent with existing standards that have required appliances sold in New Zealand to be able to operate safely and efficiently at voltages in the range -10 to +10 per cent for several years

    c. enable a significant increase in peak output from solar PV installed in homes and businesses, without needing additional network expenditure.

We do not recommend decreasing the lower voltage limit as the benefits are less clear

7. The discussion document explains that reducing the lower voltage limit from -6 to -10 per cent could potentially avoid or defer network expenditure if low voltage were to constrain charging EVs at peak times.

8. However, this approach is not recommended as expert advice is that transformer thermal limits, rather than low voltage limits, are expected to be the binding constraint on peak demand in most networks.

The risks of appliances failing following an expanded voltage range should be low

9. Appliances are designed and optimised for a certain input voltage. New Zealand's appliance standards have been aligned with international standards for many years, including the wider voltage ranges permitted in Australia and Europe. It is therefore likely that newer appliances sold in New Zealand are designed for a greater voltage range of ±10%.

10. It is also possible that older appliances can tolerate higher voltages, as they are likely to have been designed to accommodate the higher nominal voltage of 240 Volts that was historically used in parts of Australia.

11. However, there is a risk that allowing higher or lower voltage could result in some appliances depreciating or failing prematurely, resulting is costs, inconvenience, and potentially harm to consumers. The main purpose of the proposed discussion paper is to seek evidence of the risks to appliances, so we can properly assess the cost and safety implications of any changes on households or businesses.

12. The discussion document also seeks views on options for how changes to the voltage range could be implemented. For example, whether there are any advantages in taking a phased approach or if there are specific safeguards that should be introduced for higher risk appliances, such as medical equipment.

Next steps

13. We have completed departmental consultation on the discussion document. Subject to your approval we will begin ministerial and departmental consultation on the draft Cabinet paper. Due to recess, the next available Cabinet Economic Policy Committee meeting is on 16 October, ahead of a Cabinet meeting on 21 October. We will therefore prepare to lodge the attached cabinet paper and discussion document in early October.

14. We expect to publish for consultation towards the end of October. Then, subject to consideration of feedback and your approval, we will draft final proposed amendments to the Electricity (Safety) Regulations ready for a final Cabinet decision in February 2025, in line with your Ministerial Priorities Output Plan.

Annexes

Annex One: Draft Cabinet Paper - Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply

Annex Two: Discussion Document - Amendments to the Electricity Safety Regulations to expand the permitted voltage range for electricity supply

Annex One: Draft Cabinet Paper

Draft Cabinet paper withheld in full under 9(2)(g)(i)