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EV CONNECT

DRAFT ROADMAP

WORKSHOP

9 June 2021

Programme

Topic	Starting	Presenting
Introduction and housekeeping	8.30am	John Hancock
Policy & Regulation	8.40am	EECA, MBIE, EA, ComCom
Scene setting	9.10am	Greg Skelton
International perspective	9.30am	Bruce Thompson
Summary of feedback from last workshop	10.10am	Scott Scrimgeour
Coffee break	10.20am	
The draft roadmap	10.40am	Scott Scrimgeour
Introduction to the table topics	11.00am	John Hancock
Deep dive 1 – delivering the roadmap	11.10am	Jackson Lung
Deep dive 2 - Demand management services	11.40am	Glenn Coates
Deep dive 3 - The DSO function	12.15pm	Ray Hardy
Closing	12.45pm	John Hancock

WELCOME TO THE EV CONNECT ROADMAP WORKSHOP

John Hancock | Signature Consulting

EV CONNECT

Greg Skelton | Wellington Electricity

DRIVING THE PROJECT FORWARD

KEY STAKEHOLDER MESSAGES

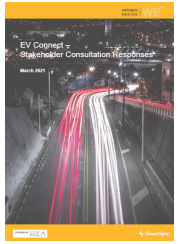
Energy Efficiency & Conservation Authority |**Andrew Caseley**

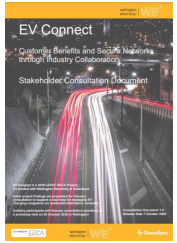
Ministry of Business, Innovation and Employment | **Briony Bennett**

