Orion

10 November 2025

EECA
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Unlocking the potential of demand flexibility - a residential product perspective

1. Thank you for this opportunity to make a submission on EECA's Green Paper "Unlocking the potential of demand flexibility – a residential product perspective".

Background

2. Orion New Zealand Limited (Orion) owns and operates the electricity distribution infrastructure in Central Canterbury, including Ōtautahi Christchurch. Our network is both rural and urban and extends over 8,000 square kilometres from the Waimakariri River in the north to the Rakaia River in the South; from the Canterbury coast to Arthur's Pass. We deliver electricity to more than 230,000 homes and businesses and are New Zealand's third largest Electricity Distribution Business (EDB). Orion and its various predecessors have been providing this essential service to the region for close to 120 years.

3. Orion is a Lifeline Utility for the purposes of the Civil Defence Emergency Management Act 2002. Orion has a statutory duty under this legislation to ensure it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency.

4. Orion has a fully owned subsidiary, industry service provider Connetics, and together with Orion the two organisations make up the Orion Group.

5. Central Canterbury is a place of rapid growth and transformation, embracing change and innovation, with Ōtautahi Christchurch at the heart of this diverse and vibrant region. Electricity distribution has always been an essential service that underpins regional, community and economic wellbeing. Our service is vital to the wellbeing and livelihood of the people and businesses who live and operate

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here. Now, it also has a critical part to play in New Zealand's transition to a low carbon economy.

6. In this context Orion's Group Purpose of "Powering a cleaner and brighter future with our community" is central to all we do. As Aotearoa New Zealand transitions to a low carbon economy, the energy sector has a critical part to play, primarily through electrification. Orion has established its purpose to be a vital player in that transition for our community and our region. We are focused on helping our community realise its dreams for a future that is new, better, and more sustainable over the long term.

7. We are conscious that we face a rapidly evolving energy environment in the decades ahead. The changing landscape facing Orion is primarily driven by three factors – climate change, new technology and increasing demand for electricity. The increasing demand for electricity is driven by the need to both enable decarbonisation at pace, and support population growth.

8. Orion welcomes the Demand Flexibility Green Paper and supports EECA's clear and constructive framing of demand flexibility as a strategic enabler for a more efficient, resilient, and decarbonised electricity system. Orion's own strategy identifies "facilitating decarbonisation and hosting capacity at lowest cost" as a core objective, recognising the increasing demand arising from electrification and the need for smarter, more dynamic network management. With this in mind, Orion agrees in principle with EECA's direction – particularly the emphasis on consumer choice, interoperability, and accessible communication between end-use technologies, aggregators and the wider electricity system. We share the view that demand flexibility will play a critical role in improving network efficiency and utilisation, supporting renewable generation and delivering long-term benefits in affordability, reliability, and sustainability.

9. At the same time, Orion is concerned that the Green Paper's perspective is overly technology-centric, proposing that device-level standards and technical interoperability can be defined without careful consideration of other key enablers required for flexibility at scale, including market-led innovation, governance and coordination, market design, and consumer engagement and trust. *Greater focus is needed on bringing the market on the journey toward open protocols and interoperability, providing clarity on which standards will apply to which functions, so that market participants have the confidence to invest and innovate within a coherent national framework*.

10. In response to EECAs definition of demand flexibility and demand response, we suggest demand response should be considered a category of, rather than as distinct from, demand flexibility.

11. We set out below our responses to the consultation questions. We note the focus of the Green Paper is substantially about key residential end-use products for demand flexibility, however, a number of the consultation questions ask about the industrial and commercial sectors.

Key end-use products and approach to commercial and industrial

Q1. The main use cases for demand flexibility presented in this paper are: managing peak demand (generation and line capacity) constraints, optimising renewable energy use, and optimising home energy use.

- **Do you think these are the main use cases?**

Yes, we agree that these are main use cases for demand flexibility.

