

Resi-Flex

Residential flexibility



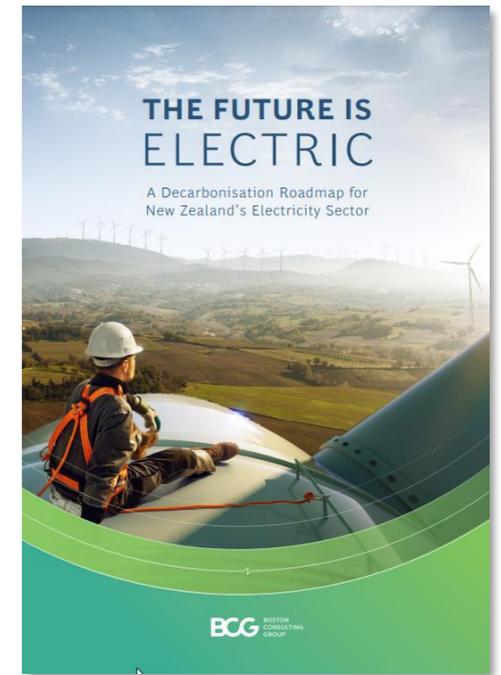
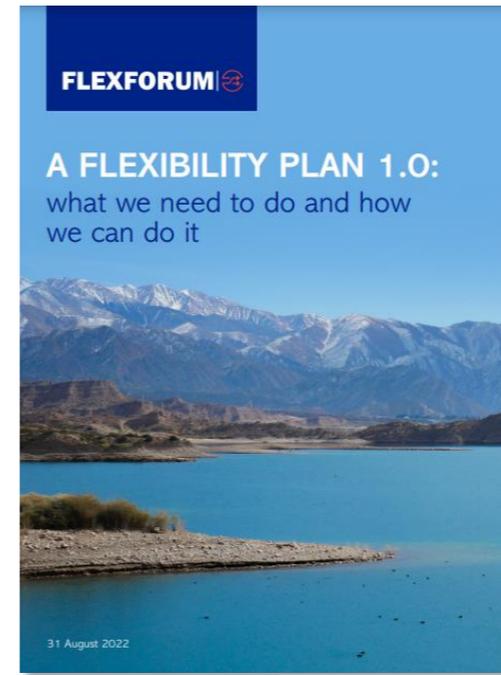
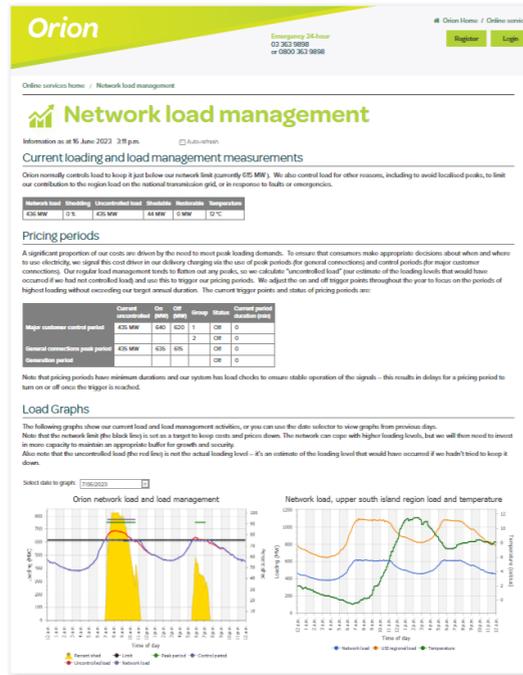
JUNE 2023

Evie Trolove and Scott Scrimgeour
EEA Conference – 28 June 2023

Orion + we*
*wellington electricity

Flexibility has system wide benefits

Flexibility is defined 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.



Project Phases

Resi-Flex takes a learning-by-doing and exploratory approach.

The project is live, so all findings shared are preliminary.



USER REQUIREMENTS
PHASE 1

- Explore consumer perceptions and motivations
- Identify flexibility stakeholders' barriers and enablers
- Identify network use-cases and technical requirements

COMMERCIAL MECHANISMS
PHASE 2

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

CO-DESIGN & TRIAL
PHASE 3

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

Supported by:



Supported by:



