# EV Connect

Customer Benefits and Secure Networks through Industry Collaboration

Project Briefing and Workshop

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www.welectricity.co.nz

# Programme

| Agenda | | Presenters |
|---|---|---|
| 8.30 – 8.55 am | Arrival & Registration / Coffee | |
| 9.00 – 9.15 am | Opening Remarks & Workshop Purpose | John Hancock |
| 9.15 – 9.30 am | Overview of Project & 3 Work Stream Themes | Greg Skelton |
| 9.30 – 9.45 am | ***Network Challenges & EV Opportunities*** | Geoff Thorburn |
| 9.45 – 10.15 am | Workshop Questions – Section 2 & 3 | |
| 10.15 – 10.25 am | BREAK | |
| 10.25 – 10.45 am | ***Partners & Protocols*** | Bruce Thompson & Matt Hickey |
| 10.45 – 11.15 am | Workshop Questions – Section 4 & 5 | |
| 11.15 – 11.30 am | ***Markets & Regulation*** | Ray Hardy |
| 11.30 – 11.50 am | Workshop Questions – Section 6 | |
| 11.50 – 12.00 pm | Wrap Up | |

# OPENING REMARKS & WORKSHOP PURPOSE

John Hancock | Signature Consulting

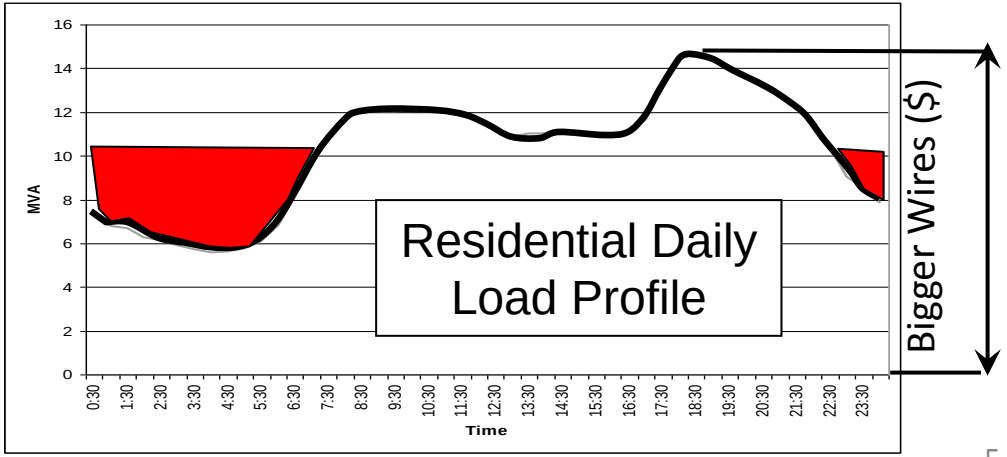
# OVERVIEW OF PROJECT & 3 WORK STREAM THEMES

Greg Skelton | WELL

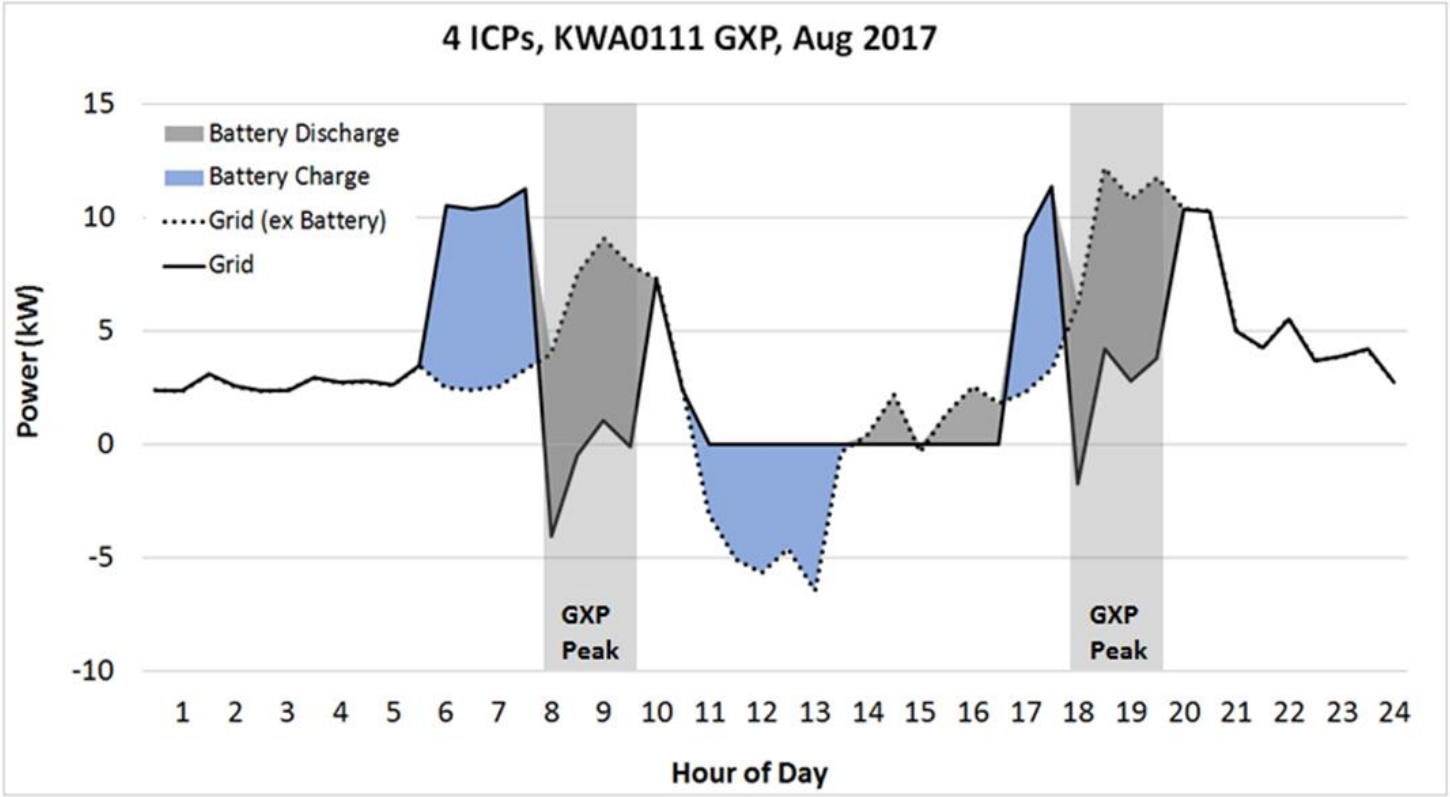
# Back to the Future – Energy Storage

## Energy Storage 1960s – 1990's

- Thermal power plants need consistent base load
- NZ tradition to develop night load (energy storage)
- Electric Hot Water Cylinders. Night Store Heaters
- Ripple Signals to turn appliances on to cheaper night energy
- EV's are another night time energy storage appliance
- Plenty of room on our system for residential EV night charging

