Resi-Flex
Unlocking the value of residential flexibility

JULY 2023

PUBLIC REPORT

PHASE 1, RELEASE 1 - THE CONSUMER AND FLEXIBILITY STAKEHOLDER LENS

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The transformation of Aotearoa's energy market is fast becoming a New Zealand imperative, with the increased focus on climate change, decarbonisation and the electrification of our economy all indicating that the energy sector is on the cusp of significant change.

As a result, there is an influx of innovation projects, trials, and research initiatives underway, together with strong industry collaboration to enable and support the rapid decarbonisation of our country.

As part of this, the use of flexibility is being increasingly recognised as a critical enabler of consumer choice, new market entrants, as well as fundamental to an efficient power system.

This has seen Orion and Wellington Electricity partner in the Resi-Flex project to explore the use of flexibility from residential consumers as part of the future energy mix. Through understanding the requirements of all users across the value chain for flexibility – from consumers to flexibility stakeholders, to distribution network companies – Resi-Flex will help to define and trial the commercial mechanisms needed to incentivise greater use of flexibility resources in the future.

This is Release 1 of the Resi-Flex Public Report, which is focused on exploring the perceptions, motivations, barriers and requirements of Consumers and Flexibility Stakeholders only. It is intended through this first release to share early learnings about these users' requirements, before seeking further feedback and publishing Release 2 which will focus on Network Use Cases and the Commercial Mechanisms developed for future trials.

Background Context

The Business Context

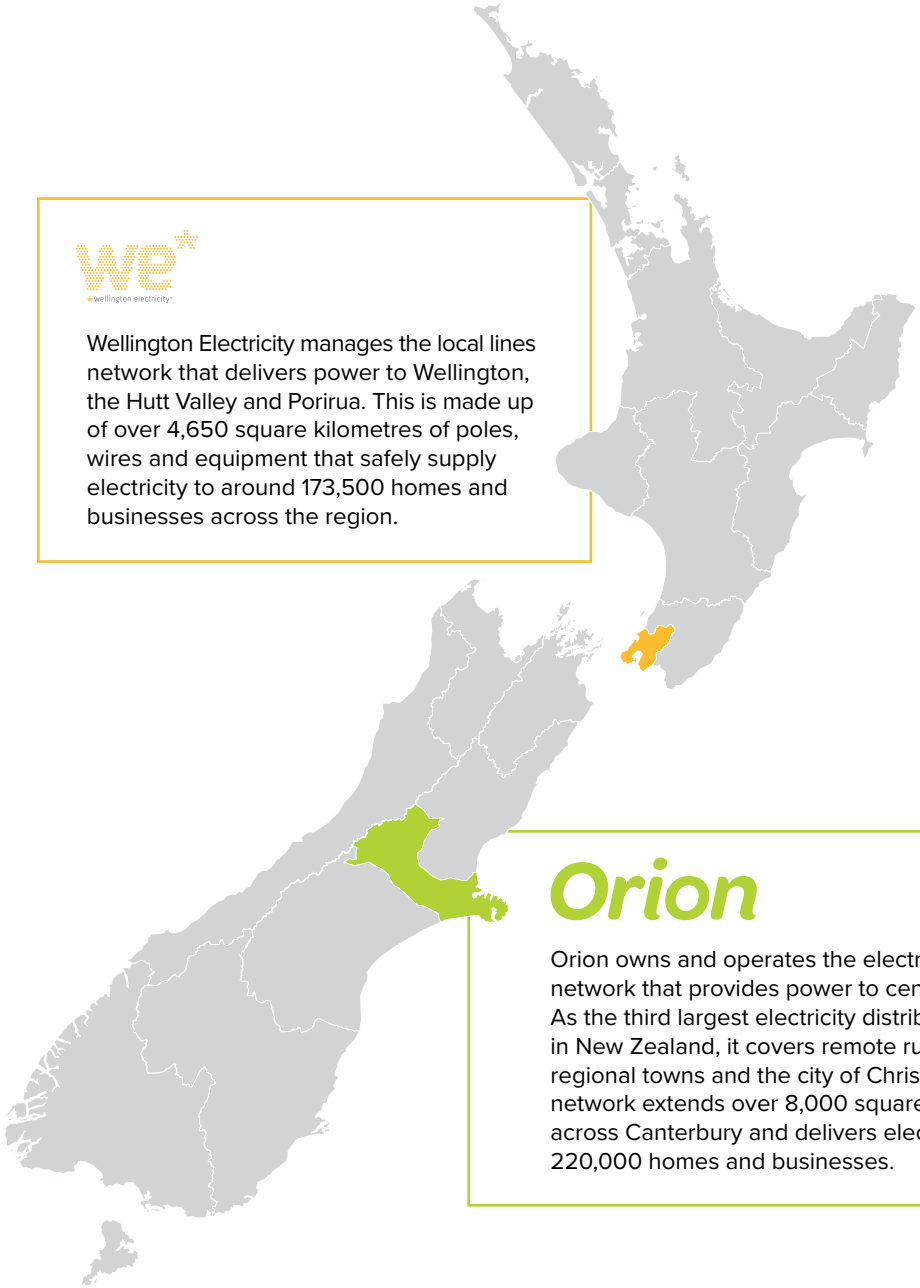
Orion and Wellington Electricity Drivers

Through the Resi-Flex partnership, Orion and Wellington Electricity have been able to drive progress, leverage shared resources and expertise, and develop scalable insight.

Like other Electricity Distribution Businesses (EDBs), both companies have different flexibility use cases depending on their specific network and customer characteristics, demand forecasts and capacity limits but have a shared interest in understanding flexibility user requirements which is driven by:

- Transport electrification, including Electric Vehicle (EV) growth and emergence of clusters.
- Housing intensification and population growth.
- Evolving consumer behaviours and expectations as they change the way they use, generate and manage their energy.
- Uncertainty around future hot water control as consumer behaviour changes and new propositions from flexibility stakeholders become available (mainly a driver for Orion).
- Low voltage networks that residential customers are connected to not being designed for large devices like EV chargers.
- Increasing transition from gas to electricity (mainly a driver for Wellington Electricity).

By working on Resi-Flex together, Orion and Wellington Electricity have been able to review the findings of this project through the lens of each company's differing needs, as well as share ideas, learn, and enrich our understanding of flexibility and its users for the benefit of all of New Zealand.



Wellington Electricity manages the local lines network that delivers power to Wellington, the Hutt Valley and Porirua. This is made up of over 4,650 square kilometres of poles, wires and equipment that safely supply electricity to around 173,500 homes and businesses across the region.

Orion

Orion owns and operates the electricity distribution network that provides power to central Canterbury. As the third largest electricity distribution network in New Zealand, it covers remote rural areas, regional towns and the city of Christchurch. Orion's network extends over 8,000 square kilometres across Canterbury and delivers electricity to around 220,000 homes and businesses.

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The Case for Change

A New Zealand and International View

The transition towards net-zero emissions is leading to an increasing reliance on electricity.

Historically, Aotearoa has largely managed peak demand electricity use by managing consumers' hot water heating through ripple relays. This has enabled EDBs to defer network investment, demonstrating the value of modifying consumer consumption patterns.

With the demand increase due to decarbonisation, the smart capabilities of Distributed Energy Resources (DER) and the increasing share of intermittent generation, the potential and need for demand-side flexibility is increasing.

The benefits of using flexibility are therefore being actively explored across Aotearoa and internationally. It has been a useful component of the Resi-Flex project to understand this context as part of researching flexibility user requirements.

USE OF FLEXIBILITY – THE INTERNATIONAL CONTEXT

The importance of developing flexibility is not limited to New Zealand. Many other countries have identified its development as a key step in their decarbonisation programmes, as outlined below (noting this is not an exhaustive list).

- The International Renewable Energy Agency (IRENA) has highlighted the value of demand-side flexibility for power sector transformation[1].
- Great Britain's independent energy regulator (Ofgem) includes the following change programme[2] as part of its strategic framework: "To deliver full chain flexibility in how we generate, use and store energy".
- Australian Renewable Energy Agency (ARENA)[3] is providing research funding for demand-side flexibility trials.

USE OF FLEXIBILITY - THE NEW ZEALAND CONTEXT

There are a range of stakeholders across the energy system in New Zealand who have identified the use of flexibility as a central deliverable as part of our country's future energy and decarbonisation strategies, as outlined below (noting this is not an exhaustive list).

- The Ministry for the Environment's Emissions Reduction Plan[4] calls for more efficient use of New Zealand transmission and distribution infrastructure.
- Boston Consulting's 'The Future is Electric' Report[5] includes high-priority actions to develop flexibility services, improve distribution peak pricing signals and smart managed tariffs to "enable a smart electricity system".
- Research by Concept Consulting[6] suggests EVs and hot water will provide almost 90% of the potential for flexibility from consumer appliances. Although, based on the assumptions made by Concept Consulting, we anticipate other technologies (ie., solar and batteries) will also play a major role. Note, most consumers are unaware of the existing or future value of flexibility or how this impacts their power bill.
- The Electricity Authority's Market Development and Advisory Group (MDAG)[7] has emphasised the need for tariff and technology innovation to ensure consumers have access to the information they need to make informed decisions about electricity use and flexibility.
- Transpower's Whakamana i Te Mauri Hiko[8] (September 2022) identifies the development of flexibility at the grid and distribution level as key deliverables.
- The cross-sector working group, FlexForum, has been established to unlock the value of flexibility for households, businesses, communities, the power system, and New Zealand as a whole. In August 2022, they published 'A Flexibility Plan 1.0'[9] as a starting point for coordinated and collaborative action. It has an emphasis on learning-by-doing to deliver on the steps set out in the Plan (steps C, 20 and 21 directly relate to Resi-Flex).
- Wellington Electricity's EV Connect Roadmap[10], which was developed through a series of industry workshops, identifies the actions needed to implement flexibility (actions 17 and 18).