OUR PURPOSE

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



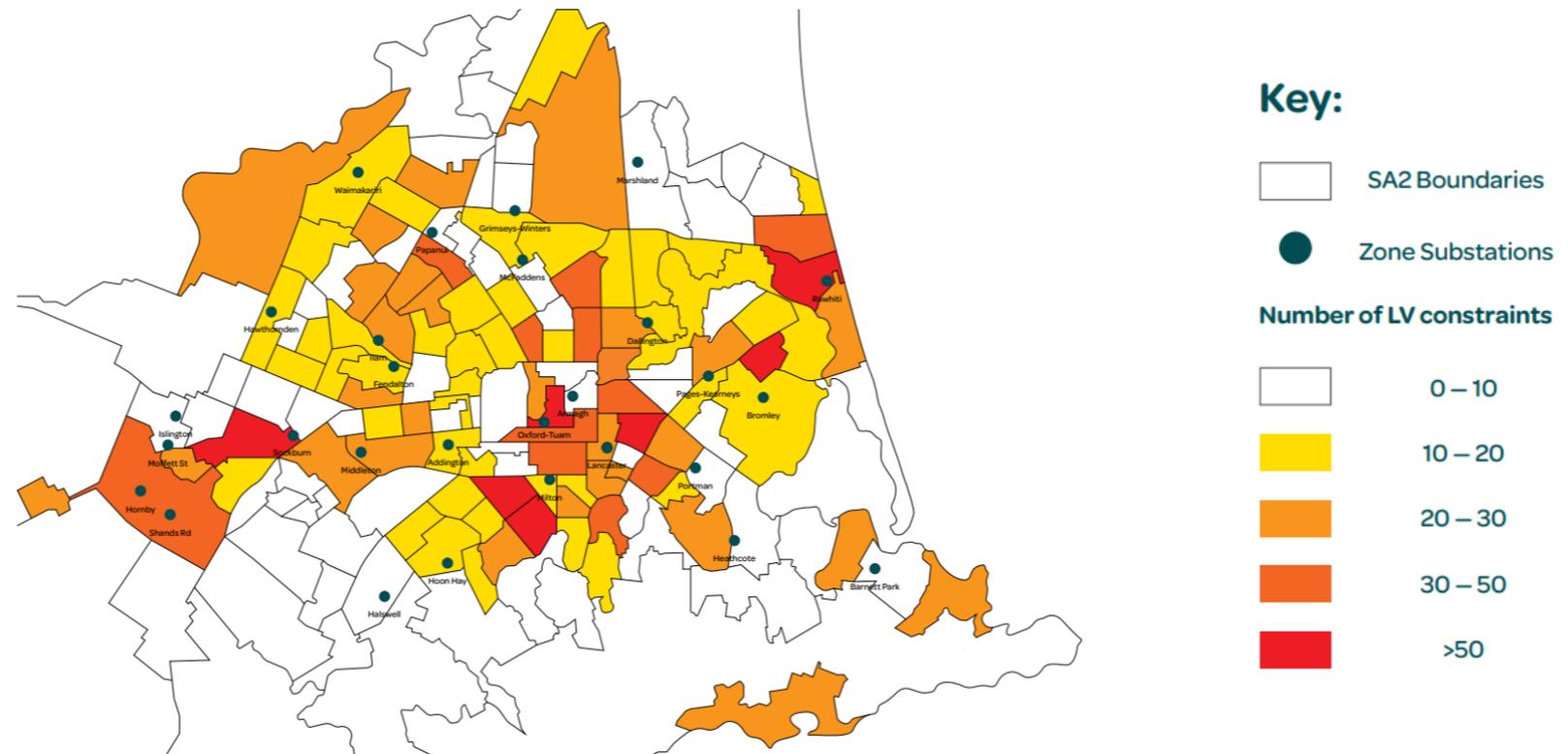
User requirements



Phase 1

Network use cases

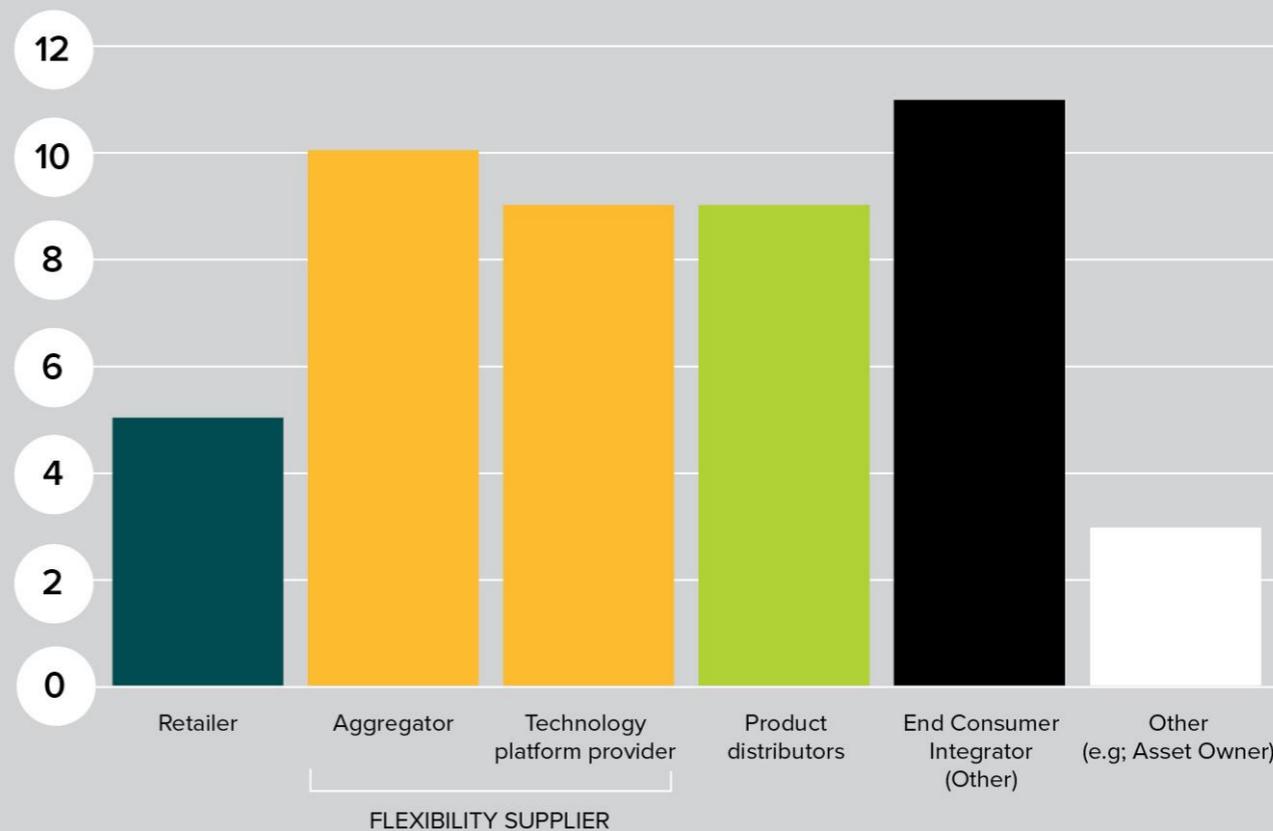
Our needs are becoming more location specific. For Orion this is due to differences in baseload, the pace of decarbonisation in different suburbs and housing intensification.



Flexibility Stakeholders



STAKEHOLDERS WITH MULTIPLE ROLES ACROSS THE CURRENT FLEXIBILITY MARKET



Representation across 17 stakeholders consulted

Barriers and enablers

From our flexibility stakeholder research, we identified themes they perceive are limiting flexibility and enablers to support greater participation.