# Solar & Controlled Battery



# Participants and Approach

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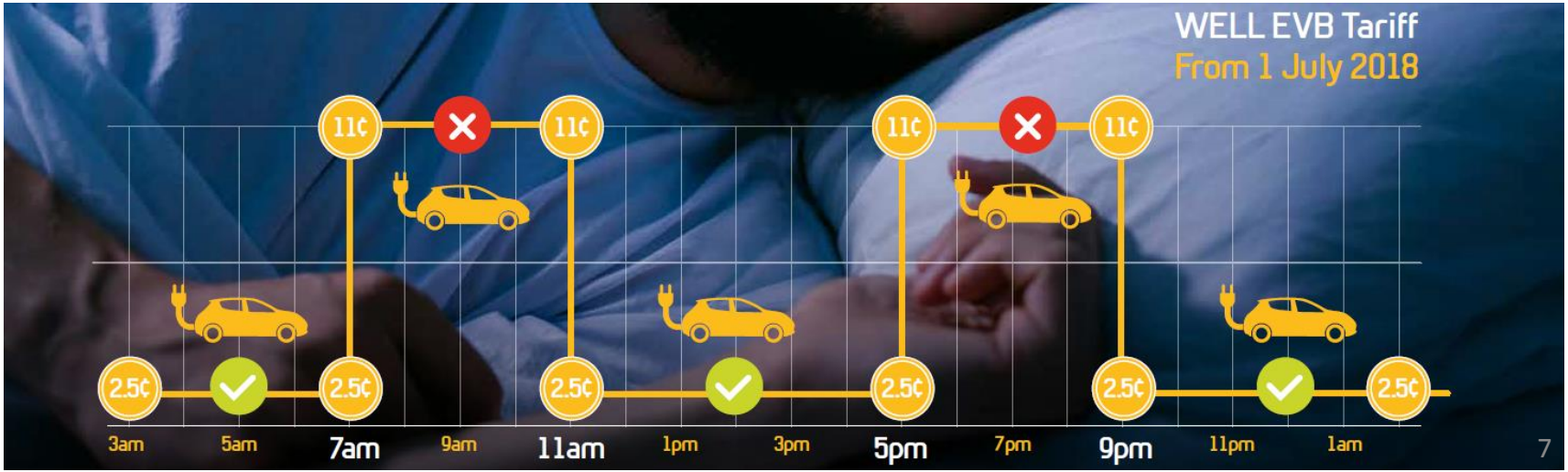
**92**
Eligible participants

**12**
Retailers
represented across the 92 eligible participants

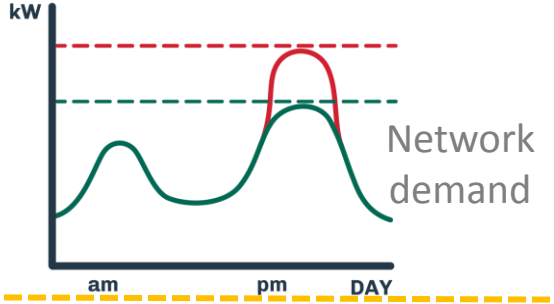
**77**
Half-hourly (HHR) Data Sets Received

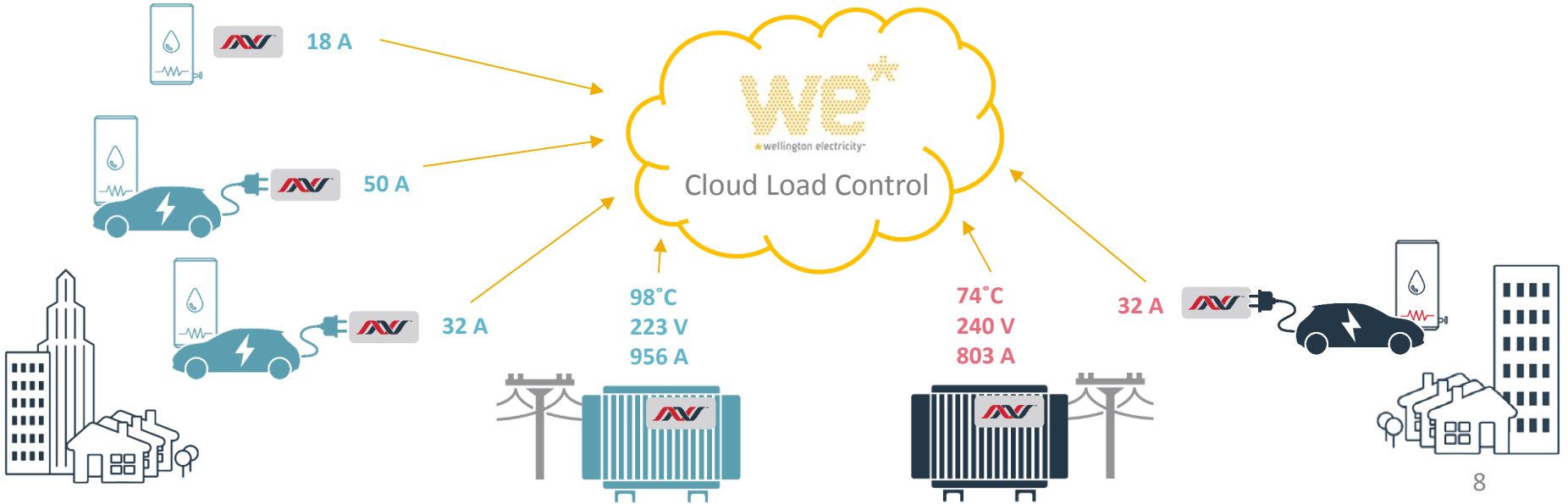
**24**
Months of HHR data sought
from Nov 2015 to Oct 2017