Electricity Authority| **Ron Beatty**

Commerce Commission | **Andy Burgess**

Progression of LEVCF Project





Industry Implementation

2017

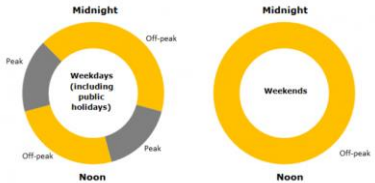
2018

2019

2020

2021

Future



Final Roadmap

Dean Gowans (Embrium) 1962 - 2021

The EV Connect (LEVCF) team

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GreenSync

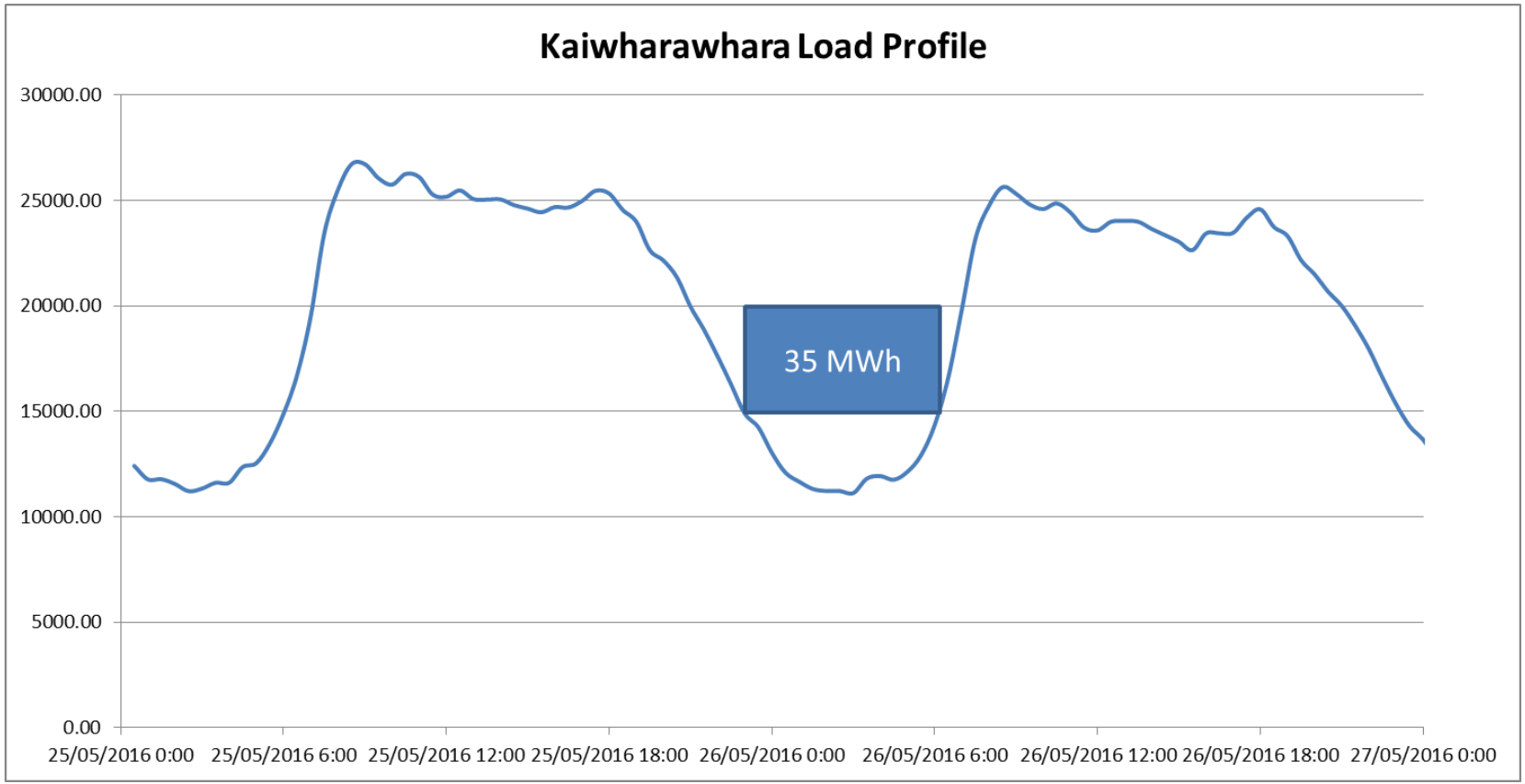
GOODMEASURE

genesis

JET CHARGE

CHARGEFOX

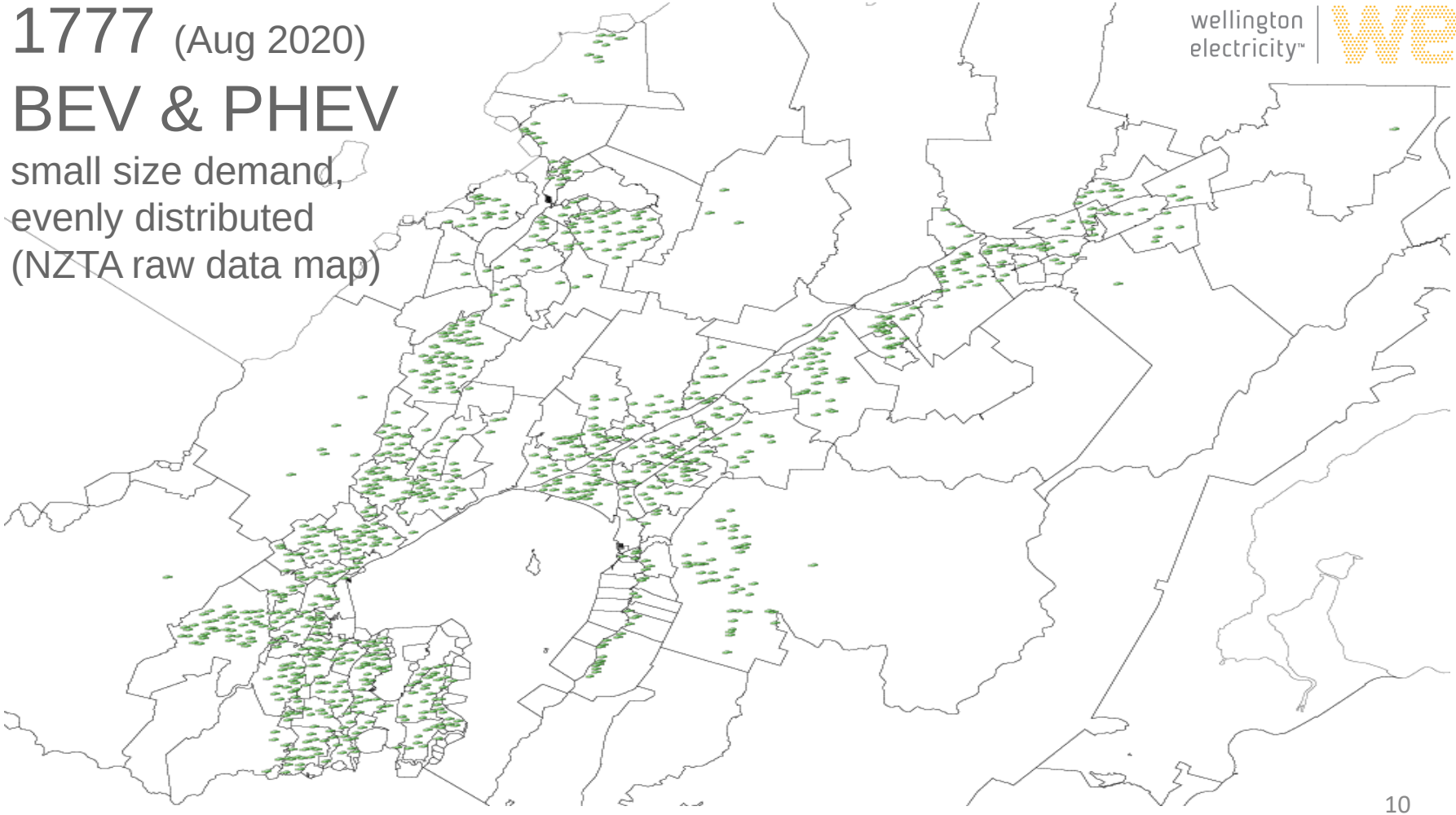
Network Charging Availability



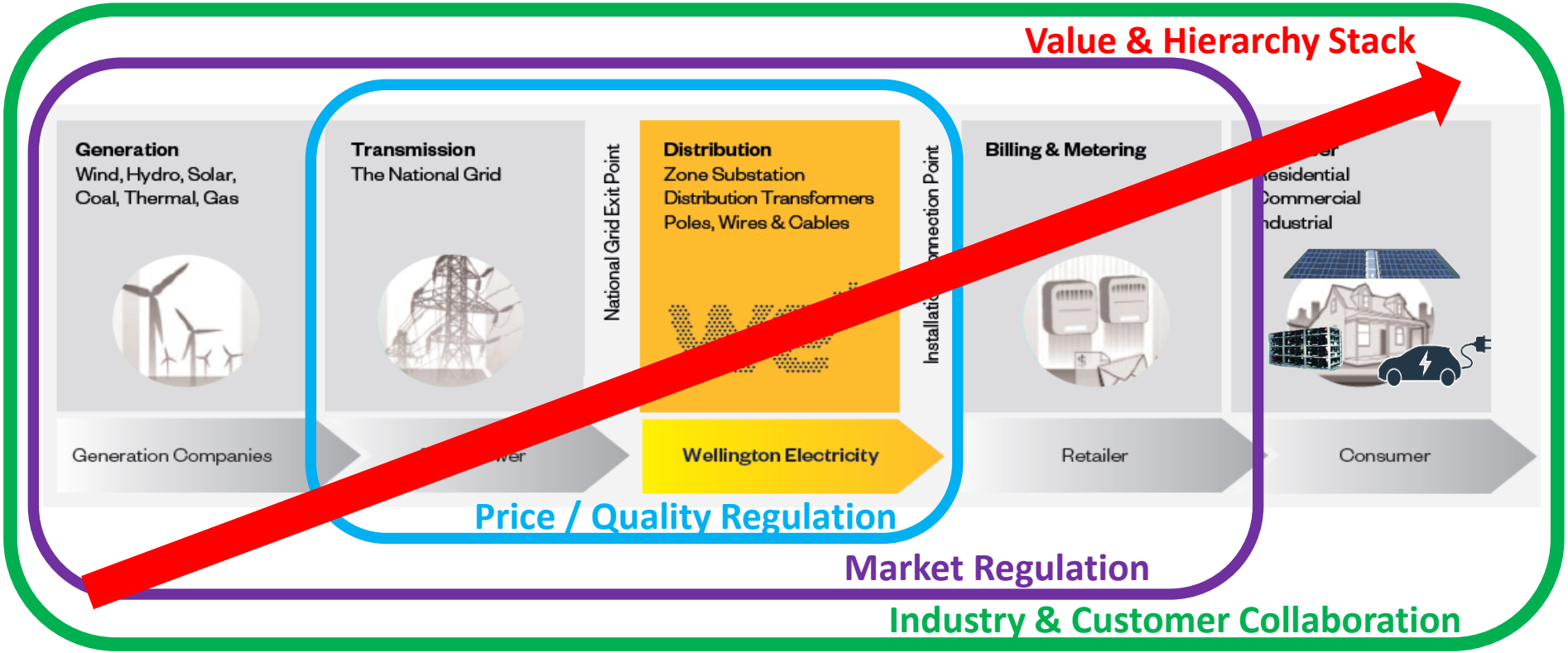
1777 (Aug 2020)

BEV & PHEV

small size demand,
evenly distributed
(NZTA raw data map)



Consumers Part of a Co-ordinated Industry Supply Chain – Collaboration important



Industry solution for EV demand management – draft roadmap

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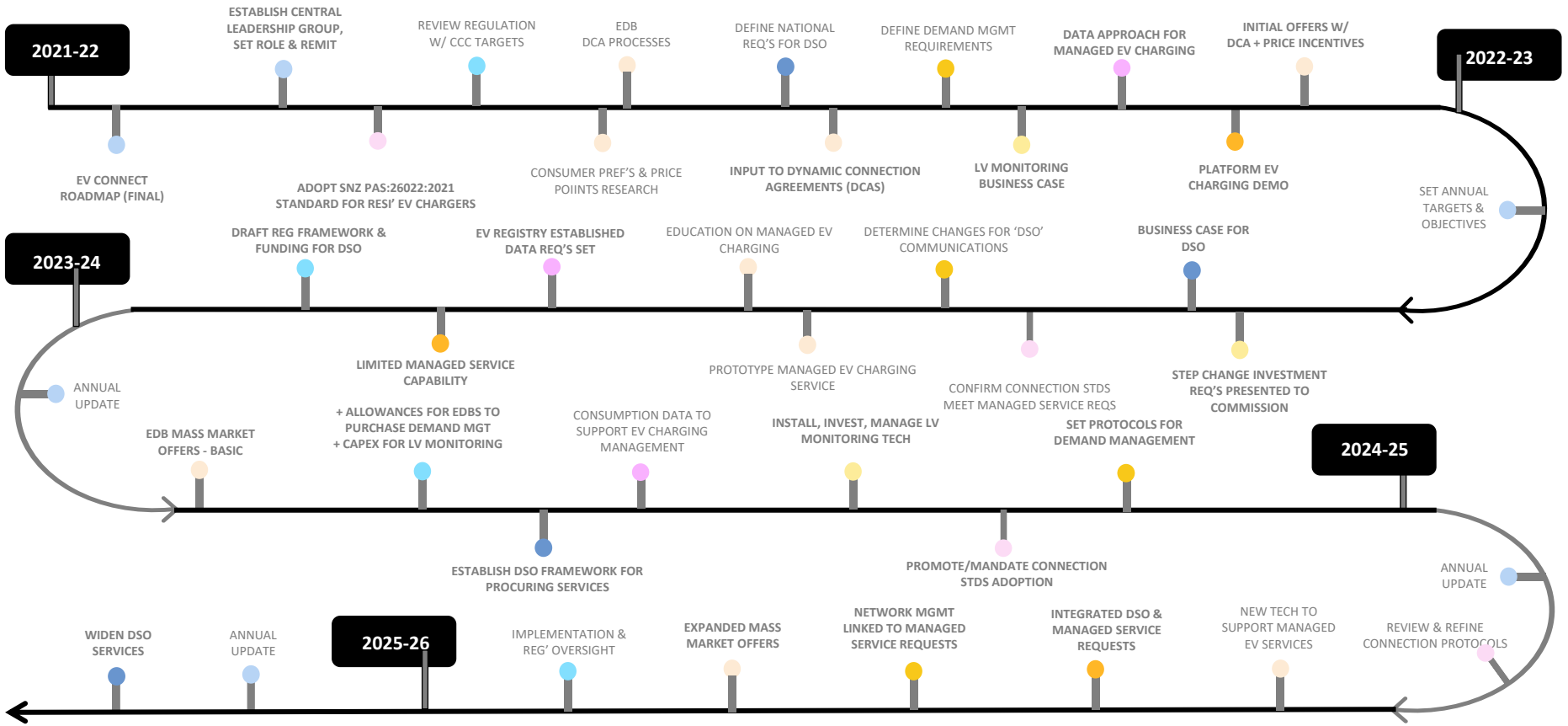

Climate change targets – added imperative & urgency

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Revised carbon trading scheme – all emissions priced correctly

Developing carbon sinks – planation and native forests

Reducing agriculture emissions

Transition to renewable electricity generation

Transition from gas to electricity for home and business use

Electrification of the transport fleet

Todays Goal – Plan the way forward

	Action	Who
1	Workshop draft Roadmap (3 areas)	Workshop participants
2	Provide written feedback (**end of June**)	All Stakeholders
3	Finalise LEVCF roadmap (**end of July**)	WELL
4	Kick-off programme	New leadership group (industry coordination)