Barriers

REGULATION &
STANDARDISATION

MINDSET

ENABLING
PROCESS-PILOTS

COMMERCIAL ISSUES &
SCALABILITY

ACCESSIBILITY &
PREDICTABILITY

Enablers

CUSTOMER VALUE

MARKET STIMULATION

COMMERCIAL MECHANISMS

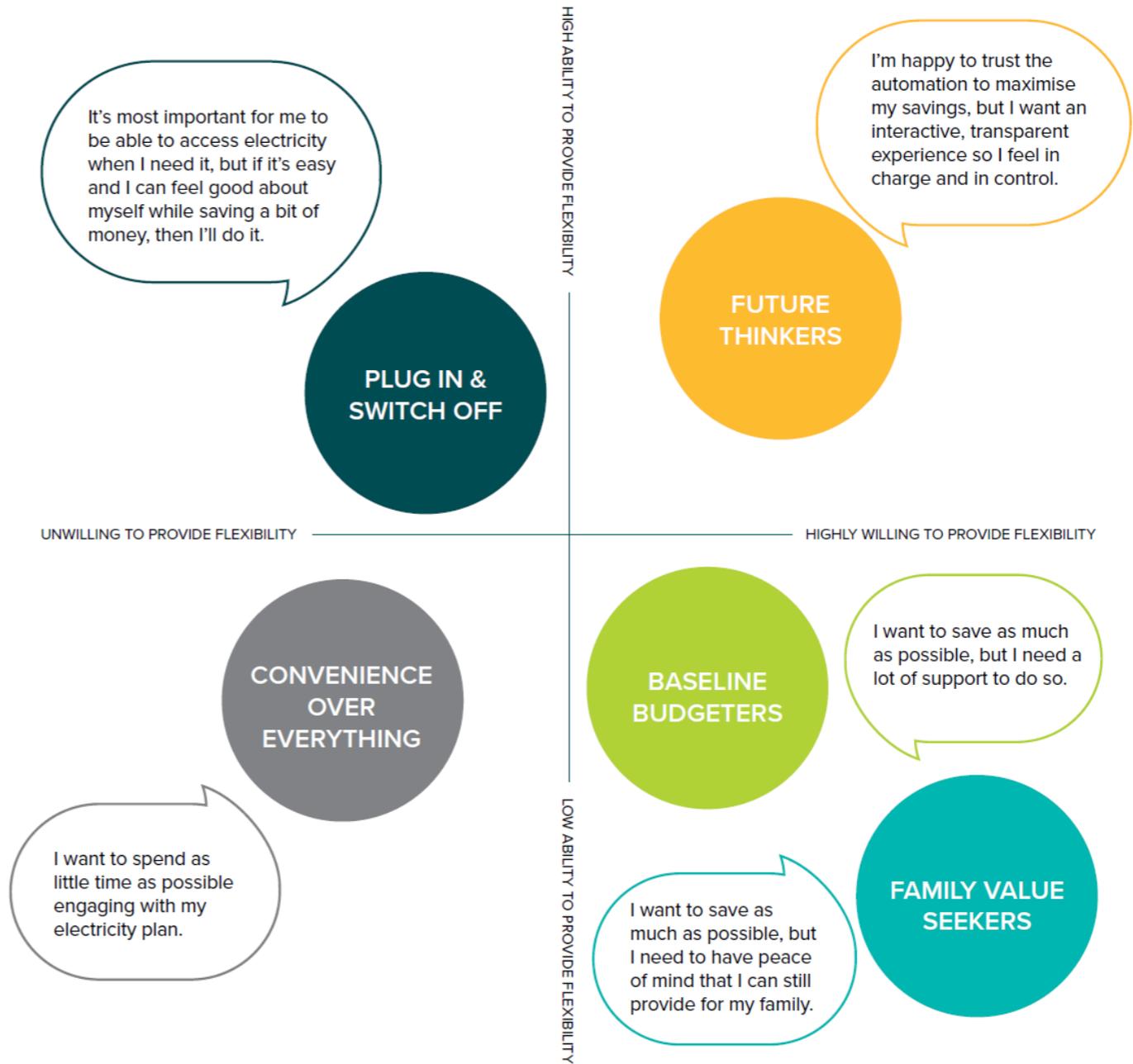
OPERATIONAL EFFICIENCY

Stakeholder wants and needs



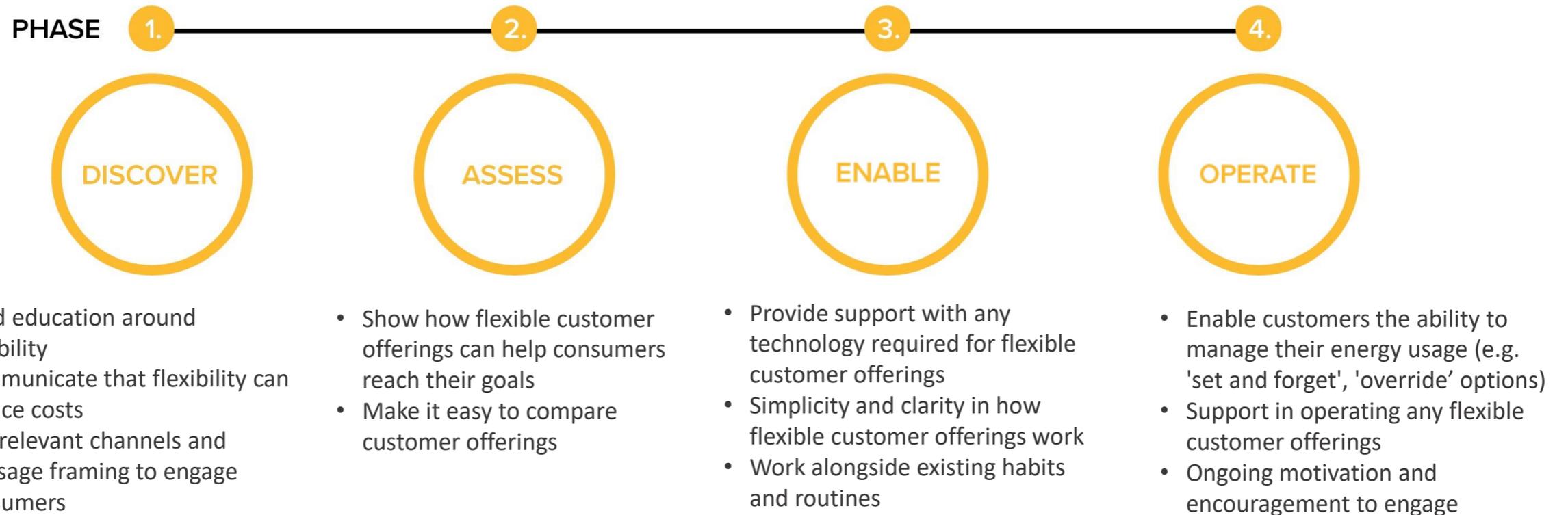
Consumer Personas

THE COM-B MODEL



Summary Consumers journey experience

This summary journey map highlights the user requirements that were consistent across all personas, which will need to be considered when designing future trials