**860**
Other WE* ICPs Used as a control group

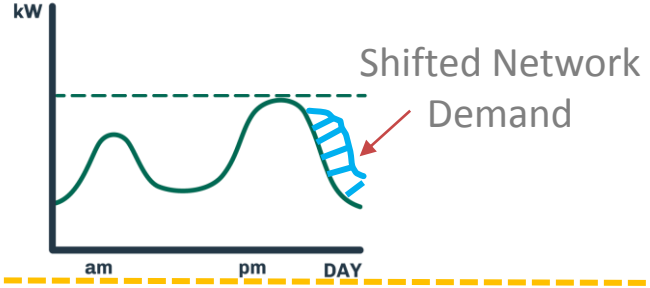


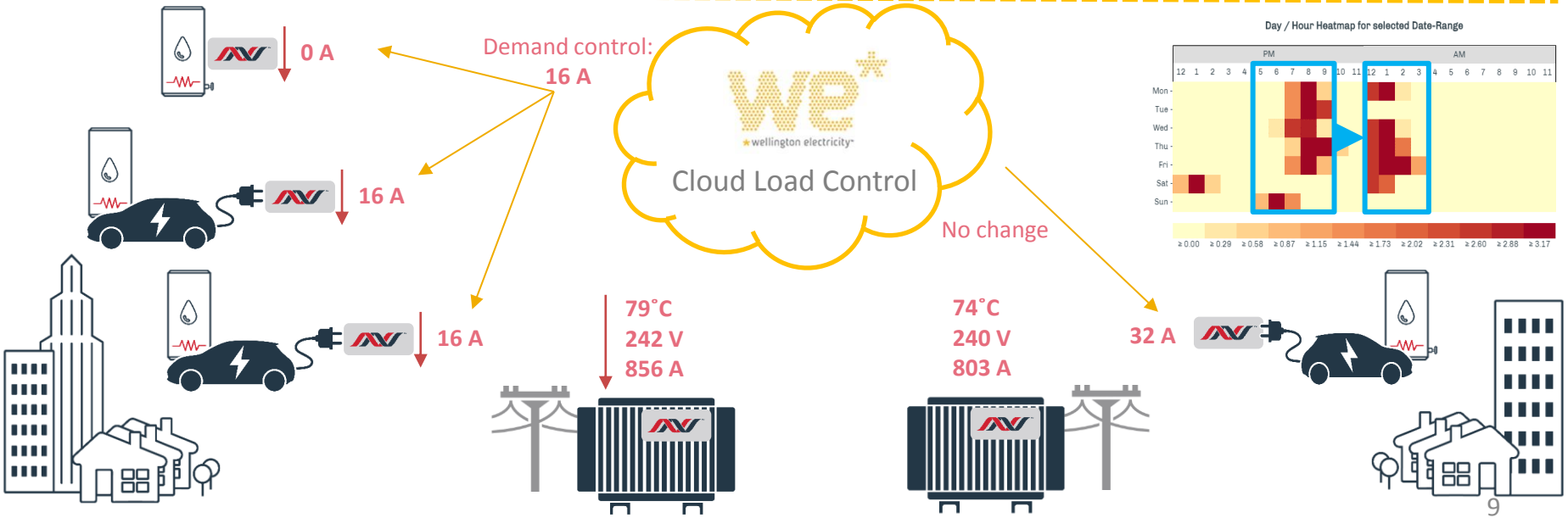
# Monitoring of LV Assets

# Dynamic LV Control

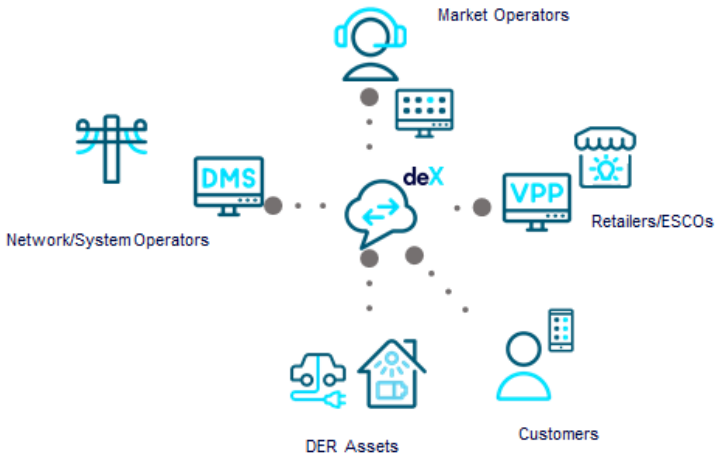



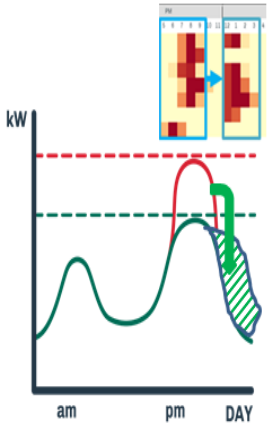
# A Bright New Future….
# Customer Enablement