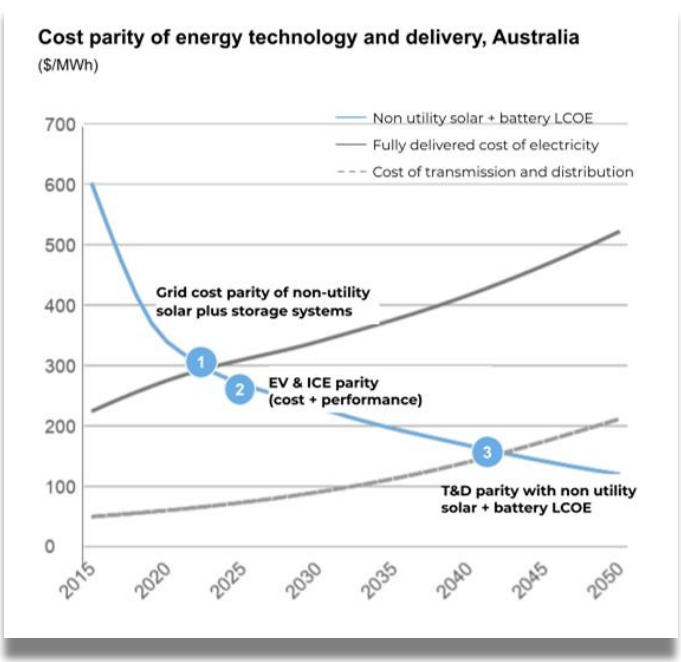
INTERNATIONAL PERSPECTIVE

Bruce Thompson | GreenSync


GreenSync
WE* Workshop Presentation
June 2021

Energy transition is here

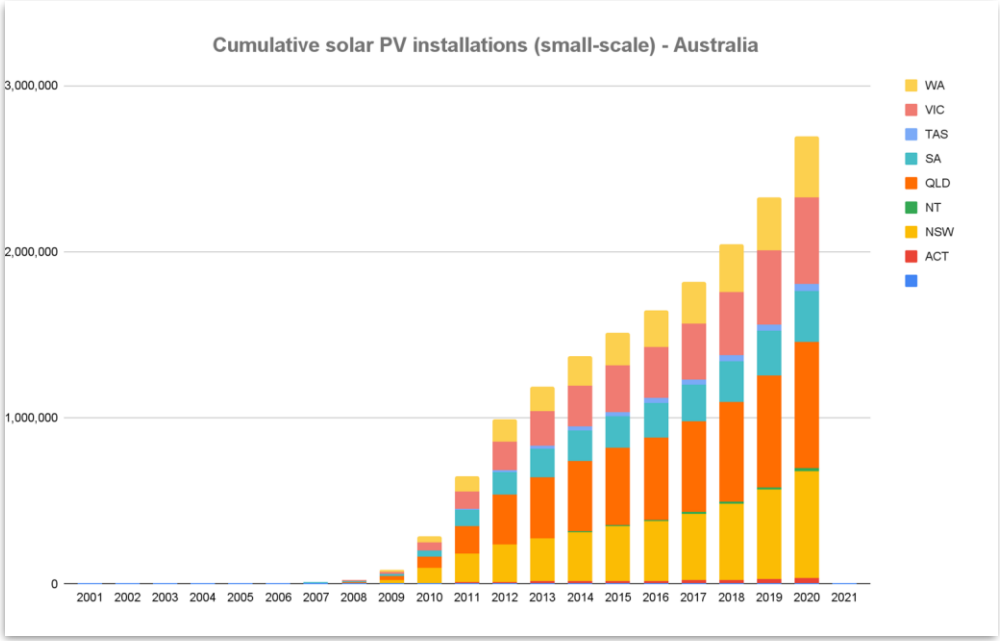
The grid is already at a tipping point



When customers go off-grid, will energy companies be left in the dark? | EY - Global

Australia is first

Australia is at the forefront of a global trend… customers' DER transforming the grid



Source: Clean Energy Regulator, Small Scale Installations 2021

Over 2.6 million households now have solar

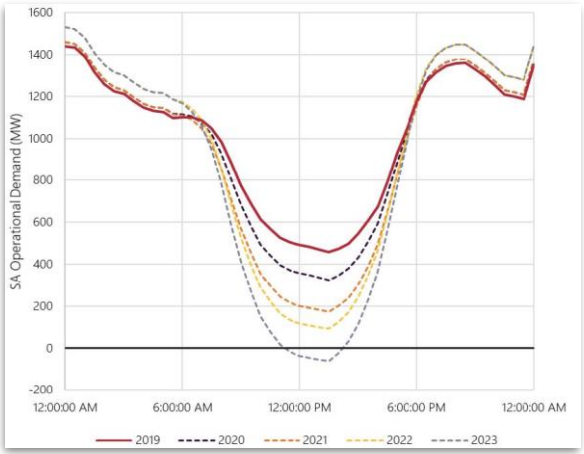
The number increased by 365,000 in 2020 alone

… A 2GW 'virtual' power station in one year

… batteries and electric vehicles to follow

The impacts are material - today

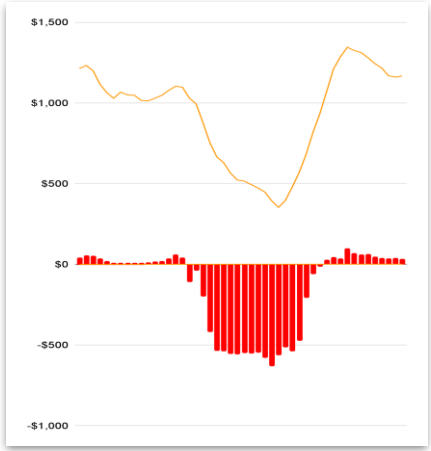
Physical: System Min & Max Demand Risk



AEMO assessment: Effect on South Australia's operational demand from increasing solar PV generation (19 Nov 2019 & projected)

- SA *Smarter Homes* Remote Disconnect in place since 1 Jan 2021
- Service already called on 14th March,
- WA, Qld and Victoria expected to follow within 12-24 months

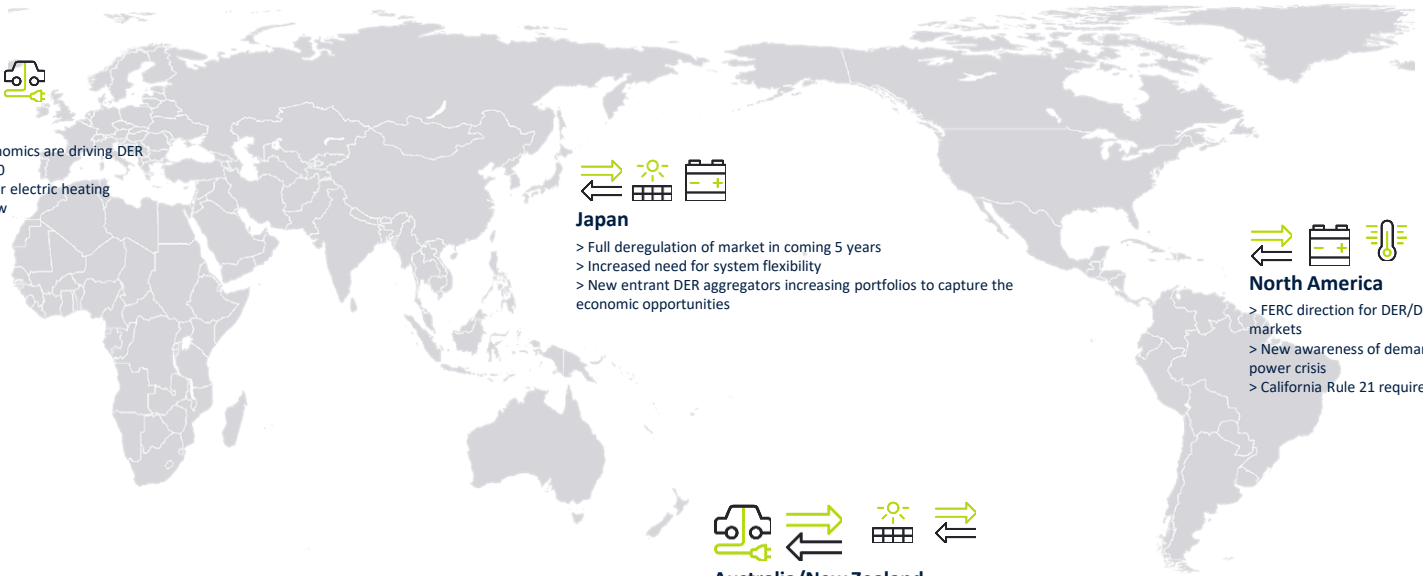
Financial: Spot Price Impact



AEMO: Price & Demand Data Sunday 14th March 2021

- SA NEM & WEM consistently negative spot prices in Autumn and Spring
- Other states starting to experience significantly lower wholesale prices
- FCAS services increasing in value

Global transition has begun



Europe

> Carbon policies & economics are driving DER
> No new ICEs from 2030
> Significant forecasts for electric heating
> Solar continues to grow

Japan

> Full deregulation of market in coming 5 years
> Increased need for system flexibility
> New entrant DER aggregators increasing portfolios to capture the economic opportunities

North America

> FERC direction for DER/DR participation in ISO markets
> New awareness of demand side influence, post Texas power crisis
> California Rule 21 requirements

Australia/New Zealand

> Highest solar penetration per capita in the world
> Batteries are becoming rational economic choice
> Car importers, so will be 'driven' to EVs by ICE policies elsewhere
> NZ Zero Net Target

Scalable device connectivity is key

Managing scale

More solar systems, electric cars, batteries, heat pumps, etc. are being installed every day.