- **What other use cases are there?**

We think there is also benefit in considering use-cases from the energy consumer point of view, specifically return on capital invested in energy infrastructure. For example, if capital expenditure on energy infrastructure can generate additional returns through the day-to-day operation of a commercial or industrial site with demand response options, and this can strengthen the business case for investing in new distributed energy resources (DER) technologies and products.

Q2. In the residential sector, the following products have been identified as key end-use products for demand flexibility: EV chargers, heat pumps, electric hot water systems which use a storage tank, fridges/freezer, clothes washers, dishwashers, clothes dryers, inverters for solar and battery systems, and HEMS.

- **Do you think these are the key demand flexible end-use products in the residential sector?**

End-use products may be more accurately defined as the products that consume electricity to provide a direct functional benefit to the user, as distinct from HEMS, solar and battery systems (and potentially EV chargers), which may better defined as enabling technologies (in the context of flex –

flexibility enabling technologies).

For example,

Flexibility enabling technology	**End use product**
HEMS	Heat pump Hot water cylinder Smart fridge/freezer, dishwasher etc…
Smart EV charger	Electric vehicle
Grid-tied solar and battery system	Any end-use product in the home

We are aligned with the ENA's position that a focus on what makes products most suited to providing a demand flexibility capability (and the magnitude / timing of that capability) should determine which products are the focus of flexibility development. We are uncertain about the costs/benefits of implementing flexible solutions for heat pumps (particularly given New Zealand's relatively low level of installed thermal insulation) and fridges/freezers.

- **If not, what are the key products and why?**

Other products/facilities you may wish to consider are

- outdoor pool heating and pumps – this may be appropriate in areas where there is a high pool/spa pool ownership, and
- underfloor heating, which may be particularly well suited for demand flexibility due to its high thermal mass opening possibilities for pre-heating and allowing longer interruption periods.

Q3. Do you think a standardised end-use product/application-based approach is relevant for the commercial sector, or is a bespoke/customised approach needed?

It is not immediately clear to us how EECA is defining the term "commercial" in this context. We

note that in the North Canterbury RETA Report, EECA included schools, hospitals and accommodation facilities in the definition of "commercial".[1] However, there are likely to be some instances where standardised flexibility enablement (see Q2) products, for example batteries, EV chargers and small-to-medum sized hot water systems are relevant and appropriate for the commercial sector. This is particularly so given the high number of small businesses in New Zealand which may not have overly complex operations. As MBIE notes

> *Loosely defined as those with less than 20 employees, there are around 594,000 small businesses in New Zealand representing 97% of all businesses. With roughly 1 to 5 employees, there are approximately 102,000 micro-businesses representing 17% of all businesses. Small businesses account for 27% of employment and contribute over 40% of economic value-add."*[2]

For the *application* of flex, and for the products that can allow flex in our larger commercial businesses, Orion considers that a bespoke or semi-customised approach may be more appropriate. Insights from Orion's recent C&I demand flexibility study highlight that:

- Load characteristics and flexibility potential vary widely between sectors — e.g. refrigeration in supermarkets, HVAC in education or large offices, and hot water in accommodation or aged care.
- Operational constraints and customer experience considerations are central to participation decisions. For instance, schools may pre-heat classrooms before morning peaks, while aged-care or hospitality sites cannot compromise occupant comfort at any time.
- Technical control and equipment needs differ by end use, from building management system (BMS) integration for HVAC, to temperature-sensitive logic for refrigeration, and thermal storage for water heating.
- Variables will also include the size of the commercial premises where the business is undertaken, whether a premises is multi-tenanted, and the number of employees.

In summary, a hybrid approach could lower participation barriers by providing standardisation where

[1] See https://www.eeca.govt.nz/assets/EECA-Resources/Co-funding/RETA-North-Canterbury-Summary-Report.pdf
[2] See https://www.mbie.govt.nz/business-and-employment/business/support-for-business/small-business-and-manufacturing

possible, while also supporting the high diversity of energy use in the commercial sector.

Q4. What do you think the key end-use products/applications are in the commercial sector?