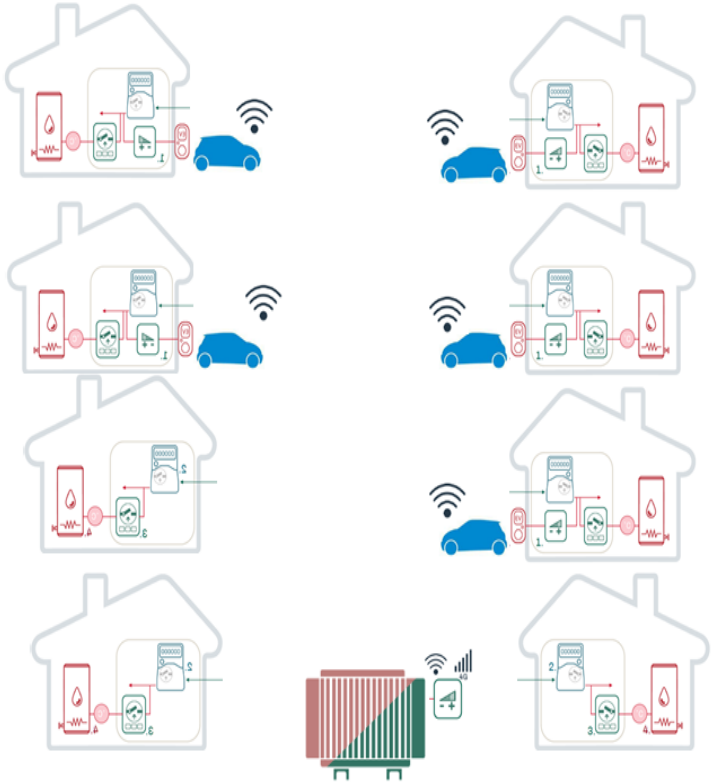
## About deX

**What's deX**

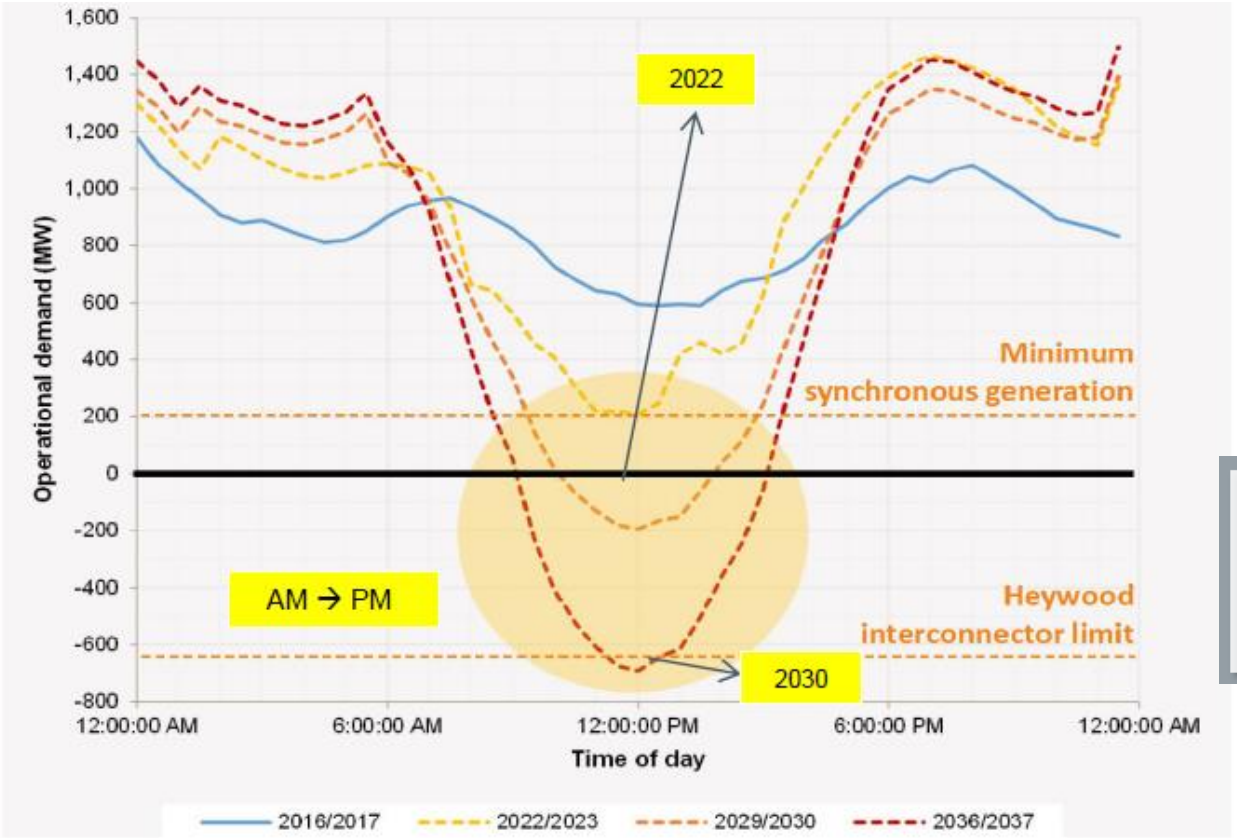



- EV registration with EDB at icp
- Agree DCA
- Install Transformer Monitoring
- Manage network performance using DCA tools
- Maintain peak demand management through DCA enablement
- In future, enable V2G for network support via DCA terms



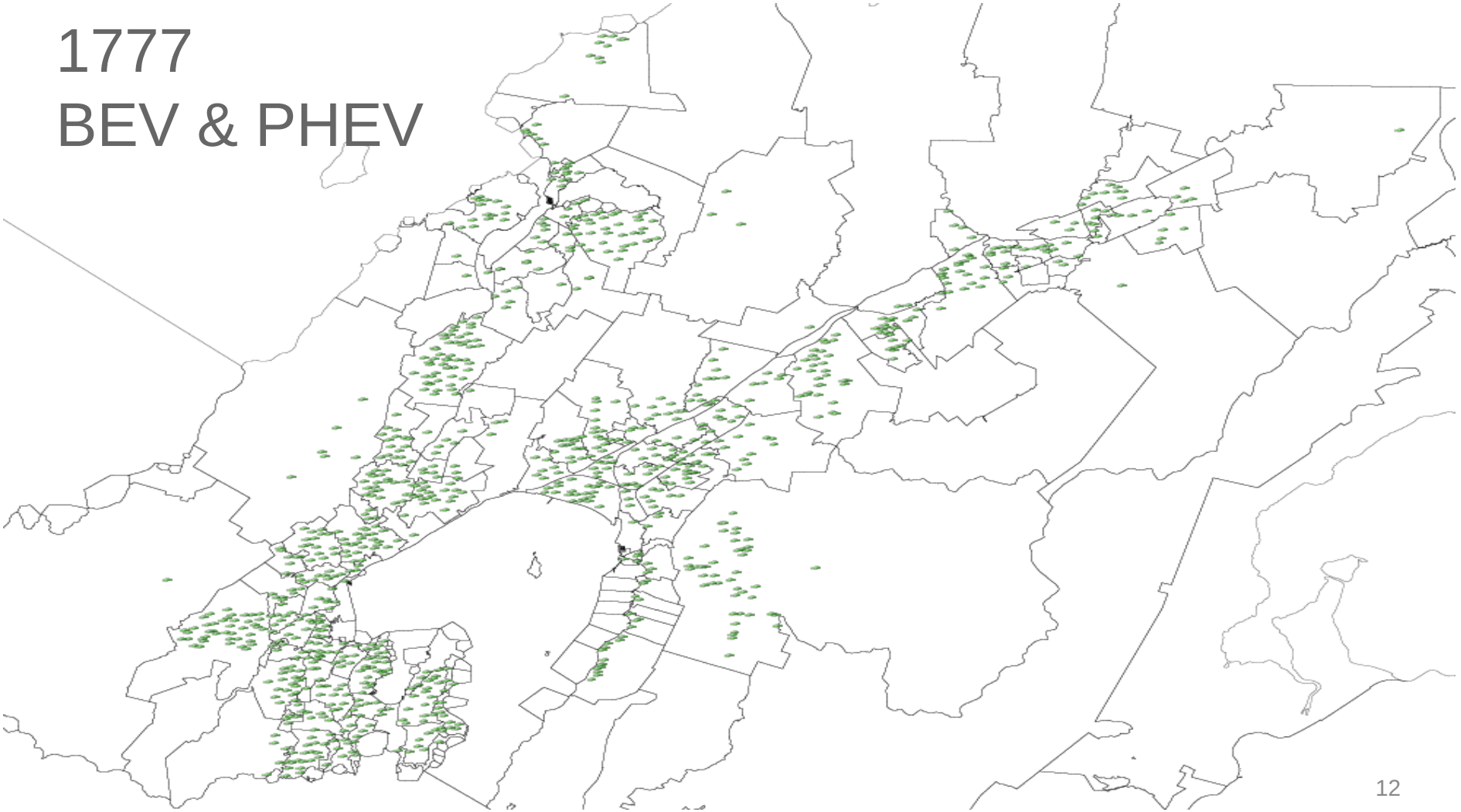
# Avoiding Poor Incentives - Solar Tariffs