Commercial Mechanisms



Phase 2

Commercial framework



COMMERCIAL
MODEL

Calculating the economic value of flexibility - translating into price signals and payment budgets

COMMERCIAL
MECHANISMS

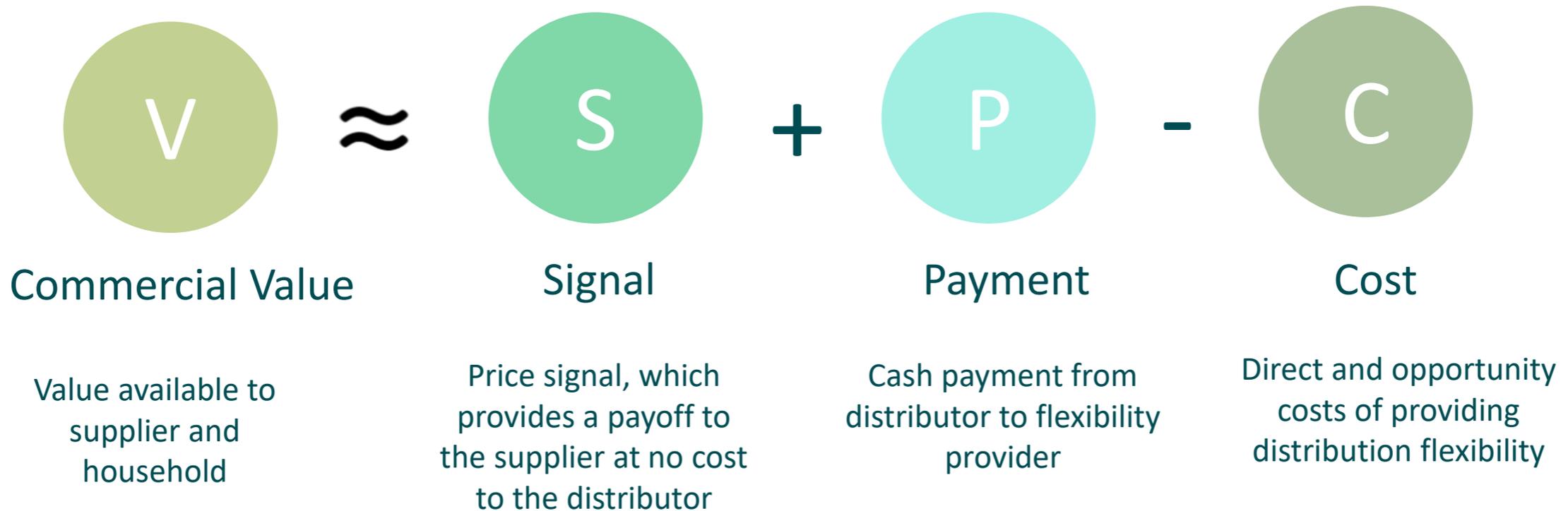
Designing and evaluating commercial mechanisms

STACKING
ANALYSIS

Considering the value stack – current & future price conflicts and synergies

Commercial model

Maintaining the value stream



Valuing flexibility

For distribution services

Congestion

Not in practice for distribution networks.