1 Demand-side flexibility for power sector transformation, IRENA, December 2019
2 2022/23 Ofgem Forward Work Programme, Ofgem, March 2022
3 ARENA Projects
4 Emissions Reduction Plan, MfE, May 2022
5 Climate Change in New Zealand: The Future is Electric and Summary Brochure 'The Future is Electric: A Decarbonisation Roadmap for New Zealand's Electricity Sector', Boston Consulting Group, October 2022
6 Concept Consulting Research Report
7 Price discovery under 100% renewable electricity supply, Market Development Advisory Group
8 Whakamana i Te Mauri Hiko Monitoring Report, Transpower, September 2022
9 FlexForum Flexibility Plan 1.0
10 Wellington Electricity's EV Connect Roadmap

Defining Flexibility

System-Wide Benefits

'Flexibility' occurs when electricity consumption or generation is modified in response to a signal – consumers can respond directly or allow devices to be managed on their behalf.

Flexibility is defined by Ofgem[11] as "modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system". This definition has been recommended for use by the Electricity Authority's Innovation and Participation Advisory Group (IPAG) and its Market Development Advisory Group (MDAG)[12].

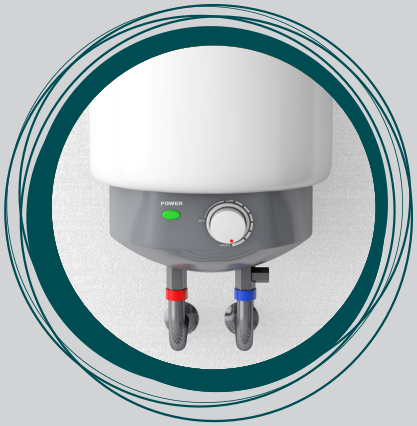
In this Public Report, there are two types of flexibility referred to from an EDB lens:

- **Price signals** (or Price-based Flexibility*) through distribution pricing, where networks charge for the use of lines;
- **Flexibility services** (or payments / Contracted Flexibility*), where the network procures and pays for a response.

Flexibility is useful for EDBs to help balance energy supply and demand, manage network constraints, or manage power quality issues.

The services that flexibility can offer therefore add system-wide benefits because of the value enabled by accessing the flexibility resources and 'stacking' them together.

Flexibility is available in some appliances or Distributed Energy Resources (DER) already like:



HOT WATER CYLINDERS

ELECTRIC VEHICLES

SOLAR AND BATTERY SYSTEMS

11 Ofgem – UK: Our flexibility vision
12 FINAL Demand side flexibility review for publication (ea.govt.nz)

Terms with * use FlexForum definitions.

ELECTRICITY DISTRIBUTION BUSINESSES

(Need flexibility to help manage network needs)

FLEXIBILITY STAKEHOLDERS

(Orchestrate flexibility resources allocation in response to various needs)

RESIDENTIAL CONSUMERS

(Provide flexibility resources to be managed in exchange for rewards)

Throughout Resi-Flex, the above terminology has been used to describe the relationships between the key parties in the flexibility value chain for residential consumers. Given the role of various parties to enable residential flexibility, the broad term 'Flexibility Stakeholders' has been used to represent Retailers, Flexibility Suppliers, Aggregators, Technology Platform Suppliers and End Consumer Integrators (which are described in more detail on p20).

Resi-Flex Overview

THE PROJECT APPROACH

PROJECT PURPOSE

To incentivise flexibility from residential consumers by exploring commercial mechanisms in collaboration with flexibility stakeholders.

PROJECT OBJECTIVES

The Resi-Flex project has been anchored in a clear set of objectives, which have directed the phases of work and the outcomes Orion and Wellington Electricity are striving to deliver.

Project Phases

A Process to Drive Focus

The Resi-Flex project utilises a learning-by-doing and exploratory approach, and comprises three phases.

The first phase focuses on identifying user requirements from various perspectives across the flexibility value chain, including consumers, flexibility stakeholders, and distribution network companies.

These user requirements are helping inform the second phase, where a commercial framework is being developed to define a range of mechanisms to incentivise flexibility.

In the third and final phase, Orion and Wellington Electricity will partner with flexibility suppliers to co-design consumer offerings based on the selected commercial mechanisms and trial these with consumers. These trials will help inform EDBs on which mechanisms to scale, ultimately creating opportunities for residential consumers to provide flexibility, while supporting equitable outcomes for all consumers, including those in energy hardship.

RELEASE 1
- Explore consumer perceptions and motivations
- Identify flexibility stakeholders' barriers and enablers

RELEASE 2
- Identify network use-cases and technical requirements

RELEASE 2
- Develop and evaluate a range of commercial mechanisms
- Assess flexibility service conflicts and synergies
- Assess regulatory barriers and enablers

- Co-design customer offerings with flexibility stakeholders
- Trial and evaluate the effectiveness
- Plan implementation of scalable solutions

Prerequisites

Regulatory and Market Changes

There are critical regulatory and market changes needed to ensure that flexibility services can be provided, while maintaining a secure and stable electricity system.

While wider regulatory and market changes are outside of the scope of Resi-Flex, the project assumes that these will be in place to enable flexibility to be scaled. Orion and Wellington Electricity have other activities and projects focused on the changes needed to provide a stable electricity system that can support flexibility. The project assumes key capabilities are being developed which include (but are not limited to):

- Ensuring DER can participate in flexibility;
- Making flexibility available to EDBs in emergency situations;
- Rules to ensure EDBs can maintain network security when resources connected to distribution networks are used to provide flexibility to the wider electricity system;
- Providing regulatory allowances to EDBs to develop and purchase flexibility services.

LIMITATIONS OF THIS REPORT

Resi-Flex has a number of limitations, due to its exploratory nature and we acknowledge them for the following reasons (including, but not limited to):

1. Flexibility is a new concept for Aotearoa. Therefore, it is not a mature market and will evolve with adapting strategies and solutions.
2. The infancy of flexibility in New Zealand means that the views of the stakeholders, consumers and those of Orion and Wellington Electricity are still evolving. Therefore, it is expected that user requirements will continue to be refined as the industry gains understanding and experience.
3. Resi-Flex's goal is to understand user requirements - it is focused on researching, understanding and designing future trials. Resi-Flex is not prescribing solutions or services for business-wide implementation. The recommendations from any trials as part of this project may not be implemented in the future depending on other project outcomes, regulations and commercial constraints.
4. This Report does not represent Orion and Wellington Electricity's business strategies, and any shared insights do not supersede Orion and Wellington Electricity's existing delivery and pricing strategies. The Orion and Wellington Electricity perspectives expressed in this Report are solely in regard to what is needed to stimulate the flexibility market.

SPECIFIC TO CONSUMERS:

5. The consumer research is not focused on the full customer spectrum, but rather specifically 'consumers' of electricity. The personas developed in this report are predominantly based on international trials and data, so more research will be required to further validate these findings in the New Zealand context.
6. Consumer-related data from international trials is skewed towards early adopters who are more likely to engage in trial programmes, so there is less detailed data representing less engaged or less energy literate consumers.
7. The consumer personas do not cover the entire population of New Zealand, rather, they are designed to provide breadth across New Zealand consumers.

SPECIFIC TO FLEXIBILITY STAKEHOLDERS:

8. The summarisation process that was used for Flexibility Stakeholders risks re-interpreting stakeholders' views because of our own cognitive bias in the process of collating and categorising the feedback into themes and key findings. Similarly, stakeholders weight things differently and come with their own biases or managed messages.

The Consumer Lens

SUMMARY OF CONSUMER RESEARCH

Research Purpose

Establishing Clear Outputs

From the outset it has been important for Orion and Wellington Electricity to establish what was required from the consumer research so that we could design services with flexibility stakeholders, with the end-user needs in mind. Therefore, the purpose of the research was to deliver four key outputs:

- Define and describe a range of consumer groups, based on their willingness and ability to adopt flexibility.
- Describe potential consumer journeys to flexibility.
- Describe perceptions, motivations, barriers and enablers to participating in flexibility.
- Detail consumer evaluating criteria to inform value propositions (e.g., override functionality).

1.

Identification and refinement of persona groups

Relevant persona groups were identified. These were based on the ability and willingness of different groups to adopt flexibility.

2.

International secondary research

Secondary data was analysed, using international research from ongoing flexibility trials, as well as behaviour change research and data about New Zealanders' current electricity usage and behaviour. Based on this, the persona groups were further assessed and refined.

3.

In-depth interviews with New Zealanders

Orion and Wellington Electricity acknowledge the limitations of applying findings from international secondary research to the New Zealand market. To mitigate this within the scope of Resi-Flex's research, in-depth interviews were conducted with five New Zealanders who reflected each of the finalised persona groups.