SA Power Networks

Electricity Network: 200,000km
Customers: 852,000

# 1777
# BEV & PHEV

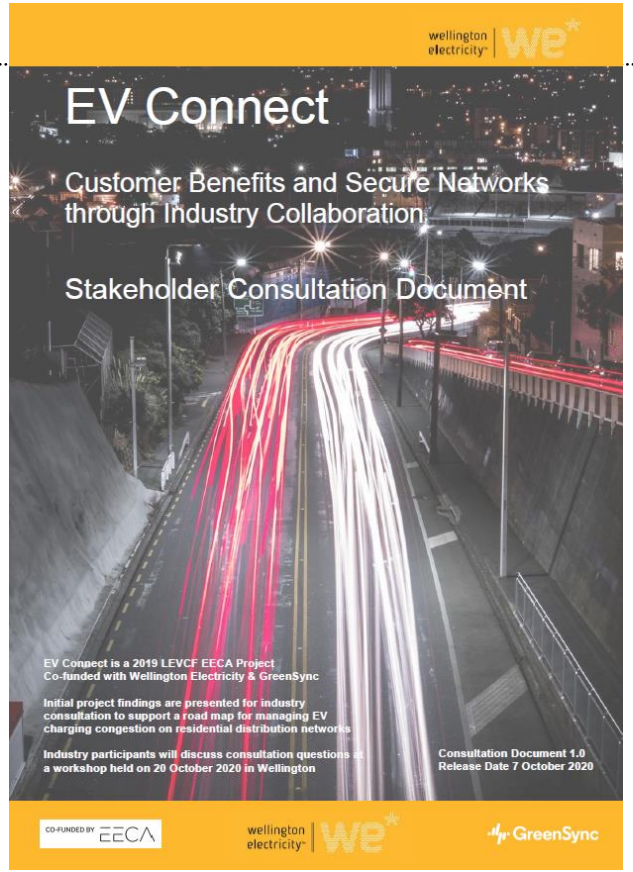


# Industry Workshop – EV Connect Consultation Document

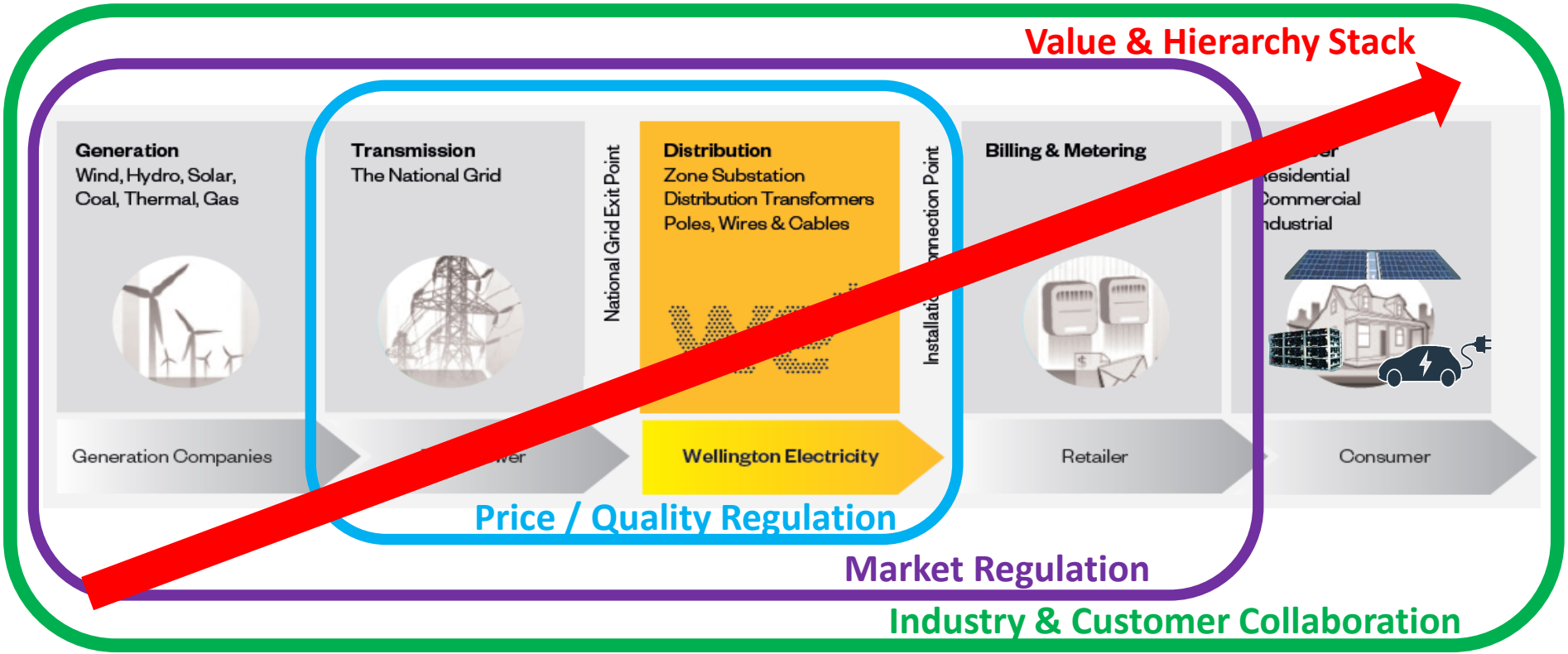
- 50 stakeholders
- 45 questions / 3 hrs ?

- Lets be sensible:
  - 3 x 15-20 min presentations
  - 3 x 25 min discussions of 8 key questions
  - WELL team collating feedback
  - Submit on questions, over the next 2-3 weeks (Submissions close 6 Nov).

- Road Map Workshop ‘21



# Consumers Part of a Co-ordinated Supply Chain



# Workshop Themes / Discussion Topics

- Network Challenges & Opportunities (3)22
  - EV technology regulatory framework, data sharing agreements, non-price congestion reduction
- Partners & Protocols (3)10
  - DCA's, DCA registry (incentive or regulation), next steps for network adoption (1-3yrs).
- Markets & Regulation (2)13
  - Competing participant benefits & supply quality, enabling industry alignment-timeframes-next steps