This is not stopping.

Enabling interoperability

Coordination is challenged by inconsistency in communications standards and protocols.

Standards will follow not lead.

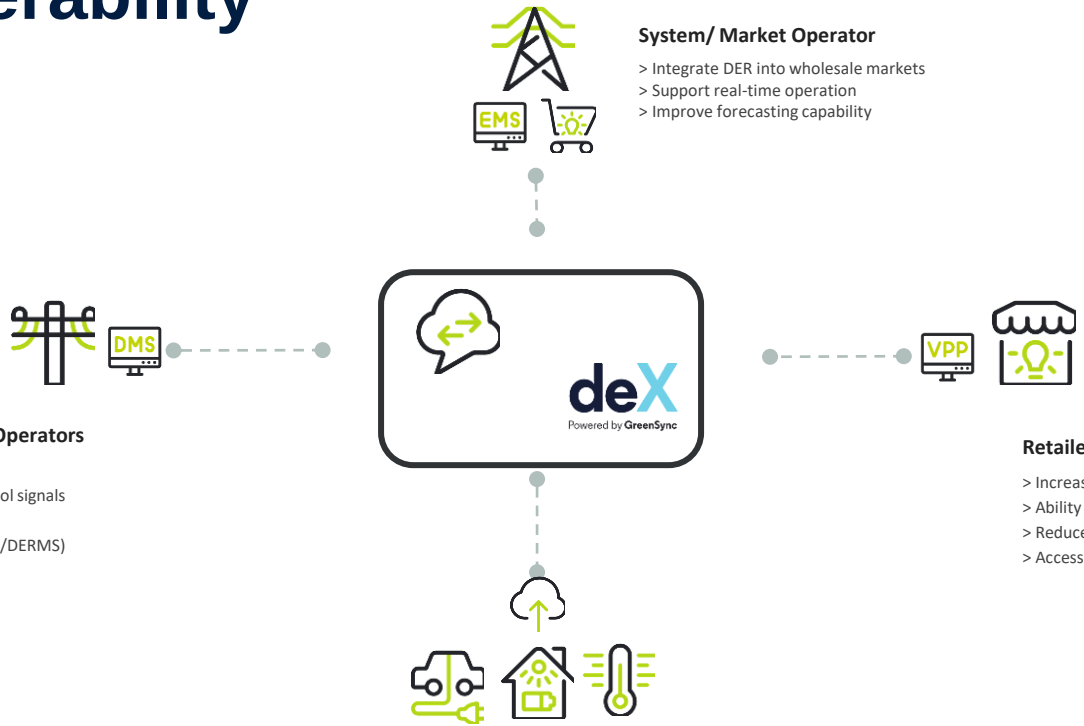
Reducing friction, cost & complexity

Split incentives, technology maturity and DER capital cost have restrained VPP growth to date.

This is changing rapidly.

What's needed is low cost, scalable digital connectivity

Interoperability



System/ Market Operator

> Integrate DER into wholesale markets
> Support real-time operation
> Improve forecasting capability

Electricity Distribution System Operators

> Immediate oversight of diverse fleets
> Allow 'big red button' to convey control signals
> Ability to procure flexibility services
> Integrate into current systems (ADMS/DERMS)

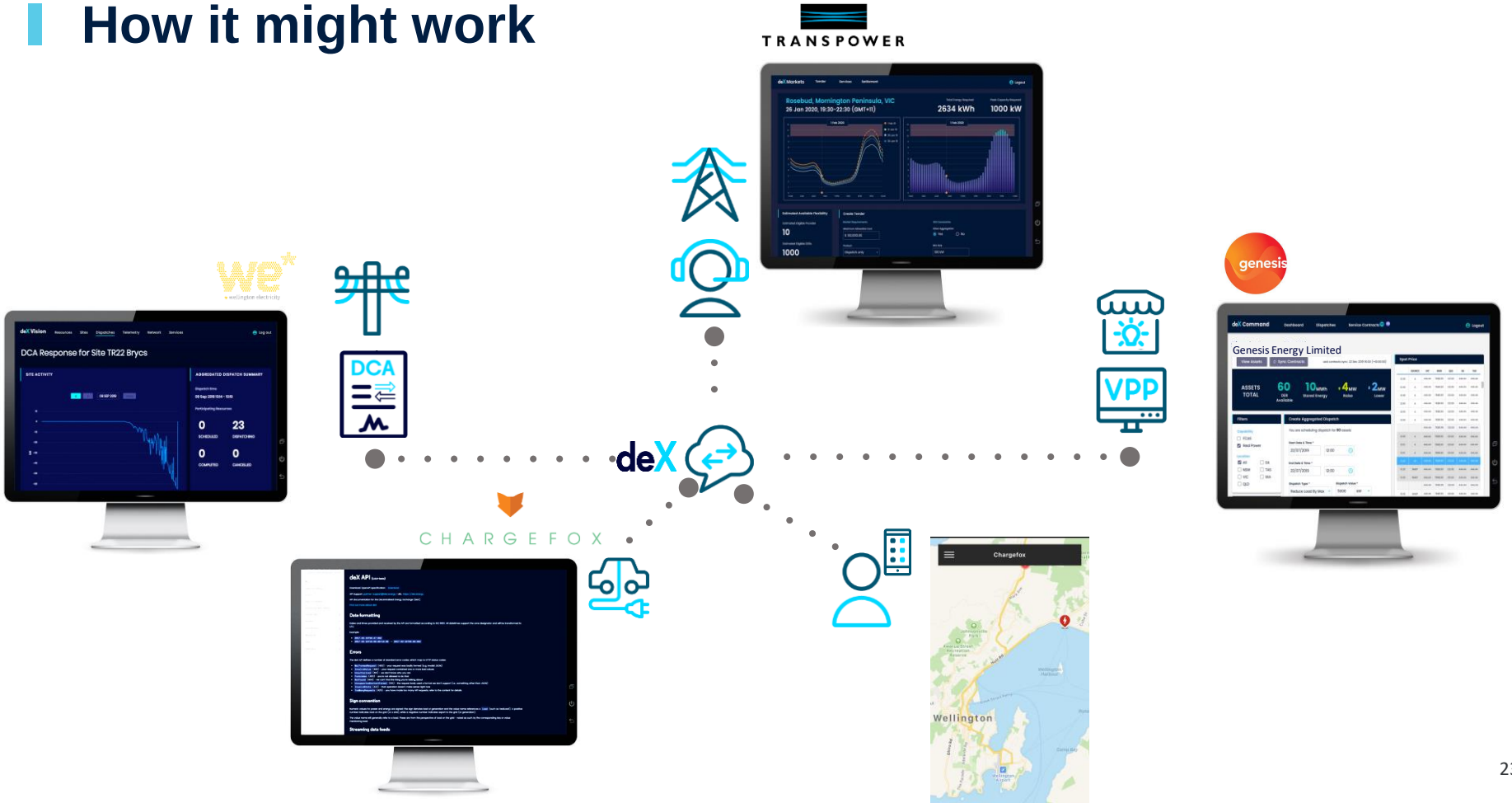
Retailers, Aggregators

> Increase competitiveness of customer offers
> Ability to delivery new business models
> Reduces DER integration and mgt costs
> Access to greater numbers of customers

Technology OEMs

> Provide customers 'VPP Ready' capability
> Reduces compliance costs across jurisdictions
> Provides ability to monetise APIs