From our experience working with Orion's commercial and industrial consumers, these are the types of end-use products/applications that EECA could consider when looking at the commercial sector:

- Heating, ventilation and air conditioning (HVAC) systems (separate to process heat for industrial processes)
- Refrigeration systems
- Industrial water heating systems
- Water pumping systems including municipal drinking and wastewater
- Public swimming pool heating, filtration and HVAC systems
- Building automation and energy management systems
- Electric vehicle fleet charging systems.

Q5. Do you think a standardised end-use product/application-based approach is relevant for the industrial sector, or is a bespoke/customised approach needed?

We refer to our answer above and suggest that similar considerations will apply, albeit weighted toward a more customised approach than the commercial sector. Again, it is not immediately clear how EECA distinguishes between the commercial and industrial sectors but we presume that by industrial, generally EECA is referring to businesses that are engaged in manufacturing processes, or transforming raw materials into products. These types of premises will likely have high energy usage, and highly bespoke systems and processes.[3]

Q6. What do you think the key end-use products/applications are in the industrial sector?

We refer to our answer at Q4, and also note that products/applications involving process heat will be key in this context.

In addition, we are interested in future potential for large-scale industrial heat storage to soak up

[3] Examples of these types of premises are detailed in the Regional Energy Transition Accelerator Reports at https://www.eeca.govt.nz/co-funding-and-support/products/about-reta/

increases in excess renewable power, and to provide additional flexibility to the network.

Q7. What are the barriers to the uptake of demand flexible technology?

From a residential householder perspective, we suggest that a key barrier is energy hardship. We refer you to the Report on energy hardship measures for June 2022 (a new report has not been released since then).[4] Main findings from that report included:

- more than 110,000 households could not afford to keep their home adequately warm,
- households with Māori and Pacific peoples are more likely to experience measures of energy hardship,
- renters are between 4 and 6 times more likely to experience energy hardship,
- around 1/3 of low-income households could not afford to keep their accommodation adequately warm, and
- crowded households are more likely to experience measures of energy hardship compared to non-crowded households.

More recent analysis suggests that some 30% of households face energy hardship.[5] Those facing energy hardship can also include "hard to reach energy consumers". Hard to reach energy consumers includes marginalised groups such as those affected by mental illness/other disabilities, isolated elderly, isolated (indigenous) rural communities, victims of crime/domestic violence.

Purchasing energy efficient products and systems that enable demand management will be simply out of budget for many householders. They will not be able to afford the initial investment, and may not have time to learn how to use the products and systems.Other concerns that may act as a barrier to the uptake of demand flexible technology include:

- The loss of ability to override an external party's control of the householder's own device. If there is no ability for manual overrides, it may deter households from embracing the technology,
- The potential complexity of adopting the technology and understanding how it works in practice and the effects on the daily lives of householders,

[4] See https://www.mbie.govt.nz/assets/measures-of-energy-hardship-june-year-2022-report.pdf
[5] See https://www.rnz.co.nz/news/business/567858/energy-reform-has-to-go-beyond-cheaper-off-peak-power

- Complex tariff regimes that are difficult to understand,
- A perception that the financial rewards are too small in exchange for possible inconvenience,
- Low trust in electricity retailers and perceived uncertainty about whether customers will receive fair value from DER control,
- Perception of home batteries being unsafe and environmentally unsustainable,
- Data privacy and who has access to information about a household's daily routine and preferences. It may not be clear where the data is stored or how it is used, or who has access to the data and this may inhibit uptake of the technology, and
- Cyber security and the compromising of a household's products or technology applications. We appreciate that cyber security discussions are out of scope of this Green Paper but household concerns about cyber security may act as a barrier to embracing demand flexible technologies.