# SECTIONS TWO & THREE

Network Challenges & EV Opportunities

Geoff Thorburn | WELL

# Regulatory Support

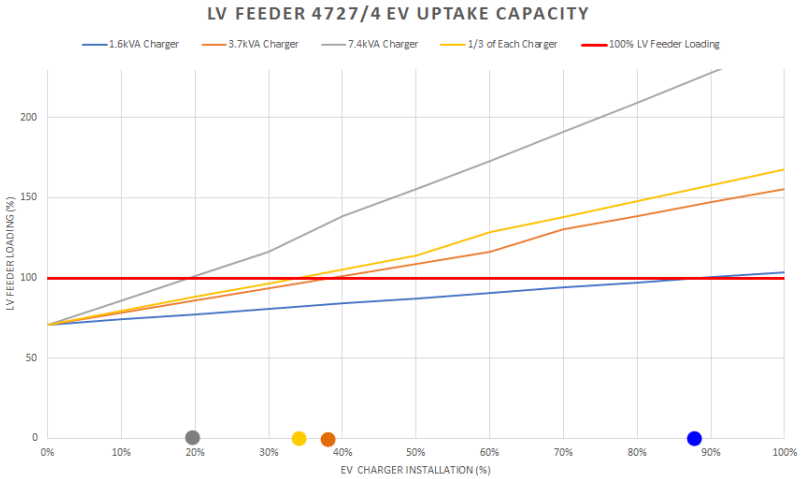
2017

2018

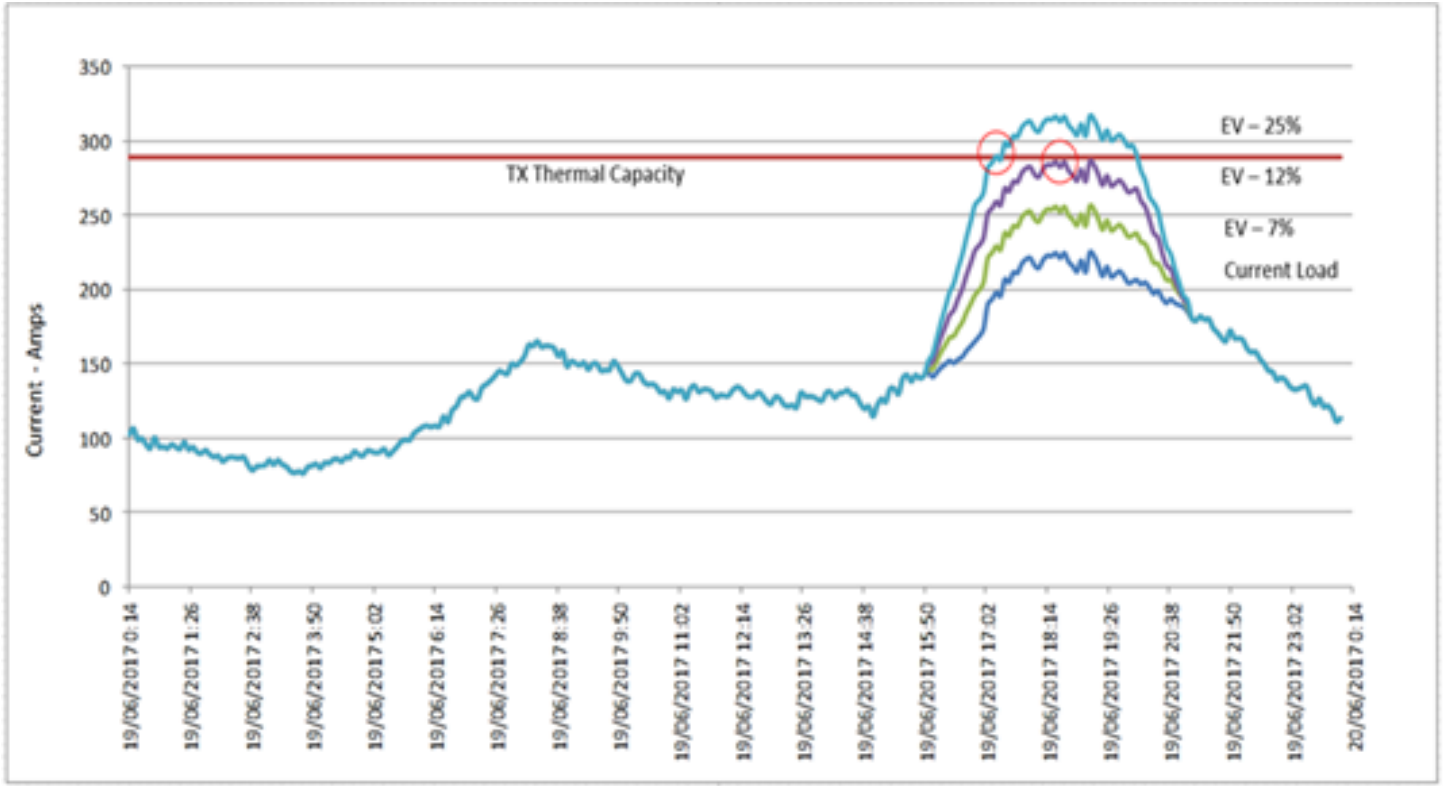
# Understanding Constraints - 1

- The three common EV chargers people are installing in households have capacities of 1.6kVA, 3.7kVA and 7.4kVA.
- The study uses the scenario of 1 EV charger installed per house.
- Assuming coincident EV charging and a ADMD of 3.5kVA, the EV uptake capacity is:

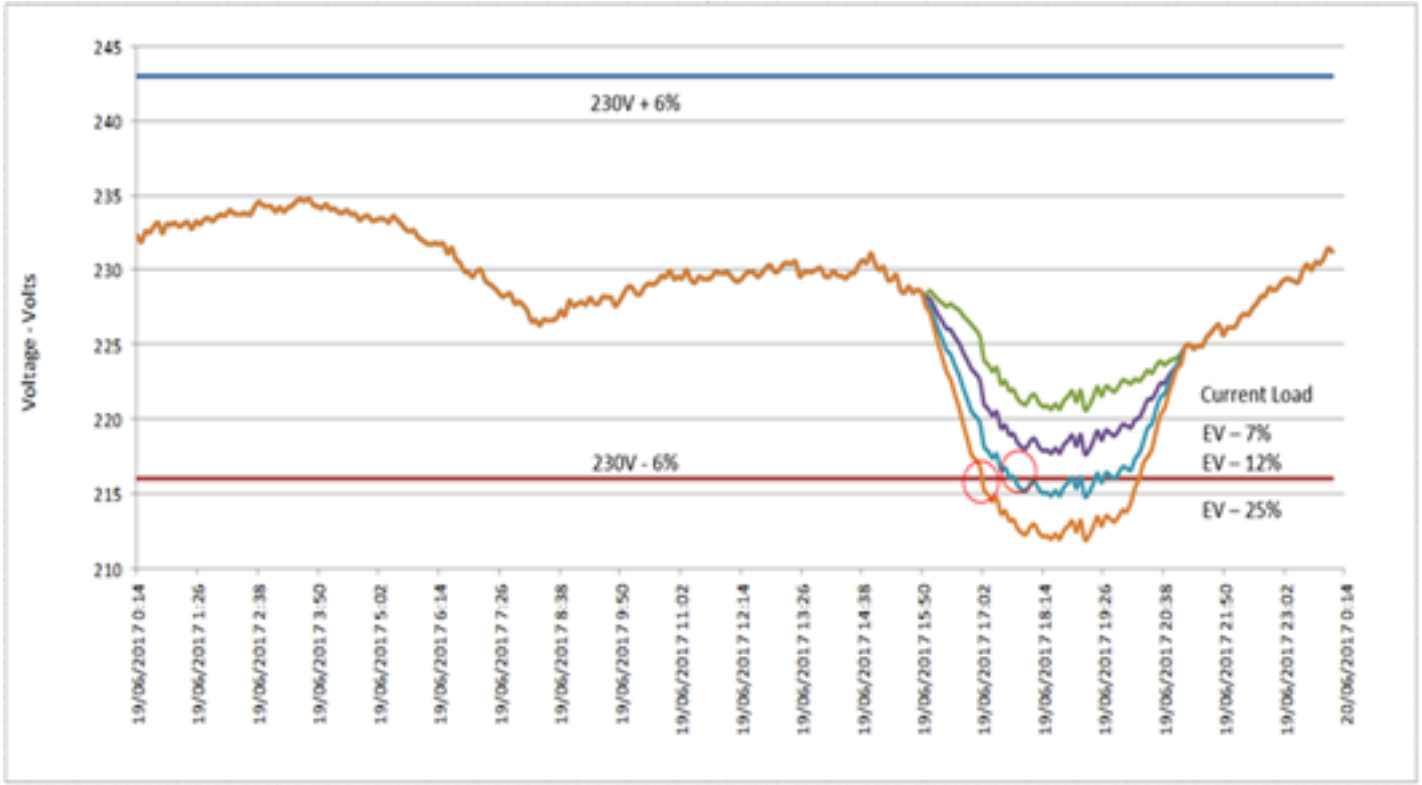
| Charger Size | ICP EV Uptake Limit Before LV Feeder Overloading (%) |
|---|---|
| 1.6kVA | 87% |
| 3.7kVA | 37% |
| 7.4kVA | 20% |
| 1/3 of each charger | 34% |