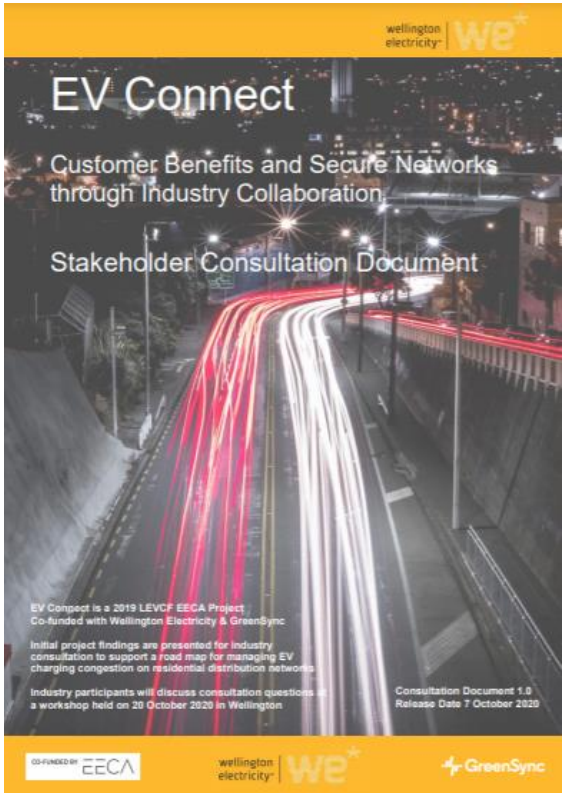
How it might work

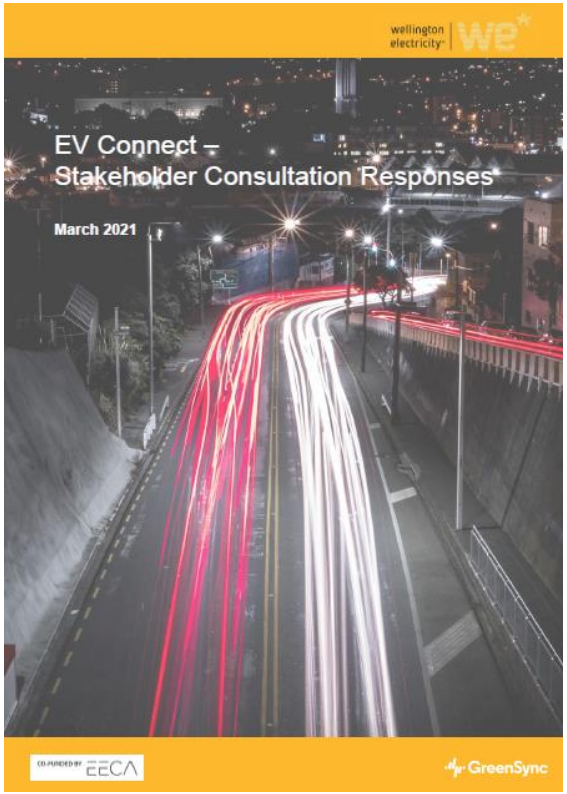


FEEDBACK FROM THE LAST WORKSHOP

Scott Scrimgeour | Wellington Electricity

Discussing the issues and challenges





50 workshop participants and 13 submissions: Aurora Energy, Commerce Commission, Drive Electric, Electra, Electricity Engineers Association, Electricity Authority, Electricity Networks Association, Energy Efficiency & Conservation Authority, Energy Safety, Flick, Independent Electrical Generators Association, Major Energy Users Group, Meridian, Ministry of Business, Innovation and Employment, Network Tasman, New Zealand Transport Authority, Our Energy, Transpower, Powerco, Orion, Unison Networks and Vector.

Clear consensus on key areas …

- National leadership – joint government/industry
- Establish a national EV charger registry – diverging views on the extent
- Standard protocols for EV technologies
- Develop visibility of LV network
- Use prices to signal value of shifting demand – supported by technology
- Responsibility for network quality of supply should remain with distribution businesses
- Develop demand management technology and services

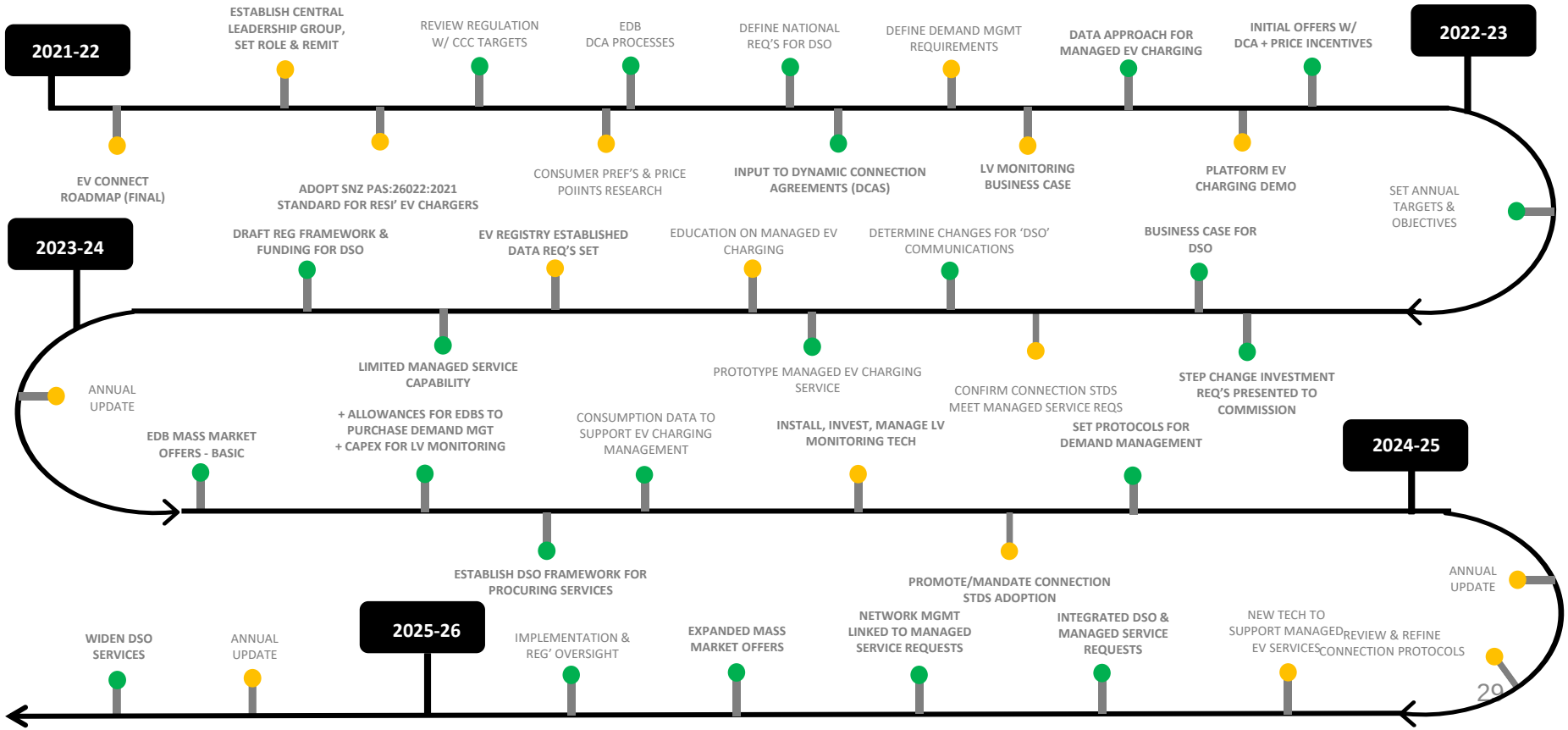
There were some diverging views …

- NZTA should provide EV location data to Distribution Businesses
- Who should provide demand management services 
- The application of dynamic connection agreements – thresholds and customer choice
- The changes needed to supporting regulation
- When should a DSO function be provided and by who? 
- The application of subsidies and tariffs to support EV uptake

Areas of uncertainty …

- How are competing interest in DER are managed?
- What changes are needed to drive innovation?
- What changes are needed to progress the actions needed to accommodate EVs?
- What is the speed that change is needed?
- How demand management services could be developed and implemented?

Foundations of the roadmap built on consensus…



A WELL-EARNED BREAK

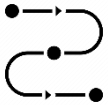
THE DRAFT ROADMAP

Scott Scrimgeour | Wellington Electricity

The draft roadmap

Based on feedback

Kept high-level



Focused on order (rather then ‘time to complete’)

Still areas of uncertainty

Need your feedback on the roadmap

Outcome will be a robust set of actions & a way forward

Objectives

Customer value

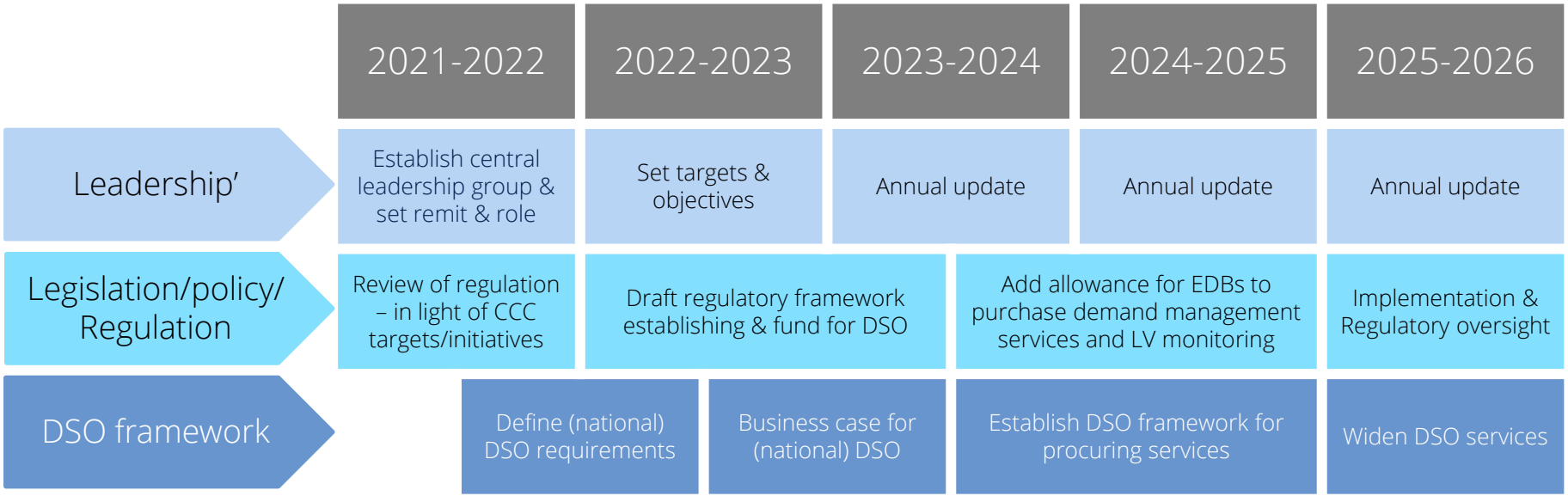
A safe, secure and affordable network

Policy and regulatory alignment

Workstreams to deliver the objectives

Key objectives	Who leads	Workstreams
Policy & regulatory alignment	Government, policy makers and regulators	Leadership
		Legislation/policy/Regulation
		DSO framework
Customer value	EV stakeholders – customers, retailers, EV sellers, OEMS	Connection protocols
		Data & information needs
		DER services & technology
Secure and affordable network	Electricity distribution networks	LV network
		Demand management & DSO
		Platform technology