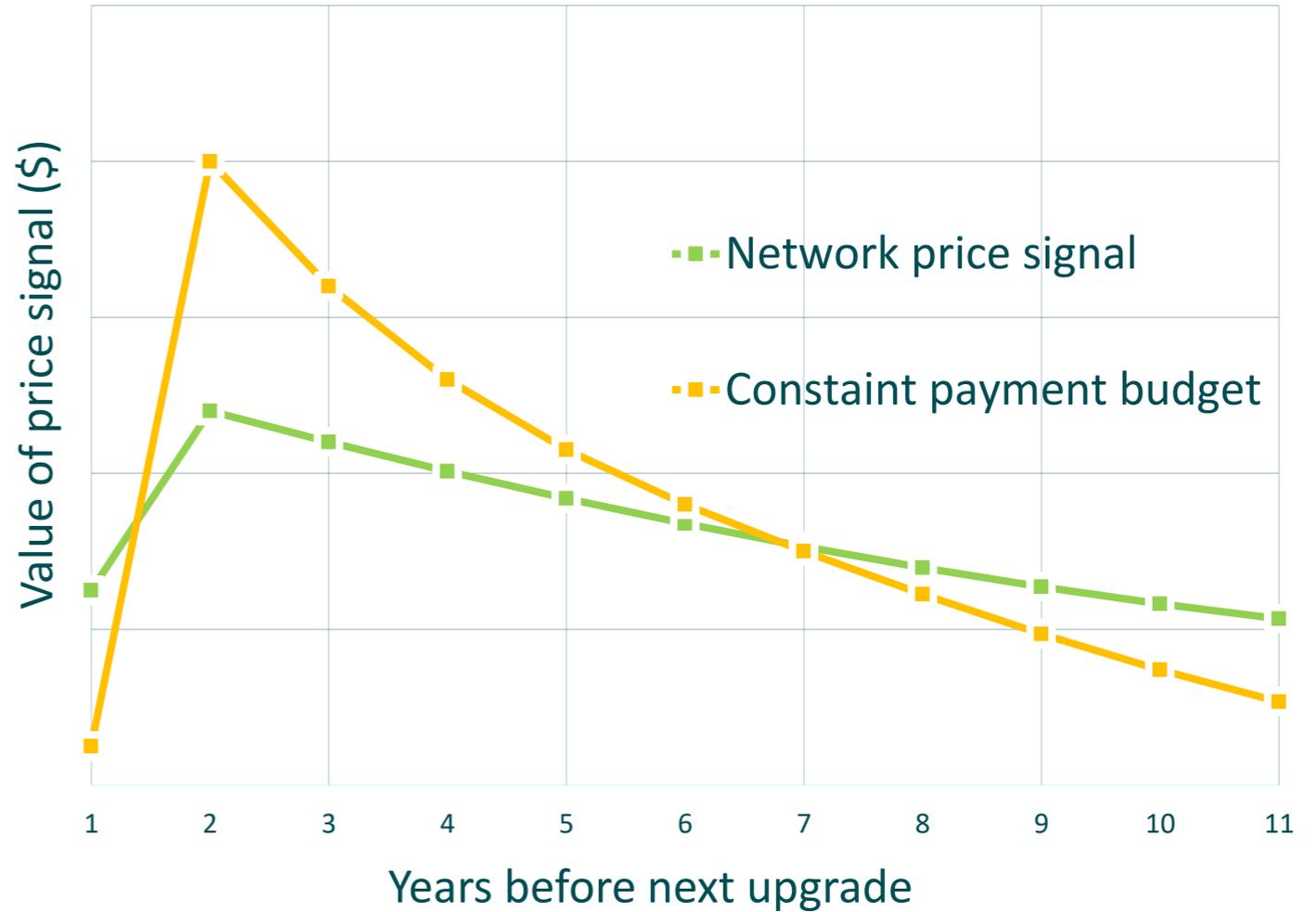
Deferral

Most pertinent source of value is deferring capacity upgrade investment.

Sizing

Adopting lower design capacity also of value, but difficult to monetise.

Constraint dependent



Commercial mechanisms – options building blocks



Standards

Requirements for network connection, tariff eligibility, or to avoid surcharge.

Flex ready – HWC and EV wall chargers must be *capable* of receiving and acting on a signal

Flex enabled – as above, but must be enrolled in a service that at least enables emergency access



Price signals

Network charges structured to make flexibility payoff.

Time-of-use – low (or zero) usage charges for off-peak consumption (\$ per kWh)

Appliance discount – anytime access to off-peak rates for eligible HWC and EVWCs

Zone charges – retailer charged for aggregate peak demand at zone substation (\$ per kW)



Payments

Cash payment for delivering flexibility outcome.

Booster payment – targeted (year and geography) payment for flex that enables imminent deferral.

Standby payment – payments for availability and delivery (if called) of resource to manage build risk.

Flex payments – ongoing payment for flex that allows systematically later growth investment.