# Understanding Constraints - 2

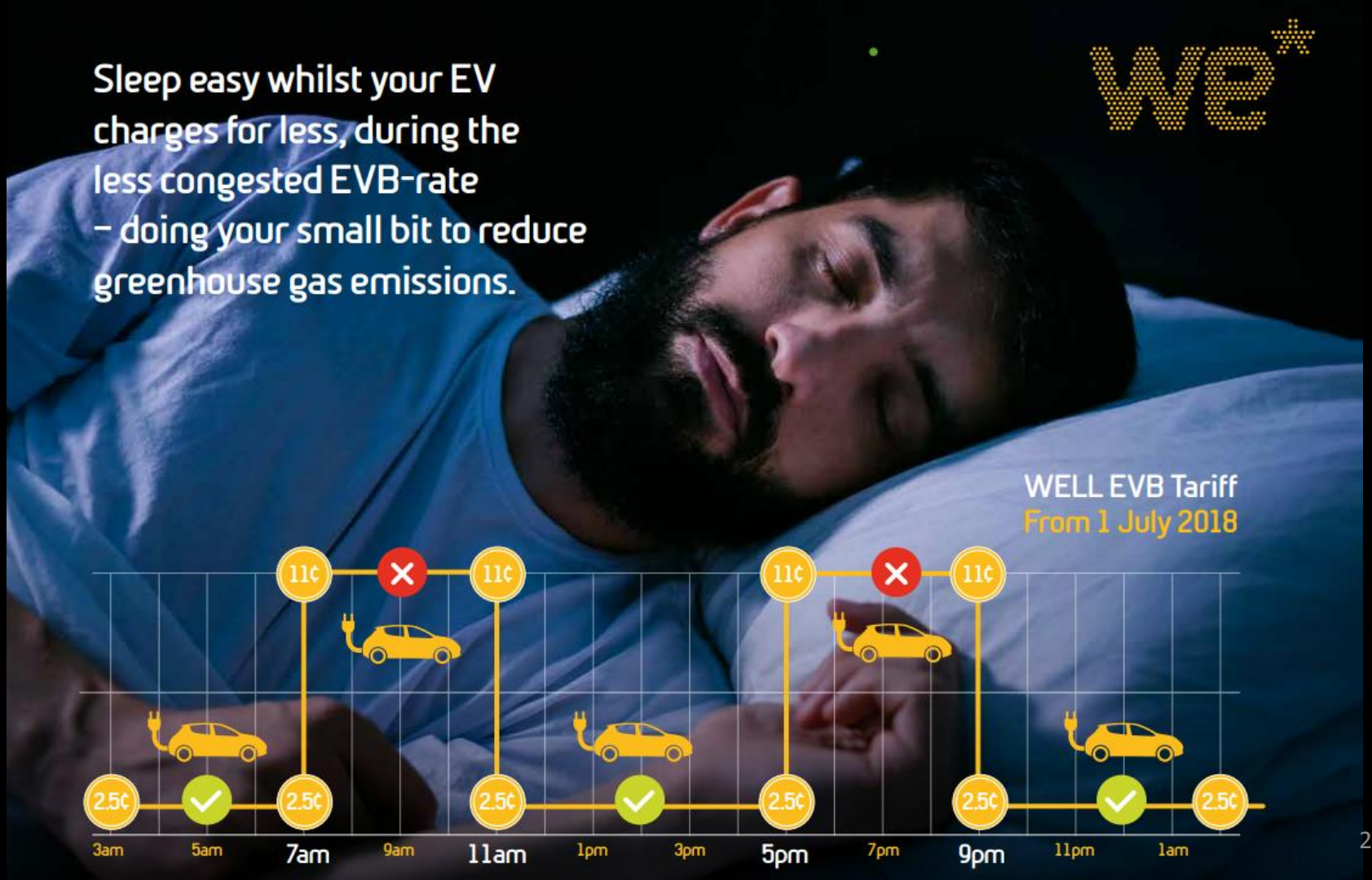


# Understanding Constraints - 3

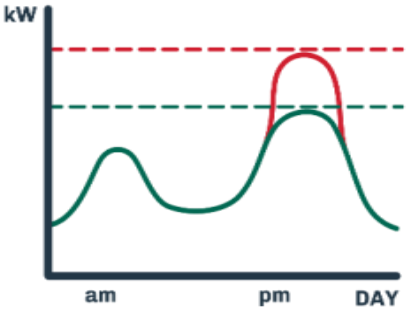


# Low Voltage Visibility

- At the LV feeder level
- At the ICP level


Sleep easy whilst your EV charges for less, during the less congested EVB-rate – doing your small bit to reduce greenhouse gas emissions.
WELL EVB Tariff
From 1 July 2018
11¢
2.5¢
3am
5am
7am
9am
11am
1pm
3pm
5pm
7pm
9pm
11pm
1am

# EV Connect Trail



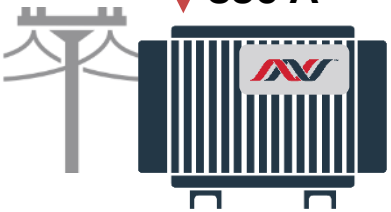

Charger modulation:
**16 A**


WE* NCR

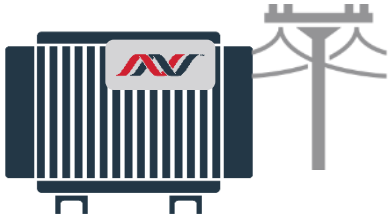
deX

No change


**79˚C**
**242 V**
**856 A**



**74˚C**
**240 V**
**803 A**



**32 A**

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# Questions?

# Network Challenges & EV Opportunities

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| | Section | Question |
|---|---|---|
| Q1 | 3.3 Network Policies and Standards | Do you agree that it would be sensible to implement a regulatory support framework and / or device requirement for EV charging technologies similar to the existing approach for distributed generation? |
| Q2 | 3.3 Network Policies and Standards | Should the central vehicle registry (NZTA), or another entity, be enabled/tasked with capturing and sharing data with the electricity registry of EV ICP locations? |
| Q3 | 3.4 Network Tariff Charges/ Incentives | If tariffs are insufficient to drive behaviour, ie fuel/electricity makes the lines charge differential too small to influence behaviour, what other congestion reduction steps could be taken? |