Policy & regulatory alignment



Customer Value

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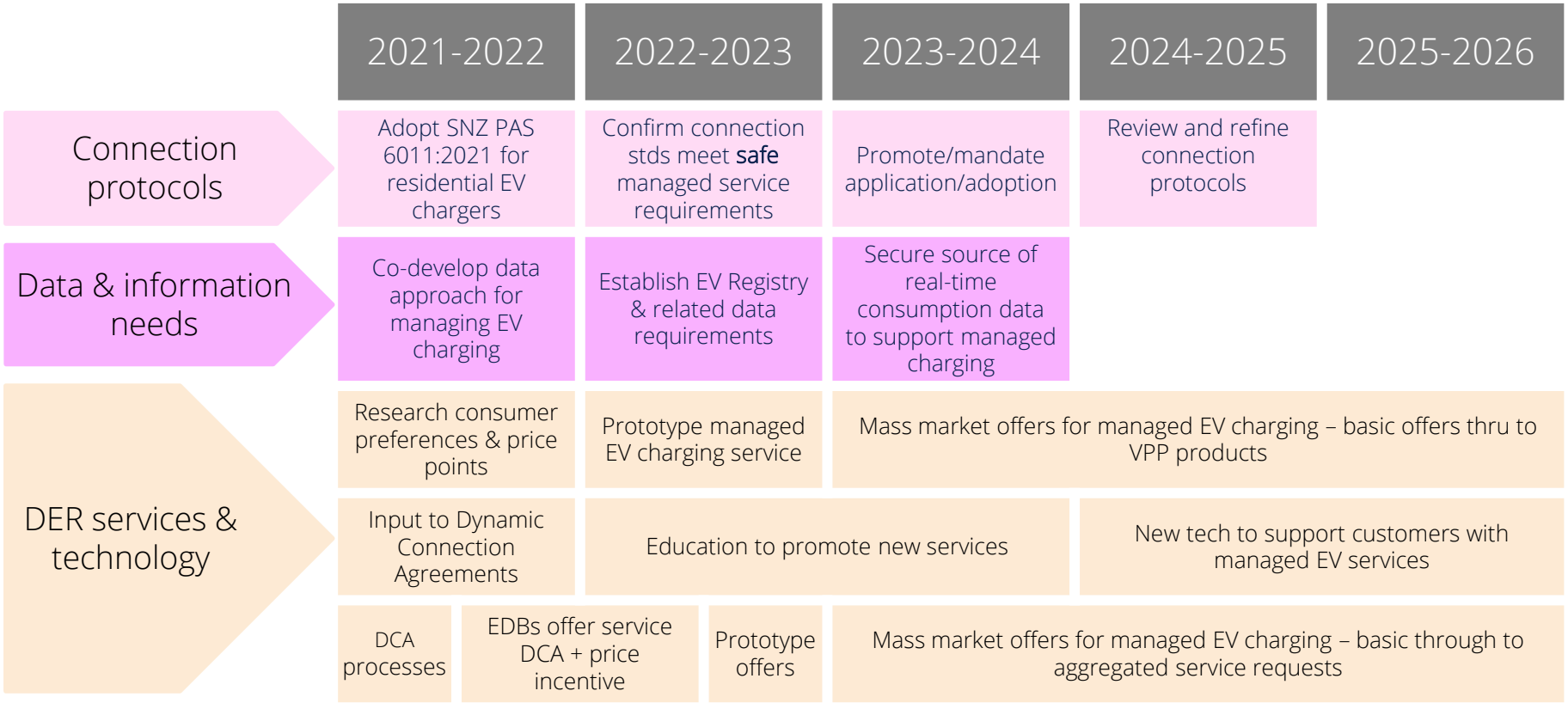

A safe, secure and affordable network

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	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
DER services & technology	previous	previous	previous	previous	previous
LV network	LV monitoring business case	Present step-change investment req's to Commission	Invest, install & manage LV monitoring technology and systems		
Demand management & DSO	Define internal EDB demand management requirements	Determine changes for 'DSO' communications	Set protocols for demand management	Link network management to managed service requests (aggregated service requests)	
Platform technology	Demo device management for multiple EV tech	Limited managed service capability		Integrate with DSO and managed service requests	

Putting it all together - the draft roadmap

EV CONNECT ROADMAP OBJECTIVES & WORKSTREAM MAP – WHAT, WHO, WHEN

POLICY & REGULATORY ALIGNMENT | CUSTOMER VALUE | SECURE & AFFORDABLE NETWORK | *REQUIRES REGULATORY FRAMEWORK CHANGE

KEY OBJECTIVES	WHO LEADS	WORKSTREAM	2021–2022	2022–2023	2023–2024	2024–2025	2025–2026
POLICY & REGULATORY ALIGNMENT	GOVERNMENT, POLICYMAKERS & REGULATORS	Leadership	Establish central leadership group & set remit & role	Set targets & objectives	Annual update	Annual update	Annual update
		Legislative/ Policy/ Regulation	Review of regulation – in light of CCC targets/initiatives	Draft regulatory framework establishing & fund for DSO		Add allowance for EDBs to purchase demand management services Add capex for LV monitoring	Implementation & Regulatory oversight
		DSO* Framework		Define (national) DSO requirements	Business case for (national) DSO	Establish DSO framework for procuring services	Widen DSO services
CUSTOMER VALUE	EV STAKEHOLDERS – OEMS, CUSTOMERS, RETAILERS, CONSUMER ADVOCATES, EV SELLERS	Connection protocols	Adopt SNZ PAS 6011:2021 for residential EV chargers	Confirm connection stds meet managed service requirements	Promote/mandate application/adoption	Review and refine connection protocols	
		Data & information needs	Co-develop data approach for managing EV charging	Establish EV Registry & related data requirements	Secure source of real-time consumption data to support managed charging		
		EV/DER* services & technology	Research consumer preferences & price points	Prototype managed EV charging service	Mass market offers for managed EV charging – basic offers thru to VPP products		
			Input to Dynamic Connection Agreements	Education to promote new services		New tech to support customers with managed EV services	
			DCA processes	EDBs offer service DCA + price incentive	Prototype offers	Mass market offers for managed EV charging – basic through to aggregated service requests	
SECURE & AFFORDABLE NETWORK	ELECTRICITY DISTRIBUTION BUSINESSES (EDBs)	LV network development	LV monitoring business case	Present step-change investment req's to Commission	Invest, install & manage LV monitoring technology and systems		
		Demand management & DSO	Define internal EDB demand management requirements	Determine changes for 'DSO' communications	Set protocols for demand management	Link network management to managed service requests (aggregated service requests)	
		Platform technology	Demo device management for multiple EV tech	Limited managed service capability		Integrate with DSO and managed service requests	

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THE TABLE TOPICS

John Hancock | Signature Consulting

DEEP DIVE # 1
DELIVERING THE ROADMAP

Jackson Lung | Wellington Electricity

Common Goal, Common Challenge

Common Goal:

- International Commitments to Paris Agreement – Carbon Neutral by 2050
- Decarbonisation via electrification of transportation and gas

Common Challenges:

- Significant increase in load for the network
- Lack of visibility of the new load
- Existing regulation model based on traditional load growth
- Lack of standardisation of the emerging technology

Current Initiatives

Current Roadmaps:

- EV Connect – Wellington Electricity, 2021
- Network Transformation Roadmap (NTR) – ENA, 2017
- A Roadmap to Electrification, Whakamana i Te Mauri Hiko (WiTMH) – Transpower, 2021

Other Related Works:

- ENA Distribution Pricing Working Group
- ENA Regulatory Working Group
- EA Innovation and Participation Advisory Group
- Other initiatives from other EDBs

Similarities and Difference

Topics	EV Connect	NTR	WiTMH
Focused Topic(s)	EV Focused	EV/DER/DG	EV/Gas Electrification
Roadmap timeframe	5 years	10 years	15 years
Leadership	Yes	No	No
Legislative/ Policy/ Regulation	Yes	Yes	Light
DSO Framework / Open Network Framework	Yes	Yes	No
Pricing	Yes	Yes	Light
Connection Protocols	Yes	No	No
Data & Information Needs	Yes	Yes	No
EV/DER Connection Standards	Yes	Yes	Light
LV Network Development	Yes	Yes	No
Demand Response Management	Yes	Yes	Light
Platform Technology	Yes	Yes	No
Cyber Security	No	Yes	No
Consumer Relationship	Yes	Yes	No

Similarities and Difference

Decarbonisation via Electrification

Question 1 - Combined industry programmes or the EV programme remain independent?