4.

Testing and verifying with FlexForum members, including consumer-facing organisations and Resi-Flex Partners

This stage involved presenting a draft version of the Resi-Flex Report with stakeholders and internal audiences. This feedback helped to refine the overall persona journeys.

Frameworks Used

A Complete View of Consumer Behaviour

Two key frameworks were used to develop and ensure the robustness of each consumer persona.

THE COM-B MODEL

The Com-B model helps reflect the behaviour-change aspect of flexibility. Therefore, each persona was developed according to the three components of the Com-B model:

- Capability: Does the consumer have the knowledge and understanding to engage with flexibility?
- Opportunity: Does the consumer have the resources, time or ability to engage with flexibility?
- Motivation: Does the consumer's motivations align with a want to engage with flexibility?

JOURNEY STAGES

To describe each consumer persona's journey to flexibility, the 'Discover, Assess, Enable and Operate' journey developed by FlexForum[13] was used.

PHASE 1.	2.	3.	4.
DISCOVER	ASSESS	ENABLE	OPERATE
This is where a consumer first discovers the menu of flexibility choices available given their preferences, circumstances, budget and equipment options.	During this phase, a consumer assesses and decides between different flexibility options based on their personal motivations and needs.	This part of the journey explains the support needed by a consumer from their electricity provider to enable and empower them to use flexibility (investment and commissioning).	This phase describes the day-to-day operational needs of a consumer for their flexibility options.

13 FlexForum 'A Flexibility Plan 1.0' August 2022

Motivations, Barriers and Solutions

An International View

Looking to what has been learnt internationally, in terms of the key motivations and barriers identified, together with the solutions for those themes, was a key part of the consumer research process. This helped to determine what Orion and Wellington Electricity needed to test and explore in the New Zealand context.

MOTIVATIONS	Cost saving is a key driver for flexibility	Sharing information on flexibility should be simple, relevant and engaging
	Environmental reasons are an important secondary motivator	More educated consumers are more likely to get on board with flexibility
BARRIERS	The perceived lack of control is the biggest barrier (e.g., an EV not charged when needed)	An override function for flexibility loads (e.g., EVs and hot water), together with guided support and education builds perception of control
	Aversion to changing the daily routine, together with the perceived effort to make changes, is a key barrier	Behavioural interventions and messaging can lessen the perceived effort of engaging with flexibility

SOLUTIONS

The Personas

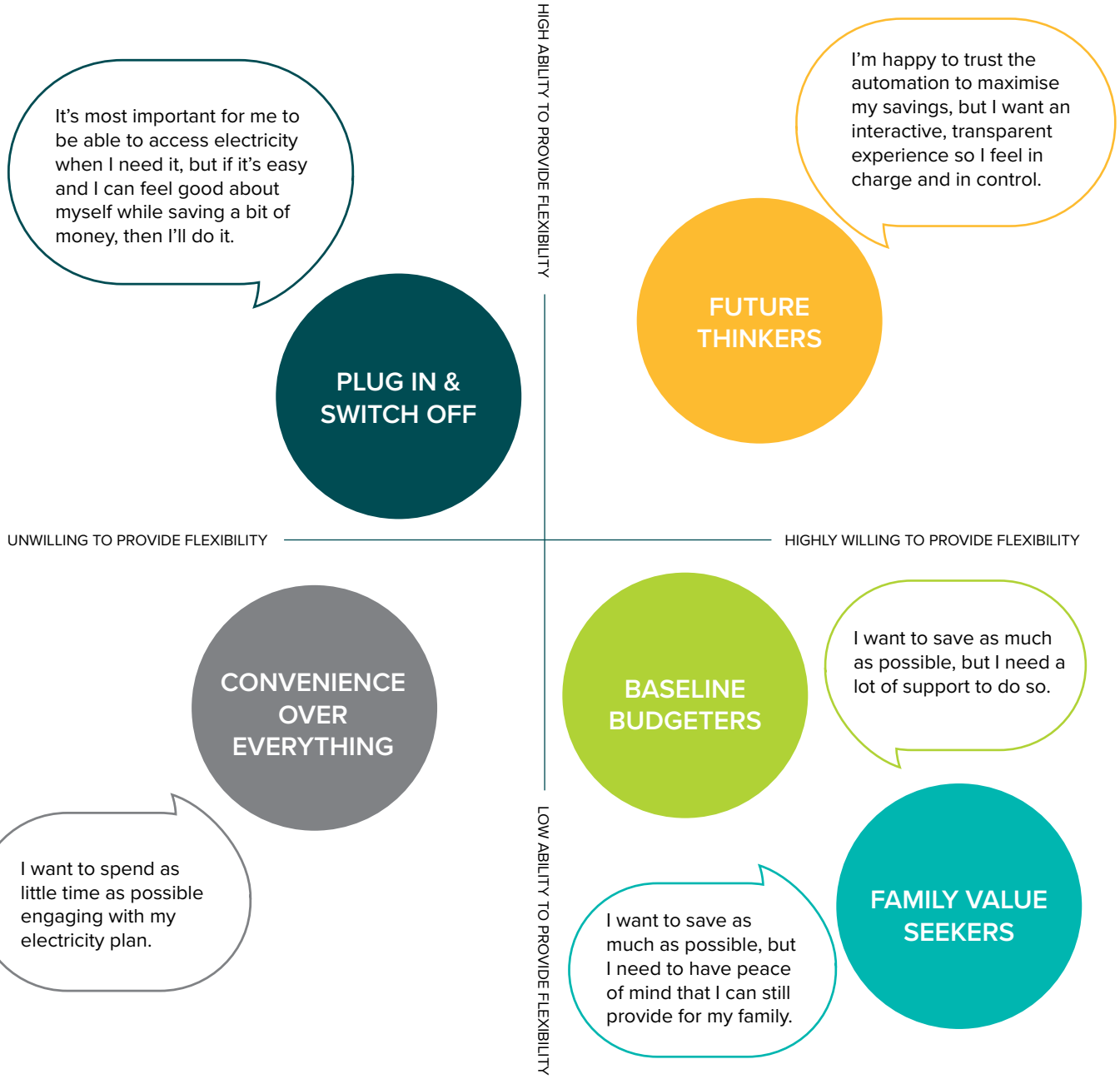
Defined for the NZ Market

Based on learnings gained from secondary international research, five consumer personas for the New Zealand market were defined.

The five personas are:

- **Future Thinkers**
- **Plug In & Switch Off**
- **Family Value Seekers**
- **Baseline Budgeters**
- **Convenience over Everything**

After conducting the New Zealand interviews, each persona was measured according to the following axes - ability to adopt or provide flexibility and willingness to adopt or provide flexibility. This helped to further develop these personas and test their application for the Resi-Flex project.



Persona Mapping

Framework Assessment

Aligned to the project's methodology, each persona was mapped against the Com-B model's three areas, giving a score for each (1: Low to 5: High).

CAPABILITY

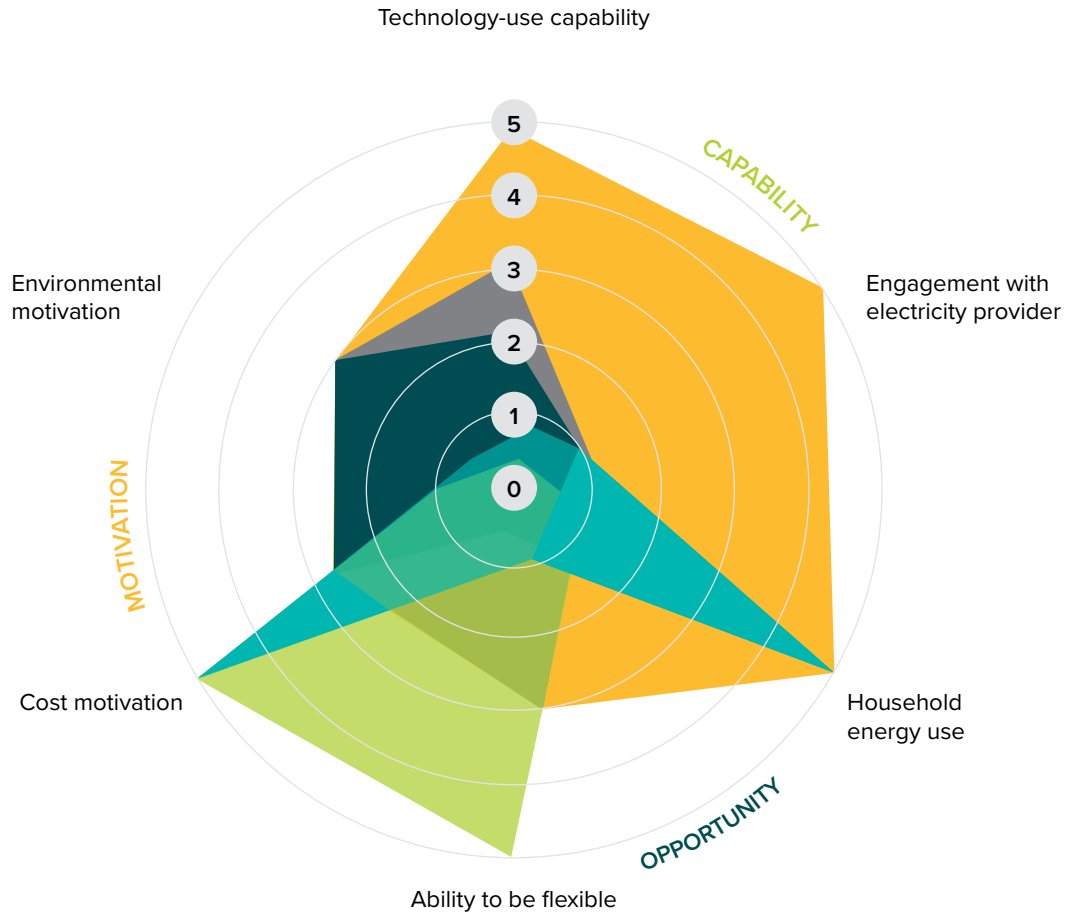
- Technology-use capability
- Engagement level with electricity provider