In a recent community engagement event held by Orion on the topic of demand flexibility, residents were broadly supportive of the idea of flexible energy use; however, actual adoption depends on simplicity, affordability, trust, safety assurance and clear personal benefit. We also refer you to the FlexForum Insights from its recent round table sessions at Flex Day 2025.[6]

In addition, we point you to the recent Australian study, the *Future Home Demand* project that has focused on household life and everyday practices to guide understandings of possible and plausible futures, which details some of these concerns as research findings.[7]

End-use product level components for demand flexible capability

Q8. The paper describes the three main end-use product components for demand flexible capability as: communication protocol, product response, and operational information.

- **Do you agree that these are the main components for demand flexible end-use products?**
  Yes, we broadly agree that these three end-use product components are important for demand flexibility capability. However, we also refer back to our comments in the opening paragraphs of this submission where we noted that Orion is concerned that this Green Paper's perspective is

[6] See 250922-flex-day-roundtable-notes_1.pdf
[7] See https://www.monash.edu/emerging-tech-research-lab/research/projects/future-home-demand-anticipating-energy-and-everyday-life-trends-across-three-victorian-networks

overly technology-centric, where technology and technology standardisation is considered without fully considering key enablers of flex, such as market and regulatory design and consumer trust and engagement.

In terms of product response, we also refer to our comment above that the product needs to retain an ability for manual override of an external party's control of the householder's own device. See trend 7 in the Future Home Demand Project report which noted that "*Some households are willing to cede a degree of control if automation brings benefits like increased convenience. However, most want to retain the ability to easily adjust settings on the fly, or to fully override automation as their circumstances change. The ability to retain a final say over devices is also strong in the households most interested in smart home technologies and other forms of energy automation*."[8]

What other components or considerations are important for end-use products?

End-use products and flexibility enablement products are located within homes, likely owned by home occupiers, and their operations affect the day-to-day running of the household. Logically, it follows that user needs and benefits should be a primary consideration for end-use or flexibility enablement products. We have heard from community engagement that residential DER products, and the wider flex ecosystem should enable users and owners of DER to:

- Easily understand how best to use their specific DER for maximum return on investment,
- Maintain visibility on when, why and by whom their DER is being controlled and how value is shared,
- Override external control , and
- Seamlessly allow any retailer and/or aggregator to access their DER if a better deal becomes available.

Q9. Do you think to support the development and uptake of demand flexibility there is a need to create a minimum level of standardisation at an end-use product level (covering communication protocol, product response, and operational information)?

Orion agrees in principle that targeted standardisation of technology including open protocols will play an important role in flexibility management moving forward.

[8] See n5, p93.

Orion is concerned, however, that prematurely setting mandates (including within EECA's funding criteria) without careful consideration and clear definition could undermine development, uptake and innovation in the flexibility space by:

- Penalising early movers that are already providing high value to users,
- Discouraging or eliminating prominent market players (both equipment providers and retailers / aggregators), and
- Limiting consumer choice.

There are benefits to both open and proprietary communications protocols. For example, open protocols facilitate seamless integration of diverse devices and systems from multiple vendors, and reduce vendor lock-in and support a competitive, innovation-friendly ecosystem. However, proprietary protocols also provide important value, particularly in early-stage or specialised deployments and enable vendors to innovate (for example by including advanced features not yet supported by open standards).

Development of demand flexible end-use products

Q10. Would you support EECA creating a voluntary approved list of residential demand flexible end-use products, similar to EV Smart Charger Approved List

Yes, assuming consumer usability considerations are included within the acceptance criteria, and EDBs are consulted on technical criteria where appropriate.

Q11. Would you participate in working groups on the key end-use products to develop voluntary demand flexibility requirements (covering communication protocol, product response, and operational information)?

- **If so, what product based working groups would you like to be part of?**
  Orion would be happy to be involved in any of the product-based working groups.

Q12. If you are an end-use product supplier, would you manufacture/import/supply end-use products that meet the voluntary specification?

No comment.

Concluding comments

12. Thank you again for the opportunity to provide this submission.

13. If you have any questions please contact Vivienne Wilson, Policy Lead, Vivienne.wilson@oriongroup.co.nz, (03) 363 9898.

Yours sincerely

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