Question 2 - Feedback suggested a government lead or/co-lead work programme. What leadership model will help ensure success?

Question 3 - What is the best model and implementation plan for ensuring the actions are delivered?

DEEP DIVE # 2
DEMAND MANAGEMENT SERVICES

Glenn Coates | Aurora Energy

FLEXIBILITY/DEMAND SERVICES

PROCUREMENT OPTIONS (AN UPPER CLUTHA EXAMPLE)

GLENN COATES
GM ASSET MANAGEMENT & PLANNING

9 JUNE 2021

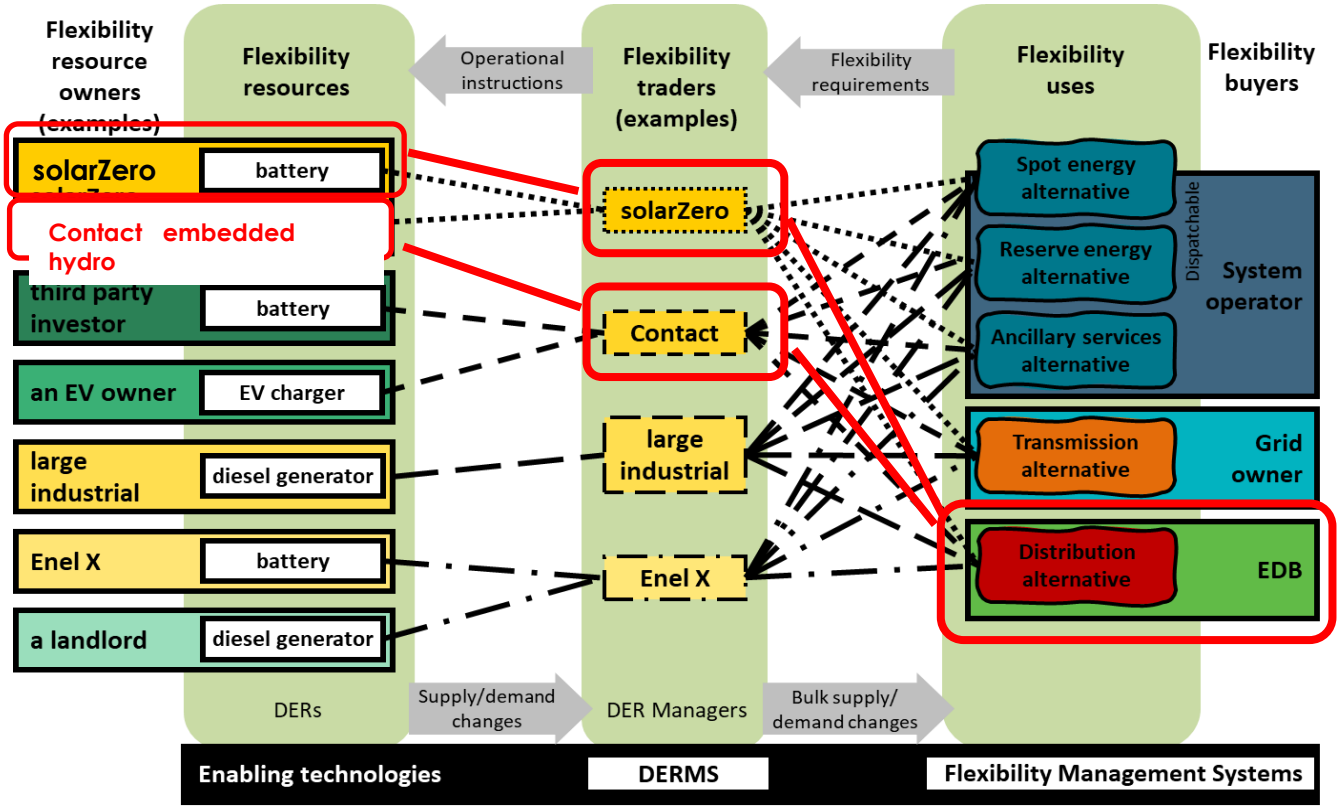
How do we grow Flexibility (Demand Response) Services?

Background

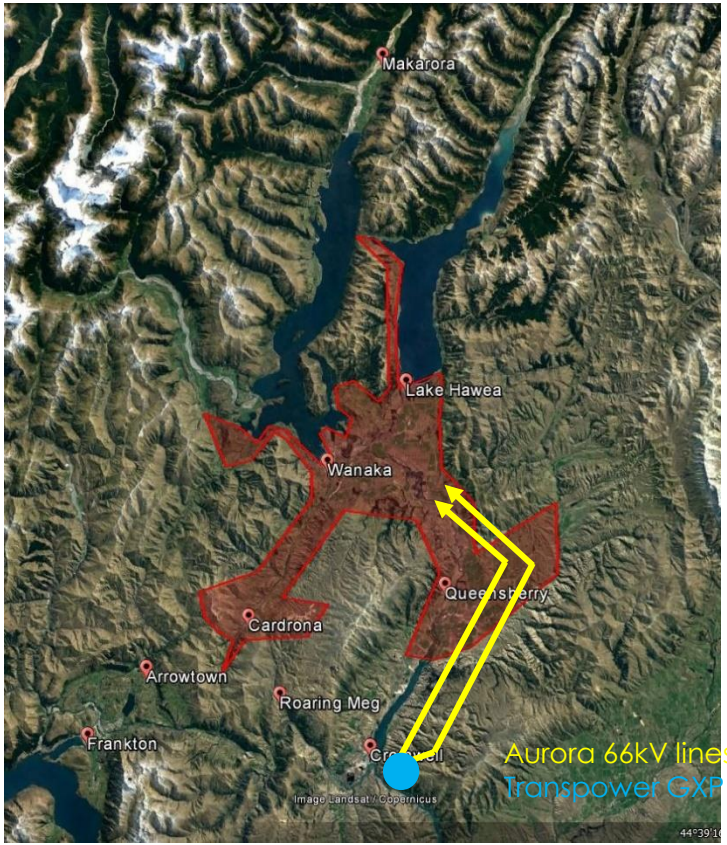
- Demand Services (EV charge management in this case) is a subset of Flexibility Services
- Flexibility Services is a generic term for the management of flexible Distributed Energy Resources (DERs)
- Flexible DERs include hot water cylinders, EVs, battery storage, controllable heating systems etc

Market procurement	Distributor led
Requires greater collaboration and is initially slightly more complex	Potentially less coordination and simpler to implement initially
Encourages scale and innovative solutions through competition	Potentially lower cost during the development phase and initial procurement
Enables value stacking – on selling of services to Retailers and Transpower GO and SO	Likely to constrain the development of a market for Flexibility Services, slowing down scale, innovative solutions and value stacking
Creates an intermediary party potentially adding costs that need to be offset by innovation and value stacking	Value stacking more difficult to achieve
Distributors (or a DSO) will need to develop a Flexibility Management System (FMS) to coordinate Flexibility Traders	Distributors (or a DSO) will need to develop a Distributed Energy Resources Management system (DERMs)
	Need to consider how to transition to a more sustainable approach

Flexibility Services – A market approach in NZ (*courtesy* IPAG)



Flexibility Services procurement example



Summary need case

- Circa 30MW of peak demand in the wider Wanaka region with no interconnections to other regions
- Load growth forecast to exceed the secure(N-1) capacity of the existing two 54km 66kV lines from Cromwell to Wanaka in 2022/23
- Short term, tactical/low-cost voltage support solutions being implemented in 2021
- The first stage of the Flexibility Services solution will need to be in place by late 2022
- Major ($20m+) network solutions required to lift capacity into the region
- Growth uncertainty further impacted by Covid-19
- Some network solutions require further feasibility and consenting investigation, in particular the feasibility of network interconnection solutions with Queenstown

Upper Clutha – testing the market for Flexibility Services

"Going to market we knew we had at least one plausible Flexibility Trader"

(accelerated development of Contact Energy's Lake Hawea hydro)

- We knew that a network owned battery was not going to have the same potential to 'value stack' as others solutions and we wanted to signal an emerging market to Flexibility Traders
- We chose a two stage approach - ROI and RFP to tease out hydro potential from Lake Hawea but also to test the capability of other emerging Distributed Energy Resources and Flexibility Traders
- Very good response to ROI and RFP with future potential evident from some quality responses
- Solarzero (SolarCity) proposed widespread implementation of home/business PV and battery storage at a lower annual cost than the annual funding cost of our network upgrade options