OPPORTUNITY

- Household energy use
- Ability to be flexible

MOTIVATION

- Cost motivation
- Environmental motivation



FUTURE THINKERS

PLUG IN & SWITCH OFF

FAMILY VALUE SEEKERS

BASELINE BUDGETERS

CONVENIENCE OVER EVERYTHING

Summary Journey Experience

The Opportunities

This summary journey map highlights the user requirements that were consistent across all personas, which will need to be considered when designing future trials.
While the importance of each need varied for the different personas, these areas were commonly identified as ways the sector could help residential consumers across the full journey experience.

PHASE

1. DISCOVER	2. ASSESS	3. ENABLE	4. OPERATE
• Build education around flexibility in NZ • Communicate that flexibility can reduce costs • Use relevant channels and message framing to engage consumers	• Show how flexible customer offerings can help consumers reach their goals • Make it easy to compare customer offerings	• Provide support with any technology required for flexible customer offerings • Simplicity and clarity in how flexible customer offerings work • Work alongside existing habits and routines	• Enable customers the ability to manage their energy usage (e.g., ‘set and forget’ / ‘override’ options) • Support in operating any flexible customer offerings • Ongoing motivation and encouragement to engage

The detail behind this summary is provided in Appendix 2.

The Flexibility Stakeholder Lens

SUMMARY OF FLEXIBILITY STAKEHOLDER RESEARCH

Research Purpose

Establishing Clear Outputs

To incentivise residential flexibility, enable market maturity, and encourage new system opportunities, it was pivotal to establish what was needed from Flexibility Stakeholders. This helped to define the purpose of the research in three key outputs:

- Understand the different types of flexibility stakeholders.
- Uncover their barriers, enablers and drivers.
- Understand the price signals they will respond to, and optimise, if enabled.

1.

Identify Stakeholders to Research

Issue draft stakeholder mapping with inputs from EDBs (Orion and Wellington Electricity).

2.

Recruit Stakeholders

Invite stakeholders to participate, utilising FlexForum and EDB contacts.

3.

Consult through Interviews and Survey

Conduct layered interviews and survey a mix of stakeholders across the flexibility supply chain.

4.

Identify Key Themes

Extract emerging messages from all results.

5.

Summarise Results

Identify overall barriers and wants and needs by Flexibility Stakeholders and resulting key factors EDBs could consider when designing flexibility services.

Steps 3-5 were led by an external consultant with an experience bias deeply steeped in the flexibility sector. Step 5 was then moderated by EDB partners, and draft results were shared with consulted stakeholders for feedback, which have been taken into account for this publication.

User Categories

Mapping The Current Flexibility Market

The contribution of flexibility as part of the new energy system mix involves a number of market players and there are currently a wide range of stakeholders in the flexibility space. While it is expected that the roles and scope of the players involved will continue to change and evolve as the sector matures, the research as part of this project identified three "user categories" across the value chain to help clarify the roles and responsibilities of the players involved in enabling flexibility as a whole-of-system approach. The 17 participating flexibility stakeholders have been mapped to these three user categories, as described below. Please note that some stakeholders consulted are in more than one category (see p21).

WHO DOES WHAT?

Roles & Responsibilities

Below is an explanation of the roles of the current market players, and the types of things they manage or are responsible for.

FLEXIBILITY STAKEHOLDERS

Retailer

- Designs customer propositions.
- Adds other value drivers (e.g. customer experience).
- May have in-house platforms and data insights.
- May operate their own Virtual Power Plant (VPP).

Flexibility Supplier (Aggregator and/or Technology Platform Provider)

- Aggregates and manages DERs.
- Connects value suppliers to DERs.
- Uses network, market, external and customer signals to optimise flexibility use (via market or contract).
- Delivers fulfilment platforms/capabilities to stakeholders.

(There are a wide range of Aggregator types: Controlled Load Aggregators, Solar-only Aggregators (curtailment), Solar/battery Aggregators (battery control), EV Charger Aggregators, Mixed Aggregators, etc.)

End Consumer Integrator

This category includes a range of players that currently integrate solutions for the end consumer. They work with Retailers, Flexibility Suppliers and/or Aggregators as:

- Consultants, designers and integrators from the energy, building or related fields.
- Product distributors.
- Consumer representatives and supporting agencies.

Market Infancy

Stakeholders with Multiple Roles

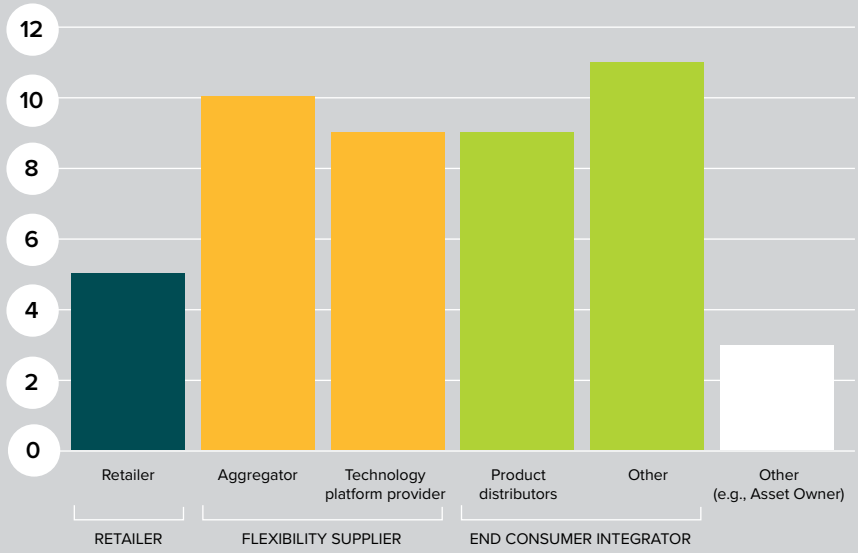
The research consisted of consulting 17 stakeholders across the still nascent flexibility market, mainly recruited through FlexForum. Of these, a mix were interviewed, some were surveyed, and some were both interviewed and surveyed.

Of the Flexibility Stakeholders consulted, many identified themselves across multiple roles within the current flexibility system, demonstrating Aotearoa's current flexibility market infancy.

Other observations about stakeholders:

- It is a fluid marketplace. Many stakeholders are playing multiple roles e.g., product developers have developed technology platforms that enable aggregation.
- Aggregators were either retailers or had developed strong partnerships with them to enable access to the retail component of the value stack.
- It is expected that the roles and scope of stakeholders will continue to change and evolve as the sector matures.

STAKEHOLDERS WITH MULTIPLE ROLES ACROSS THE CURRENT FLEXIBILITY MARKET



Barriers and Enablers

Flexibility Stakeholder Insights

The feedback from Flexibility Stakeholders uncovered the high-level themes as it relates to the barriers they perceive are preventing or blocking greater use of flexibility (or market maturity) together with the enablers (the things they want and need for the market to grow).

These insights from Flexibility Stakeholders have been summarised into five categories for the "Barriers (Preventing Flexibility Use)" and into four categories for the "Enablers (Wants and Needs)".

BARRIERS (PREVENTING FLEXIBILITY USE)

REGULATION & STANDARDISATION

- Lack of standardisation and common language
- Numerous EDB processes
- Technical barriers
- Current "market" is stacked in favour of incumbent generation and network solutions
- EDB constraints under the current regulatory regime

MINDSET

- Simplicity has been favoured over education for consumers, leading to a lack of understanding for consumers
- Legacy of utility-led control and risk aversion (due to the nature of the business) limiting innovation and collaboration

ENABLING PROCESS-PILOTS

- Isolated and infrequent
- Investment costs
- Limited scope and not scalable for rollouts

COMMERCIAL ISSUES & SCALABILITY

- Limited access to value stack. Critical mass not reached yet (locational value of DERs)
- Market preference (including RFPs) entry via retailers and partnerships – which limits access from smaller entrants
- Absence of formal communication and integration between all stakeholders

ACCESSIBILITY & PREDICTABILITY

- No predictability for where the services are needed and for how long
- No long-term commitments
- Hard to access data in general

ENABLERS (WANTS AND NEEDS)

CUSTOMER VALUE

- Remove the challenge of high upfront costs for customers, which is currently limiting market uptake
- Simplicity for consumers is key

MARKET STIMULATION

- EDB flexibility is a key component of the value stack
- The need for collaboration and co-design is critical

COMMERCIAL MECHANISMS

- There is a need for access to multiple value streams
- Cost reflective price signals from EDBs is critical
- There needs to be a combination of distribution pricing (or price-based flexibility) and flexibility services (or contracted flexibility)
- Requirement for predictability

OPERATIONAL EFFICIENCY

- Need for transparency on processes for assessing flexibility
- Consistency between EDBs is key for scalability

The detail behind this summary is provided in Appendix 3.