Develop prototypes

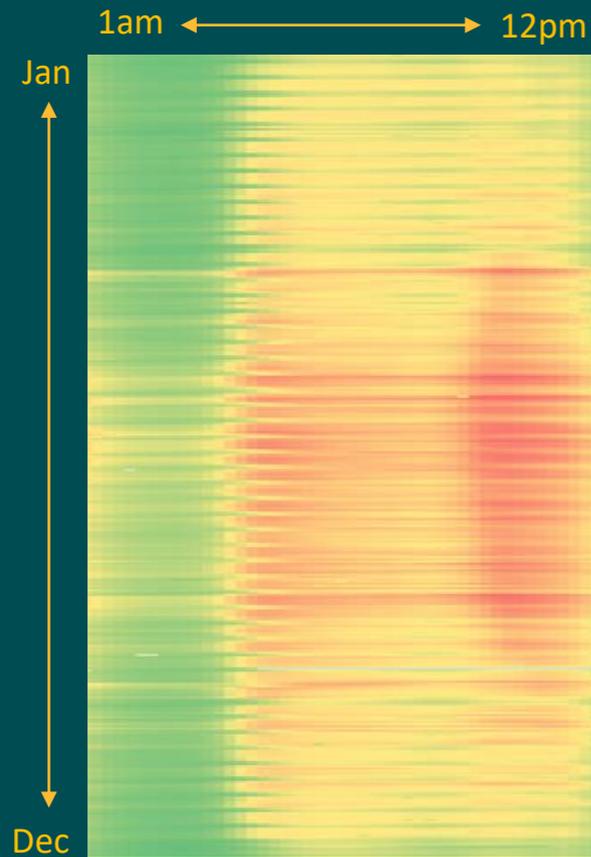
	Example prototype A	Example prototype B
Standards 	No standards – reliant on price signals	Devices capable of participating
Price signal 	Dynamic zonal pricing	Network wide ToU
Payments 	Standby payments	Booster payments to target specific constraints

Evaluation & selection

1. practical
2. scalable
3. compatible
4. attractive to suppliers
5. attractive to households
6. effective
7. fair

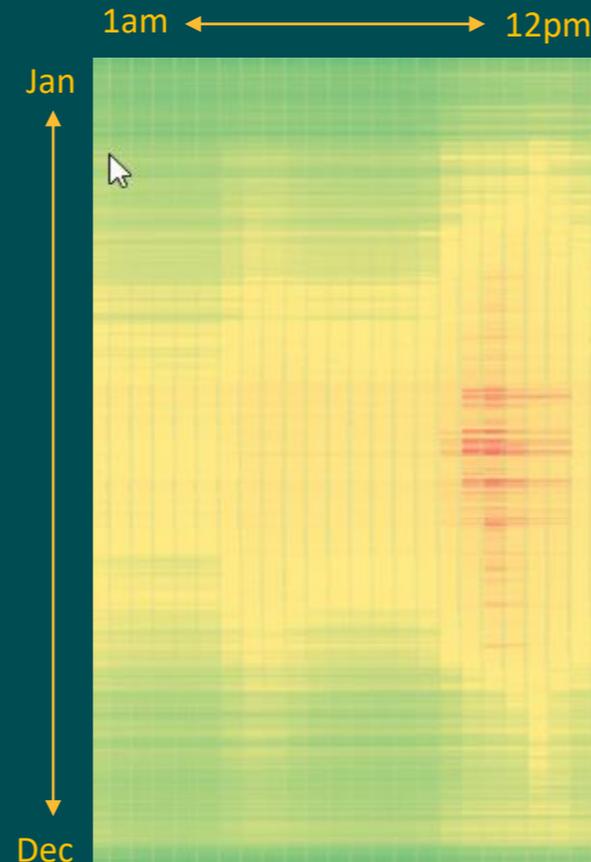
Interaction with the value stack

2018 – spot prices coincide with network peaks



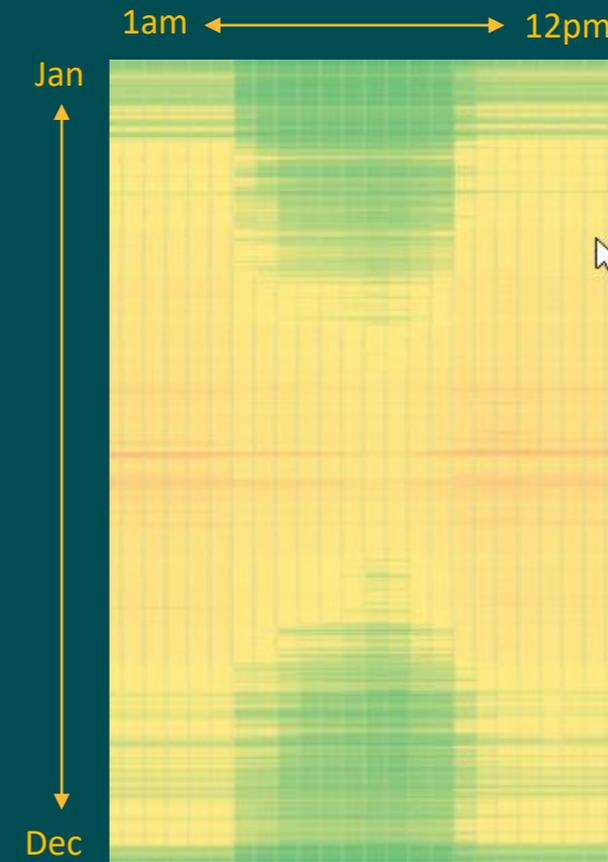
Complimentary services – value 'stacks'