Going to market for Flexibility (non-network capacity support)…

Open registration of interest (ROI)

- Broad set of requirements
- 15 responses
- Brought forward solutions we may never have considered

Selected RFP

- Carefully considered and detailed requirements
- Direct to the preferred 5 ROI respondents

One preferred supplier selected

- solarZero
- Capacity support in exchange for an availability and event payment
- Developed detailed contract for service
- Includes method for reserving capacity on the few high load days, while allowing solarZero to arbitrage on other days

Capacity support requirement definition and communication in the RFP was crucial

- What is the asset capability?
- What is the coincident load forecast?
- What are the load-duration curves

QUESTIONS

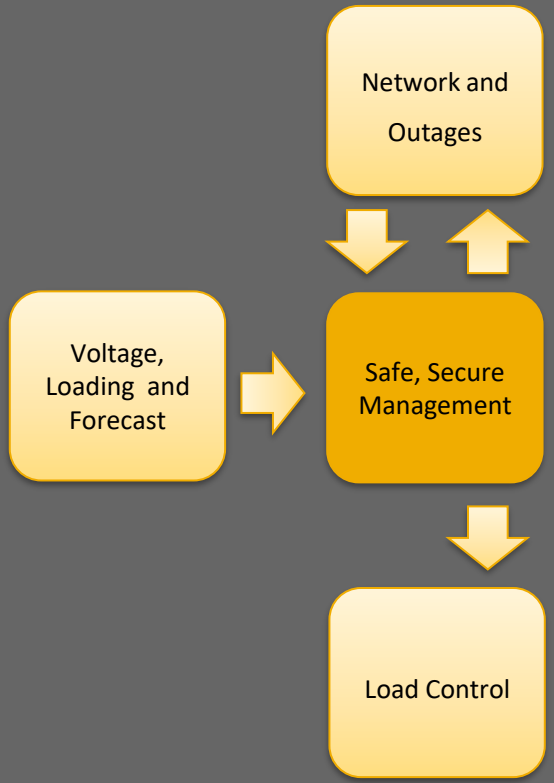
Question 4 - who should provide demand management services – EDB's, DER services providers, retailers, others?

Question 5 - Who would provide the most value to consumers?

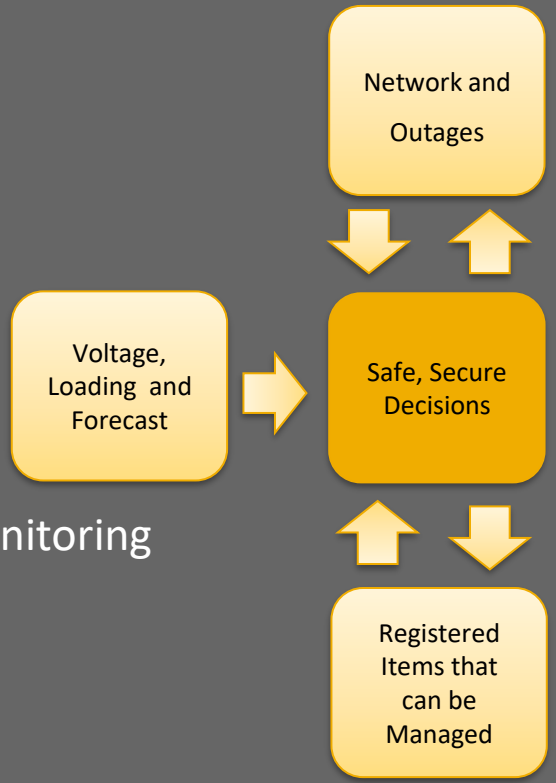
DEEP DIVE # 3
THE DSO FUNCTION

Ray Hardy | Wellington Electricity

Distribution Operator



Distribution System Operator

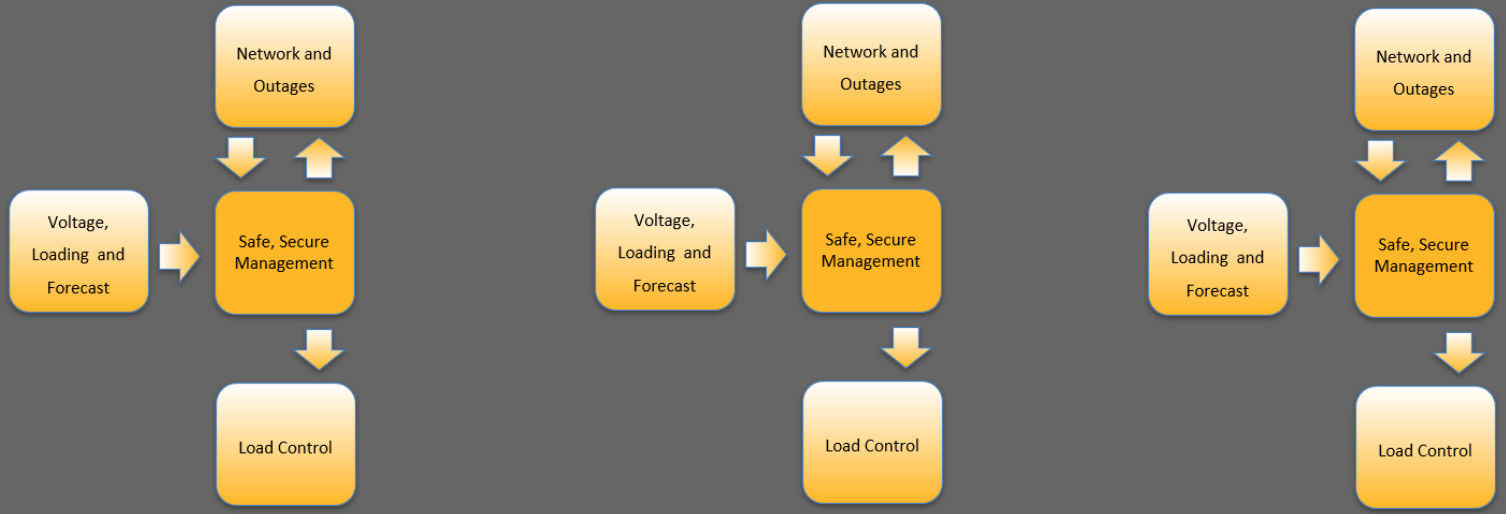


Greater LV Monitoring

Better optimization tools
Agree hierarchy of needs
(Customer, Retailer, Aggregator, Dist, TP)

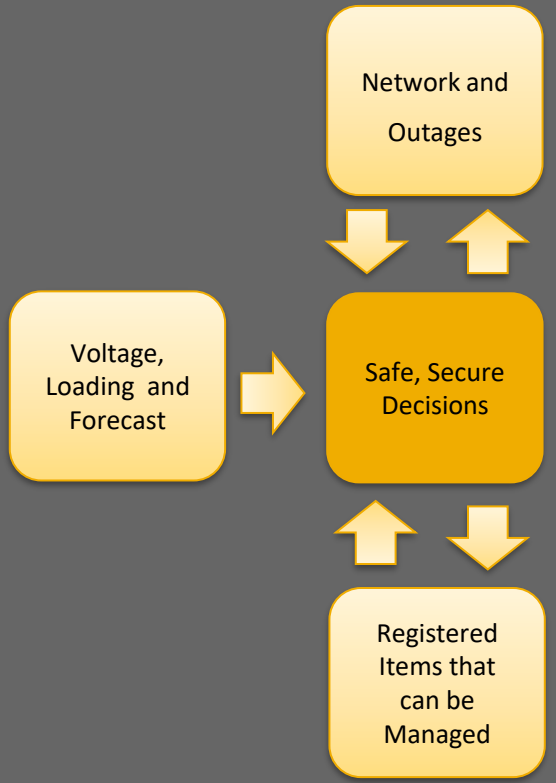
This expands with registered items available for management
Requires smart devices, API, platform….

Does the DSO function need to be centralised?

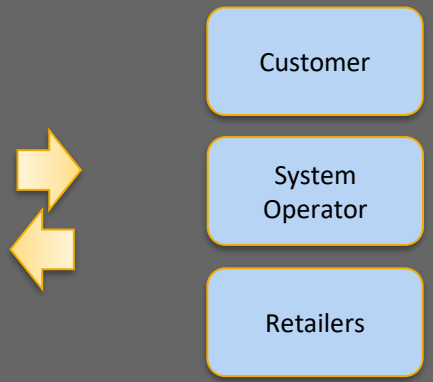


Does the DSO function need to be centralized
Or lots of DSOs…

Distribution System Operator



Agree hierarchy of needs
(Customer, Retailer, Aggregator, Dist, TP)



Question 6 - When should the DSO function be introduced?

Question 7 - Does the DSO function need to be centralised?

Question 8 - If so, who should provide this?

CLOSING – THANK YOU

John Hancock | Signature Consulting