Summary of Findings

Priorities for Development

Through researching Flexibility Stakeholders, Orion and Wellington Electricity have been able to identify priorities for development that EDBs should consider when designing flexibility services or a commercial framework that would enable flexibility services.

ENABLERS (WANTS & NEEDS)	PRIORITY AREA (FACTORS FOR EDBs TO CONSIDER)	DESCRIPTION
CUSTOMER VALUE	REDUCE UPFRONT COSTS BARRIER	Value from flexibility should support consumer investments in smart DER. In the future, standardised roll-out of 'smart devices' could contribute to lower costs.
	SIMPLE SOLUTIONS FOR THE END CONSUMER	The EDB mechanisms should allow the end consumer experience to be simple, even if industry signals are complex or data rich.
	CREATE VALUE FOR ALL CONSUMERS	The commercial mechanisms should support whole-of-system value, directly benefiting those who participate, while reducing the cost to serve all consumers.
MARKET STIMULATION	SUFFICIENT REAL VALUE	EDB value must be sufficient for flexibility suppliers to package alongside their wider offerings.
	ACCESSIBLE	Commercial mechanisms additional to distribution pricing (or priced-based flexibility) should enable open market that can attract a liquid pool of resources.
	ENABLING OTHER EDB VALUE STREAMS	DERs can provide value to EDBs other than energy injected / curtailed. Therefore, flexibility commercial mechanism design should consider the full set of value from DERs stimulated.
	COLLABORATIVE	The market is emergent. Co-design including pilots and trials will promote innovation and optimise solutions.
	SCALABLE	Pilots or first contracts should be designed with scalability in mind to maximise investment.
COMMERCIAL MECHANISMS	VALUE STACK ACCESSIBILITY	Design should optimise ability of flexibility suppliers to work across the value stack.
	PREDICTABILITY OF EVENTS	Payment structures should reflect real network needs and desired responses (e.g., "events" related to the real world and/or have good notice (hours) provided).
	USABILITY FOR PRODUCTS AND FULFILMENT	Mechanisms must be usable by flexibility suppliers. This requires listening to their needs and building complexity over time.
	PREDICTABILITY OF VALUE	Predictable long term customer value, notified to the market with early notice, allows products to be priced and positioned.
	TENURE AND FREQUENCY / VOLUME OF OFFERS	Long term (5yrs+) and a volume of offers that justifies building portfolios, customer sign ups, asset installs and drives investment.
OPERATIONAL EFFICIENCY	CONSISTENCY ACROSS EDBs	Consistent, standard processes for procurement, fulfilment, and approach to constraints/pricing.
	OPERATIONALLY EFFICIENT	Standardised interfaces and automated data exchange appropriate to need/ service.

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Looking Ahead

NEXT STEPS FOR RESI-FLEX

Resi-Flex uses a learning-by-doing and collaborative approach. It is a project to understand, explore, and help incentivise residential flexibility across Aotearoa. In Release 1 of this Resi-Flex Public Report, Orion and Wellington Electricity have gathered valuable insights about Consumers and Flexibility Stakeholders across New Zealand.

The deep-dive into Consumers has helped to create a strawman of who they are, what their motivations and barriers are when it comes to flexibility, and the journeys they take during their interaction with the energy sector.

Through researching Flexibility Stakeholders, Orion and Wellington Electricity have been able to understand what will be needed to stimulate the use of flexibility in New Zealand. This important research will help inform what EDBs will need to consider to support and incentivise greater use of flexibility in the future.

SEEKING FEEDBACK AND FURTHER ENGAGEMENT

Orion and Wellington Electricity are pleased to share Release 1 of the Resi-Flex Public Report. As part of sharing this Report, your feedback is invited to further refine the project and create opportunities for collaborative and coordinated action. Orion and Wellington Electricity are committed to sharing progress and learnings with the electricity industry through the FlexForum and other avenues as the project continues.

In Release 2 of the Resi-Flex Public Report, any feedback received will be shared, as well as further learnings since gathered. This will be combined with a deep-dive into network use-cases and Orion and Wellington Electricity's development of commercial mechanisms to be trialled with households.

To provide feedback, please contact:

Orion:
www.oriongroup.co.nz/corporate/innovation/innovation-contact/

Wellington Electricity:
smarterpower@welectricity.co.nz

Appendices

BACKGROUND INFORMATION

Definitions

Abbreviations & Terminology Explained

The range of abbreviations and terminology used in this Resi-Flex Public Report, together with the definitions for them, come from the FlexForum Flexibility Plan 1.0 or have been defined as part of the Resi-Flex project.

TERM	DEFINITION
COMMERCIAL MECHANISMS	Used to describe all the individual commercial options listed or available between Electricity Distribution Businesses and Flexibility Stakeholders.
CONTRACTED FLEXIBILITY* (OR FLEXIBILITY SERVICES)	Consumers can provide flexibility in two ways, one of them being contracted flexibility. It is provided directly via a contract through flexibility suppliers for delivering a flexibility response as part of specific connection terms between the consumer and the distributor. In this document this is also described as Flexibility Services.
DERs*	Distributed Energy Resources. Distributed (located with or near homes and businesses and connected to Distribution Networks) Energy (electricity, stored heat such as hot water, or energy sources such as hydrogen) Resources (devices and equipment which generate, store and/or consume electricity including EVs, Solar PV, battery storage, hot water cylinders, air-conditioning and refrigeration units).
EDBs	Electricity Distribution Businesses.
EV	Electric Vehicle.
FLEXIBILITY	Modifying generation and/or consumption patterns in response to an external signal to provide a service within the energy system. (This is the definition used by Ofgem and recommended by the Electricity Authority's IPAG and MDAG.)
FLEXFORUM*	Cross-industry group formed to identify a set of actions to integrate DER into the electricity system and markets to maximise the benefits for Aotearoa New Zealand.
FLEXIBILITY SUPPLIERS*	An entity providing flexibility to perform a service for an electricity participant. A Flexibility Supplier is an owner of, or responsible for, managing DER to perform services for flexibility buyers (e.g., for Electricity Distribution Businesses).
MARKET STIMULATION	Market stimulation is the need for consistency of repeatable income opportunities. At the early stage of the market, as a design principle or concept in EDB commercial offerings, it is important to stimulate and mature the market. In the long run, it is materially less important as providers will have matured, flexible assets will be more normalised in people's buying behaviour and a value stack history will inform decisions.
PRICE-BASED FLEXIBILITY* (OR PRICE SIGNALS THROUGH DISTRIBUTION PRICING)	Consumers can provide flexibility in two ways, one of them being price-based flexibility. It is provided indirectly by the consumer via their response to price signals created by the structure and level of network charges or the retail and spot prices. Price-based flexibility is or will be included in Distribution Pricing.
PV	Solar photovoltaic panels for generation and associated inverters.
VALUE STACK	Value of DER – mechanism to compensate energy created by DER in a form of bill credits across a range of values: energy value, capacity, environmental, demand reduction and Locational System Relief.
V2G	Vehicle to Grid - a technology that enables energy to be pushed back to the power grid from the battery of an electric car.
VPP	A Virtual Power Plant (VPP) is a network of DERs.

Terms with * use the FlexForum definitions.

Future Thinkers

Meet Paul

- Paul lives in Wellington with his wife and two teenage daughters. He considers himself pretty tech-savvy, and he tends to be the go-to person for technology advice in his circle of friends.
- Paul recently bought an EV, which has caused his electricity bill to spike. He has started looking for ways to maximise efficiency, including using ChargeNet to find places to charge his car outside his home, and using his hour of free power at night to save on charging costs. He already automates his dishwasher and washing machine to go on during his hour of free power, so he's happy to switch his charging routine to maximise efficiency.

CAPABILITY

Future Thinkers are the group that is the most engaged with their current energy bill, as they are highly technology and energy literate. They prefer to use an app that gives them high visibility over their energy usage and will check this frequently, especially if their bill is higher than normal.

If something seems wrong, or off, about their energy bill, they will want to get in touch with their electricity provider to ask questions. They want to have frequent updates and information from their electricity provider about changes to pricing or the energy sector in general.

They are the most confident in their ability to use and adopt new technologies.

OPPORTUNITY

Future Thinkers like to have the latest technology. Therefore, they are more likely to have EVs and tech gadgets so their energy needs are relatively high. This group also have relatively high levels of flexibility in their energy usage, as they are often seeking ways to maximise efficiency and are willing to change their routines to do so. They are the most likely to already go out of their way to pre-programme their appliances to maximise efficiency.

This group has relatively high confidence in their electricity provider to find them the best deals – they would rather automate the charging process to maximise savings and efficiency. However, when they have families with young children, there is more need for peace of mind that they will be able to access electricity when they need it.

MOTIVATION

Future Thinkers are motivated by maximising efficiency – both in terms of saving costs and the excitement of having the latest technology or being part of the latest trend.