2030 – spot prices coincide with network peaks



Complimentary services – value 'stacks'

2050 – spot peaks when renewables low



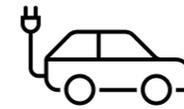
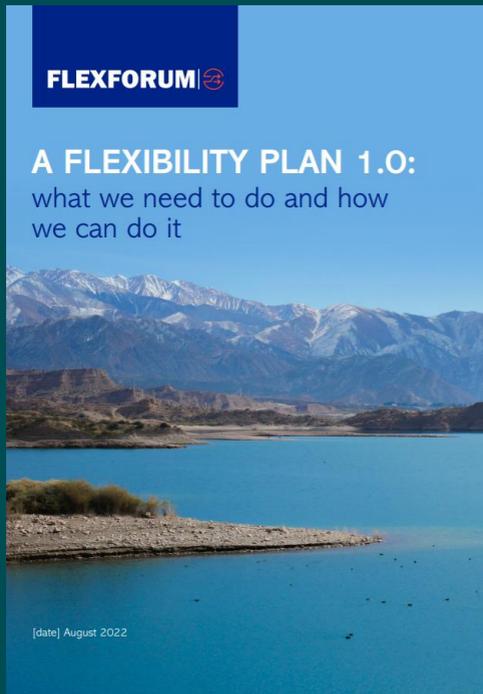
Services conflict – value mutually exclusive

Looking forward



Enabling flexibility and next steps

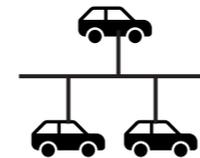
Enabling Flexibility



Devices that can participate



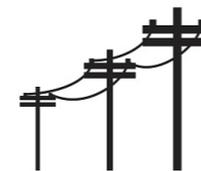
Maintaining network security



Managing the connection process



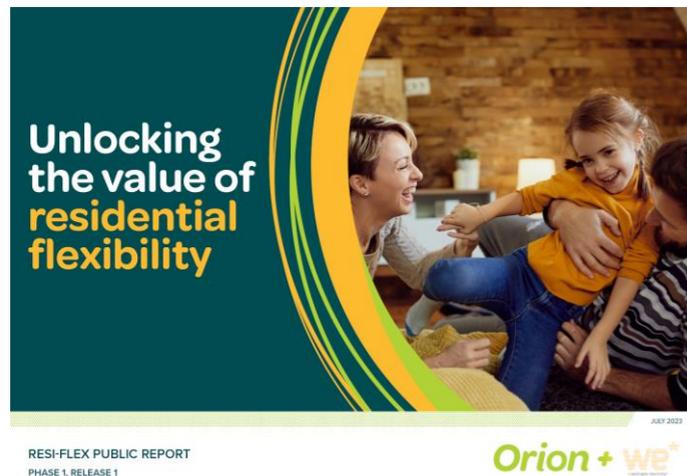
Allowances to purchase



Visibility of the LV network

What's next?

Detailing progress ...



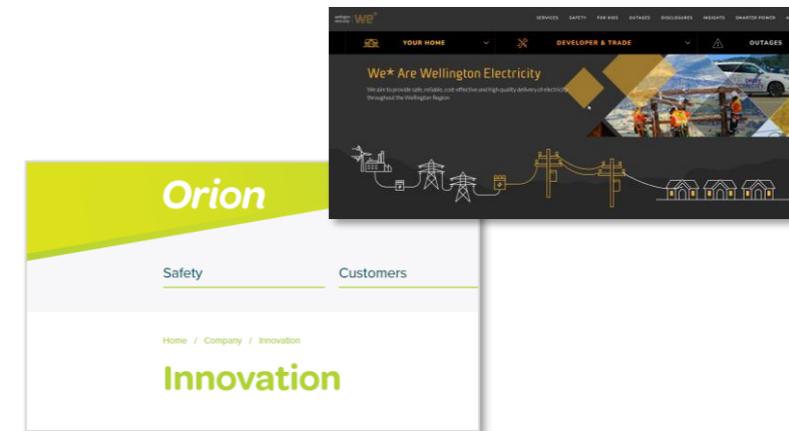
Releasing in July

Next step in project...



Quarter 3-4

Follow our progress...



Or participate in the FlexForum

Questions?



THANK YOU.

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