They are passionate about maximising efficiency in their households and will go the extra mile to make sure that they are getting the best deal on the energy they are using. They will proactively research electricity providers and switch frequently to ensure that they are always getting the best deal.

They are also likely to be motivated by environmental messaging, as they like to feel as if they're doing their bit for New Zealand's future.

> I'm happy to trust the automation to maximise my savings, but I want an interactive, transparent experience so I feel in charge and in control.

PHASE 1. 2. 3. 4.

1. DISCOVER

Paul was talking to a friend who has recently installed a solar panel, so he started doing some research on buying his own.

While he was researching solar panels and other technology that can help to bring down your electricity bill, he came across smart chargers for his EV and batteries.

He was intrigued, as he's been looking into ways to optimise his EV charging to reduce his bill, but he's not sure that he'd be able to access the latest smart charging technology yet in New Zealand.

2. ASSESS

He went on the website to find out more but was frustrated because he couldn't easily compare the new plan with his current one, that offers him one hour of free power every day. However, after doing his own calculations, he ended up switching.

Paul saw an ad online for an electricity plan specifically designed for efficient overnight EV charging, where you were sent a smart charger upon sign up and was intrigued.

3. ENABLE

Paul's plan has an app that has an interactive user interface where he can engage with his electricity usage across all of his appliances and EV - including the amount of charge provided and time taken to charge. He usually automates the process to maximise his savings when prices are lowest.

When something out of the ordinary happens, like he's taking his family on a road trip and needs the car fully charged, he will override the smart charging process through his app. He likes that it's easy and simple to do, and he can see how much extra he's paying when he does this.

4. OPERATE

Last month, his bill was particularly high and he's not sure why. He wants to be able to send a screenshot of part of the bill he's concerned about to his electricity provider, so someone can explain it to him.

Every month when Paul gets his electricity bill, he receives a 'home report' in the app. This tracks his usage across different appliances so he is able to see if he can change his routine to get better value.

HOW THE SECTOR CAN SUPPORT CONSUMERS LIKE PAUL

- Educational campaigns around flexibility and the future of the electricity sector
- Communicate that flexibility can save you money
- Using EV dealerships as a trigger point to promote flexibility options

- Calculator tools that allow them to enter their specific usage details, or a past electricity bill, for detailed plan comparison
- Tell them how much they would lose by staying on their current plan
- Provide short term plan options, so that they are able to switch plans if their needs change
- Incentivise with smart charging devices/ the latest flexibility technology

- Technology that allows them to monitor and easily understand energy usage (e.g., IHDs, smart meters)
- Personalised interventions and messages tailored to cost saving: "Tell me how much I'm saving"
- Reminders and prompts for upcoming power deals
- Proactive engagement through newsletters that talk about up-to-date best practice charging behaviour and notifications for upcoming power deals

- Detailed home reports to help to track their usage and behaviour
- Feedback regarding consumers' own consumption compared to the levels of similar homes in their areas

Plug in & Switch Off

Meet Renee

- Renee lives in Wellington and is a busy working mum with three young kids. She is considering buying an electric vehicle because some of her friends have made the switch. She likes the idea of reducing her carbon footprint, plus she has seen in the news that petrol prices are set to keep going up.
- With three kids, her household has quite a high energy bill, but she doesn't really have the time or energy to work out how to reduce it. She would love to use her washing machine less, but when the kids are back with their dirty rugby uniform, there's really nothing she can do.

CAPABILITY

Plug In & Switch Offs are not very engaged with their energy bill currently and wouldn't say they have a particularly high understanding of how their electricity pricing works. They only really interact with it when it comes in every month, but don't tend to question it.

They are also not very tech-savvy, so would be less confident when it comes to things like smart chargers.

They are concerned about the reliability of electricity in New Zealand especially after the recent storms caused lots of power outages, but they don't know how this can be addressed.

OPPORTUNITY

Plug In and Switch Offs also have relatively high household energy usage – the prefer convenience and routine over maximising efficiency and savings.

They usually have families to take care of, so they like to have the peace of mind that they'll be able to use their EV and household appliances when they want to. They usually will charge their EV to maximum every night, just in case.

For them, convenience comes first, and they don't want to spend a lot of time engaging with their electricity app or changing how they interact with their technology.

MOTIVATION

The Plug In and Switch Off group are primarily motivated by saving money, but with environmental reasons a close second.

Money isn't a huge issue in their households, although with rising costs of living it will be something that's increasingly on their mind. Right now, they don't know much about why flexible demand response is important, but in general, they do want to do their bit for New Zealand's future. Those with EVs bought them to be more environmentally friendly, so they do care about keeping New Zealand clean and green.

However, it is only motivational if they know is not going to be more expensive for them and is not going to require much effort on their behalf.

> It's most important for me to be able to access electricity when I need it, but if it's easy and I can feel good about myself while saving a bit of money, then I'll do it.

* PLUG IN & SWITCH OFF JOURNEY

PHASE 1. 2. 3. 4.

1. DISCOVER

Renee has been thinking more about her environmental footprint at the moment, so she's thinking about buying an EV. They're pretty expensive, so she's started looking at second-hand models on Trade Me.

While she's scrolling through Trade Me looking for EVs, she sees an ad for an electricity plan that maximises savings for households with EVs. She hadn't really considered how much extra her electricity bill would be with her EV, so she clicks through for more information.

2. ASSESS

The link took Renee to a website, where she could enter some information about her current electricity use and the type of EV she was thinking of, and it came back with the electricity plan that was the best for her household. The whole thing took less than five minutes!

The site tells her that she would lose money if she stayed with her current plan, and it shows her in simple terms how shifting her demand will benefit New Zealand. She's stoked that she can save money and feel good about it too!

3. ENABLE

Her plan came with a smart charger for her car, which she loves because she can plug in her car when she gets home from work, so she doesn't have to remember to do anything later.

Her electricity provider also has an app that she can use, which shows her 'green' prices when demand is low, and 'red' prices when it's high. It's really easy for her to see when she's saving.

There's also a big red button in the app where she can override the smart charging process, so she can make sure that her car is fully charged when she needs it.

4. OPERATE

When she was first setting up her flexibility app and her smart charger, Renee was sent videos from her electricity provider that walked her through how the technology worked. This was really helpful for her, and now she feels much more confident using the app.

Renee also gets little rewards in her electricity bill based on how much money she's saved that month by shifting demand. Last month, she got a $5 bill discount!

HOW THE SECTOR CAN SUPPORT CONSUMERS LIKE RENEE

- Educational campaigns around flexibility and the future of the electricity sector
- Communicate that flexibility can save you money
- Using EV dealerships as a trigger point to promote flexibility options
- Use attention-grabbing sign-up incentives (e.g. big sign-up discounts and rewards)
- Utilise family and friends discounts/ referrals

- Tell them how much they would lose by staying on their current plan
- Simplify plan options – avoid information overload
- Incentivise with smart chargers/the latest technology
- Use trending norms to show that more and more people are switching to flexibility – this builds motivation as it makes the process seem easier

- Easy override function
- Technology that allows them to monitor and easily understand their energy usage (e.g. IHDs, smart meters)
- Ability to 'set and forget' or default 'opt out' options that reduce active choices
- Personalised interventions and messages tailored to cost saving and environmental benefits
- Reminders and prompts for upcoming power deals

- Tech support for smart chargers and apps
- Rewards for reaching efficiency 'commitments', e.g. setting a goal to shift X amount of demand this month and getting rewarded for that

Family Value Seekers

Meet Jonah

- Jonah lives with his wife and their four teenage sons in Christchurch. Between the six of them, they're used to having a high electricity bill but recently it feels like it just keeps going up.
- With costs of living rising across the board, Jonah and his family are concerned they're not going to be able to afford to use electricity in the same way in coming years – but they aren't really sure about the best way to maximise efficiency, or how to cut costs.
- They find their bills complicated and difficult to understand, so they often give up trying to figure it out.

CAPABILITY

Family Value Seekers are not currently very engaged with their energy bill – they have too much going on to set aside the time to look at their bill each month. Even if they have the app or go into their bill when they get sent it, there's lots of technical jargon that they don't really understand so they usually end up just giving up.

They don't have much trust in electricity providers to not just keep raising prices once they've been locked in to a plan.

Usually, they get tips and tricks for saving money on their electricity bills from their friends and family because that's who they can trust to give them the best advice.

OPPORTUNITY

Family Value Seekers have high household energy usage – they've got lots of bodies in the house that need to be showered and fed, and lots of clothes to wash. This means that they're pretty used to having a high energy bill each month.

The nature of their lifestyle isn't very flexible – everyone has a routine that centres around school, activities or work. In saying that, there's often times where no one is at home, because everyone leads such busy lives.

MOTIVATION

Energy bills make up a large proportion of Family Value Seekers' monthly costs, so they are often looking for ways to maximise value, without impacting their ability to meet their family's needs. Particularly now, with rising costs of living and heading into winter, cutting down on costs is more front-of-mind than ever before.

This group does care about the environment, particularly when thinking about their children's future, but that feels like much less of a pressing priority right now.

> I want to save as much as possible, but I need to have peace of mind that I can still provide for my family.

*FAMILY VALUE SEEKER JOURNEY

PHASE 1. 2. 3. 4.

1. DISCOVER

Last month, Jonah received his electricity bill and it was through the roof – way higher than he'd seen it before.

He was talking to his brother about it and his brother told him that he'd just switched to a new plan that was saving him lots!

2. ASSESS

Jonah looked up the plan online, and it looked like it could get him a better deal. There was lots of jargon he didn't quite understand, but he thought he'd give it a go because it said it was perfect for high usage households.

3. ENABLE

Jonah chooses a flexibility option where his hot water cylinder turns off for part of the day – he doesn't even have to think about it as it's all automatic.

However, when they have friends or families coming over for a few days, he knows they will run out of hot water after the morning showers. When this happens, he wants to be able to turn off the option to have the hot water cylinder heating during the day, so anyone can have a hot shower when they need it.

4. OPERATE

He was then able to understand what was using the most electricity and support his family to reduce their bill the next month. Jonah was grateful for the support and felt that his electricity provider was looking out for him.

Last month, Jonah's bill was again higher than usual. However, this time, he received an email alert that explained why this could be the case, with a personalised guide with advice for how he could reduce costs through shifting his demand to different times.

HOW THE SECTOR CAN SUPPORT CONSUMERS LIKE JONAH

- Communicate that flexibility can save you money
- Use of relevant messengers to deliver information – find trusted community leaders or advocates, or utilise family and friends discounts/referrals
- Use attention-grabbing sign-up incentives (e.g. big sign-up discounts and rewards)
- Utilise family and friends discounts/ referrals

- Tell them how much they would lose by staying on their current plan
- Simplify plan options – avoid information overload
- Use trending norms to show that more and more people are switching to flexibility – this builds motivation as it makes the process seem easier
- Use sign up discounts or monthly saving incentives

- Easy override function
- Technology that allows them to monitor and easily understand their energy usage (e.g. IHDs, smart meters)
- Ability to 'set and forget' or default 'opt out' options that reduce active choices
- Personalised interventions and messages tailored to cost saving and environmental benefits
- Reminders and prompts for upcoming power deals to maximise savings

- Feedback regarding consumers' own consumption compared to the levels of similar homes in their areas and tips and tricks for reducing energy costs
- Tech support for smart chargers and apps
- Rewards for reaching efficiency 'commitments', e.g. setting a goal to shift X amount of demand this month and getting rewarded for that

Baseline Budgeters

Meet Josie

- Josie lives on her own in Christchurch, just around the corner from her daughter and grandson. She's retired now and is concerned about rising electricity prices, so she's always looking for ways to save where she can. Since it's just her at home, there's not much opportunity for her to cut down on usage so she's not sure how she can save.
- She's not very tech savvy and mostly relies on her daughter for help with any new technology. Recently, all her bills seem to be moving online, which she's struggling with as she gets confused about how to access all the information.

CAPABILITY

Baseline Budgeters aren't very engaged with their energy bill, unless it's higher than usual.

This group is not very tech savvy and will be unlikely to interact with their electricity provider via an app or website. They will often need support to use new technology.

They like being able to see their usage, but all the jargon can get a bit confusing so they don't go on very often – just when they need to pay their bills.

OPPORTUNITY

As there's not many people in the household and there's no kids, Baseline Budgeters have relatively high flexibility in the way they use energy, and low overall energy usage.

However, they're more likely to be renting, so they are more limited in their flexibility options as they have less control over the appliances/ technology installed.

MOTIVATION

Baseline Budgeters are highly motivated by cost saving. They are more likely to be in lower socioeconomic groups, so are always looking to maximise value and cut costs where possible. This is particularly the case now, with the rising costs of living.

Environmental factors are somewhat important to this group but unlikely to drive action. Instead, they'll be driven by cost-saving.

> I want to save as much as possible, but I need a lot of support to do so.

* BASELINE BUDGETER JOURNEY

PHASE 1. 2. 3. 4.

1. DISCOVER

Josie just got her latest electricity bill, and it's higher than normal.

Her electricity provider has switched to sending her online bills via her email and sometimes she struggles to find the right information here, so she asks her daughter for help.

Her daughter tells her that she's paying too much, and together they decide to look at different options that could suit Josie's needs better.

2. ASSESS

Josie's daughter has just switched to a plan where she gets one hour of free power and she thinks this could be a good option for her mum, if she can remember to do all her washing at the same time every day.

3. ENABLE

When Josie signed up, she got sent a magnet that she could put on her fridge with a helpline that she could call anytime if she has questions about her electricity plan or usage. This meant she didn't need to find what she was looking for in the app, which has helped a lot!

4. OPERATE

Josie's plan is very simple – she gets one hour of free power every night between 8-9pm.

She gets a notification from her app every day to remind her (that her daughter helped her download). Apart from that, she doesn't need to check anything.

She also saves money through load control on her hot water cylinder, which was an automatic opt-in when she signed up to the plan. She doesn't even notice, but enjoys the savings.

HOW THE SECTOR CAN SUPPORT CONSUMERS LIKE JOSIE

- Communicate that flexibility can save you money
- Use of relevant messengers to deliver information – find trusted community leaders or advocated, or utilise family and friends discounts/referrals
- Use attention-grabbing sign-up incentives (e.g. big sign-up discounts and rewards)
- Utilise family and friends discounts/ referrals

- Tell them how much they would lose by staying on their current plan
- Simplify plan options – avoid information overload
- Provide short term plan options so they can switch plans if needed
- Use trending norms to show that more and more people are switching to flexibility – this builds motivation as it makes the process seem easier
- Use sign-up discounts or monthly saving incentives

- Easy override function
- Ability to 'set and forget' or default 'opt out' options that reduce active choices
- Personalised interventions and messages tailored to cost saving and environmental benefits
- Reminders and prompts for upcoming power deals to maximise savings

- Tech support for smart chargers and apps
- Rewards for reaching efficiency 'commitments', e.g. setting a goal to shift X amount of demand this month and getting rewarded for that

Convenience over Everything

Meet Irene

- Irene lives in Christchurch with her partner and their newborn baby. They have just moved into their first home.
- She doesn't really think about electricity very much – with a new house and a new baby, convenience and routine is more important than anything.
- That means she is barely interacting with her power bill and will just pay whatever she needs to. With just the three of them, it's not usually too high anyway!

CAPABILITY

Convenience over Everything aren't very engaged with their energy bill – they usually just pay it. They are also less likely to be thinking about switching electricity providers, as they're either settled down in their own home, or in a longer-term rental situation.

This group is relatively tech savvy and will probably interact with their electricity provider via their app or the website. They like being able to see their usage, but all the jargon can get a bit confusing, so they don't go on very often – just when they need to pay their bills.

OPPORTUNITY

Convenience over Everything have relatively low household electricity usage, although their lower demand means they have more opportunity to be flexible. Especially now, as flexible working in the home and office becomes more engrained in office culture, there will be more opportunities for people to shift energy usage.

However, this is balanced out by a lack of time or energy that they're willing to put into engaging with their electricity provider – they want everything to be as convenient as possible, so they don't even need to think about it.

MOTIVATION

The Convenience over Everything group are primarily motivated by saving money, but with environmental reasons a close second.

As household energy usage isn't particularly high for them, costs are also not as high as other groups. But with rising costs of living, saving money will be increasingly on their mind.

In general, they do want to do their bit for New Zealand's future, but right now, they don't know much about flexible demand or how it can support New Zealand.

> I want to spend as little time as possible engaging with my electricity plan.

*CONVENIENCE OVER EVERYTHING JOURNEY

PHASE 1. 2. 3. 4.

1. DISCOVER

When Irene moved into her new house, she had to think about electricity providers.

She had been with her last provider for a few years, but the contract was ending, and she had noticed that her bills had been creeping up for a while.

She saw an ad on TV for a new plan that gave you a big discount when you signed up and also said something about protecting New Zealand's electricity grid. Her last house had a lot of power outages when it was stormy, so this is something that got her thinking.

2. ASSESS

Irene went to a website where she could pop in some information about her current electricity bill, and it came back with the customer offering that was the best for her household.

The site also told her that staying on her current plan would cost her a significant amount more over the next few years, which shocked her!

The site also outlined what switching would involve – it looked pretty easy, so Irene decided to give it a go.

3. ENABLE

Irene's new plan means that there are certain times of the day where she gets cheaper electricity – she doesn't really know how it works, but she has the app where she can see it if she needs to.

Her hot water cylinder is now automated, so it switches off when it's more expensive, but she's usually at work when that happens so she doesn't even notice.

There's a big button on her app where she is able to turn off this function if she needs to. So far, she hasn't used it, but she likes that it's there if she needs.

4. OPERATE

She also gets notifications about upcoming demand events that ask her to reduce power over certain times for discounts or rewards. Her power bills have started to include information about how New Zealand might have to use non-renewable energy sources if demand gets too high, so when she gets these notifications, Irene has started to try to be better with turning off lights and not running the dishwasher.

Irene still doesn't really think about her electricity bill, but she gets a notification sometimes through her app that tell her how much money she saved in her last bill, which makes her feel good about her electricity plan.

HOW THE SECTOR CAN SUPPORT CONSUMERS LIKE IRENE

- Educational campaigns around flexibility and the future of the electricity sector
- Communicate that flexibility can save you money
- Use attention-grabbing sign-up incentives (e.g. big sign-up discounts and rewards)
- Utilise family and friends discounts/ referrals

- Tell them how much they would lose by staying on their current plan
- Simplify plan options – avoid information overload
- Use trending norms to show that more and more people are switching to flexibility – this builds motivation as it makes the process seem easier

- Easy override function
- Ability to 'set and forget' or default 'opt out' options that reduce active choices
- Personalised interventions and messages tailored to cost saving and environmental benefits
- Reminders and prompts for upcoming power deals

- Tech support for smart chargers and apps
- Rewards for reaching efficiency 'commitments', e.g. setting a goal to shift X amount of demand this month and getting rewarded for that

Flexibility Stakeholder Research

Barriers and Enablers - In Detail

In the following Appendices, the detailed research findings from Flexibility Stakeholders is outlined.

BARRIERS

Flexibility Stakeholders were asked about the barriers they face in developing, delivering or scaling their service / product that structuring the flexibility market service could help address. They were also asked about other types of barriers, like issues accessing or using data (EDBs, network level, household smart metering data, etc). The list is not a comprehensive or exhaustive list of every comment made.

REGULATION AND STANDARDISATION

- As the flexibility space is emerging, stakeholders noted a lack of standardisation and common language, which leads to inefficiency, interoperability issues and increased costs for flexibility stakeholders. This is amplified by the need to navigate numerous EDB processes (e.g., procurement).
- There are also technical barriers with a lack of rules, standards or codes about flexibility and metering, Vehicle to Grid (V2G), or other limitations of existing standards (e.g., standards prescribing behaviours/ configurations which would enable flexibility services).
- Current market is stacked in favour of incumbent generation and network solutions.
- Flexibility Stakeholders recognise the constraints EDBs face under the current regulatory regime in terms of OPEX versus CAPEX solutions to create capacity.

MINDSET

- On the consumer side, simplicity has been favoured by retailers which has led to a lack of consumer understanding of the energy context and opportunity.
- On the electricity industry side, there is a legacy of utility-led ownership and focus on keeping the lights on (safety/reliability). While beneficial from an operational lens, this risk aversion limits innovation and the ability to work collaboratively.

ENABLING PROCESS PILOTS

- Pilots are still isolated and infrequent, with multiple integration needs and important investment costs (new metering).
- Pilots have limited scope and do not allow for pre-building a portfolio, nor provide pathways for rollout.

COMMERCIAL ISSUES & SCALABILITY

- There is limited access to value stack opportunities and a lack of recognition of the locational value of DER. Critical mass is not reached yet (e.g., limited amount of DERs are connected in a usable way).
- The current market structure favours entry via retailers and limits access from smaller entrants. For example, Requests For Proposals (RFPs) tend to be structured for a full solution, which requires a “partner” and limits entry for smaller players, such as Aggregators.
- The absence of formal communication and integration between EDBs, Flexibility Stakeholders and Consumers prevents seamless communication and integration between all stakeholders – which, if enabled, would lead to effective delivery of flexibility services.

ACCESSIBILITY AND PREDICTABILITY

- There is no predictability to where the services are needed and for how long, with no long-term commitments.
- There is a lack of long-term price certainty to support investment.
- It is hard to access data in general, and there is no network information available to model, predict and differentiate.

ENABLERS

Flexibility Stakeholders identified their key flexibility requirements - those aspects they see as enablers / their wants and needs. Note that the following list represents the common themes and is not a comprehensive or exhaustive list of every comment made.

CUSTOMER VALUE

The high upfront cost of flexible devices makes it challenging for consumers to invest in them.

- It is difficult for consumers to justify the marginal cost of 'smart' devices now, when the value and duration of flexibility expected in the future is uncertain.
- Value from flexibility will support consumers' investments in smart DER. However, some stakeholders indicated a desire for mandating 'smart' devices to avoid a rollout of lower cost alternatives that can't be used flexibly.

Simplicity for consumers is key, while ensuring sufficient access to signals or incentives for flexibility.

- Most consumers do not understand the make-up of their electricity bill, why flexibility is needed or the value of existing approaches like ripple.
- There is a lack of incentives for consumers to dynamically shift their electricity use as they are not exposed to signals which reflect system conditions or local flexibility needs.
- Stakeholders agreed most consumers prefer offerings that they do not have to actively participate in, using a "set and forget" type of approach to provide flexibility.
- All stakeholders agreed on prioritising simplicity for consumers, while recognising that the appetite for risk and level of engagement will vary.
- There were diverse views on what specific customer offerings would look like, suggesting ample opportunity for competition and innovation.

While flexibility benefits all consumers indirectly through lower whole-of-system costs, it is harder for some consumers to directly participate.

- Stakeholders agreed consumers risked being left behind in the transition due to lack of time, financial resources, or because they are renting or have low energy literacy.
- Perspectives on how to address this varied. Some stakeholders were focused on easier to reach segments to stimulate the flexibility market; others had a stronger focus on inclusive solutions for harder to reach consumers and communities.

MARKET STIMULATION

EDB flexibility is seen as a key component of the value-stack, particularly as a revenue stream for new market entrants without the scale or capacity to provide flexibility services to other buyers.

- For new entrants, value from EDB flexibility services supports business model validation (difficult to demonstrate through pilots and trials) which can help raise capital to scale up.
- Retailers can stack value from EDB flexibility with other value streams to create attractive customer offerings and improve engagement.
- Value from EDB flexibility can increase the viability of DER investments, accelerating decarbonisation, increasing flexible capacity and liquidity of flexibility markets.

Collaboration with EDBs is needed to understand what's needed and to co-create effective solutions.

- Opportunities to co-create and explore solutions with networks was universally recognised.
- Innovation requires communication between EDBs and flexibility stakeholders about network needs and possible solutions - including procurement processes that are not too prescriptive.
- Pilots should be designed with scalability in mind. Start-up flexibility suppliers cannot afford to invest in trials that do not lead to sustainable business models.
- Stakeholders would like EDBs to share the cost and risk of stimulating flexibility markets through a 'learning-by-doing' approach.
- Aggregators and End Consumer Integrators recognised the additional value possible through improved network visibility, power quality information and redefining consumer resilience.

COMMERCIAL MECHANISMS

Access to multiple value streams increases consumer benefits and reduces the cost of flexibility.

- Flexibility suppliers want access to stackable value from EDBs so they can package with other value streams and create scalable and attractive customer offerings.
- Value from EDBs must be sufficient for flexibility suppliers to package alongside their wider offerings.
- Access to multiple value streams (value stacking) means flexibility can typically be offered at a lower cost to serve.

EDB price signals should be cost reflective and/or transparent to support optimisation with other market signals.

- Payment structures should reflect real network needs and desired responses.
- There was a strong view that it is not for EDBs to simplify signals for consumers, and this should be done by the flexibility supplier once packaged with other value streams. While it is important to provide a simple way to provide products to consumers, flexibility providers can manage complexity.
- A few stakeholders indicated a preference for simple commercial mechanisms between market participants, with the option to increase complexity overtime.
- Payment structures should be designed with a view to usability for others in the value chain.

A combination of distribution pricing (or price-based flexibility) and flexibility services (or contracted flexibility) are needed to stimulate innovation.

- Distribution pricing was noted as a limitation as signals may not get passed through to consumers or reflect the desired intent, limiting the pathway for market innovations.
- However, stakeholders recognised that a procured service may not provide sustained value (e.g., once reinforcement takes place, the value stream is gone).
- Non-retailers tended to note the limitations of EDB flexibility generally only being available via retailers through distribution pricing.
- In addition to the importance of access to multiple value streams within the value stack, it is important to note that different DERs (and associated types of aggregators) will have a different value stack that will require different mechanisms to access those value streams (e.g. controllable loads like EV and hot water may benefit in receiving price signals, while solar and batteries may require consumers to be actively paid rather than receiving a favourable tariff).

Predictable value supports greater investment in flexible resources.

- Confidence in the value over time is more important than the value for a specific event.
- Predictable value is needed to justify marginal investment in flexible resources.
- Expected value can be packaged to reduce the capital hurdle for consumers.
- Flexibility procurement signalled ahead of time of critical need, will help build portfolios.
- Flexibility suppliers prefer long term contracts (e.g., 5 years) which improve the return on investment and support recruitment of a portfolio of consumers.

OPERATIONAL EFFICIENCY

Processes for assessing flexibility and visibility of future opportunities should be more transparent.

- Visibility of future opportunities and forecast constraints enables targeted growth.
- Regulatory reform was recognised as a key step to improve utilisation of flexibility by EDBs, including access to funds for market development and flexibility services.
- Retailers emphasised the importance of consistent methods for valuing flexibility.
- Transparency on flexibility versus network decisions would build trust and market confidence.
- Consistent procurement processes were seen as important to streamline flexibility services, while avoiding overly prescriptive requirements that stifle innovation.

Consistent EDB processes will enable efficient service provision, ability to scale and greater participation.

- Simplicity of DER connection and registration processes was recognised as important to ensure trades people promote and facilitate the installation of flexible capacity.
- Stakeholders supported common standards for communicating flexibility, with some participants' views on which standards to adopt being dependent on trials and decisions to come.
- Some stakeholders recommended digitising all the information (beyond meter data) and process flow.

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