# SECTIONS FOUR & FIVE

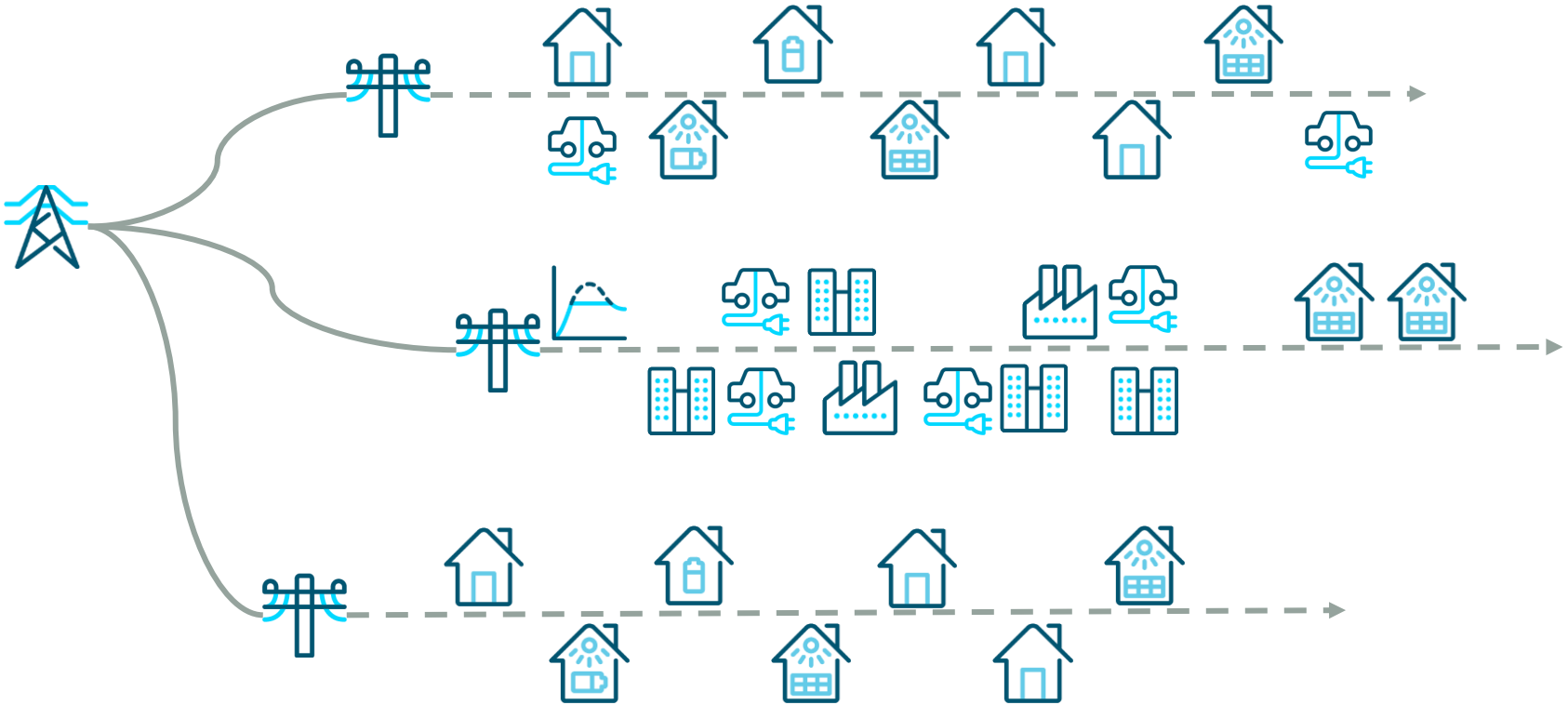
Partners & Protocols

Bruce Thompson | Greensync
Matthew Hickey | Genesis


# EV Connect Industry Workshop

## Wellington Electricity

# Risk and Opportunity



# What's required?

## EV Smart Technology

- Enable smart DER such as solar, energy storage and electric vehicles grid interoperability within technical, regulatory and financial market requirements.

> API protocols to leverage smart technology

## Grid Compliance

- Implement DER data and control services to maintain physical system and market operation within regulated limits or compliance with rebate or incentive scheme.

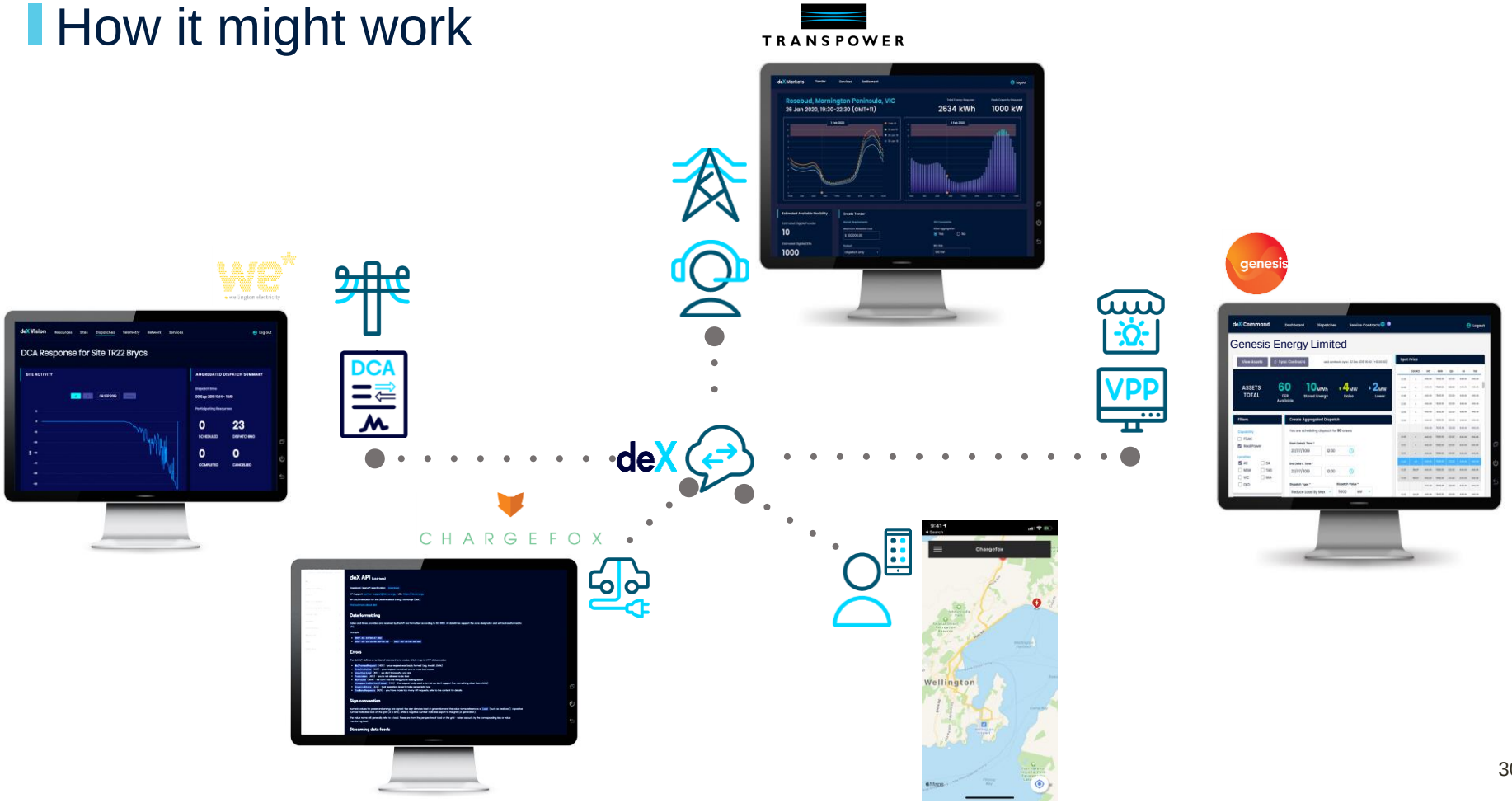
> 'Dynamic' or 'Flexible' Connection Agreements

## Customer Value

- Facilitate optimisation of individual and groups of DER to create aggregate value.

> Wholesale, FCAS market and network deferral via 'Virtual Power Plant'

# How it might work



# EV Charging

## Wellington Electricity
## Workshop

**Matthew Hickey**| Genesis

# Introduction

## — Supporting the uptake on EV's in NZ

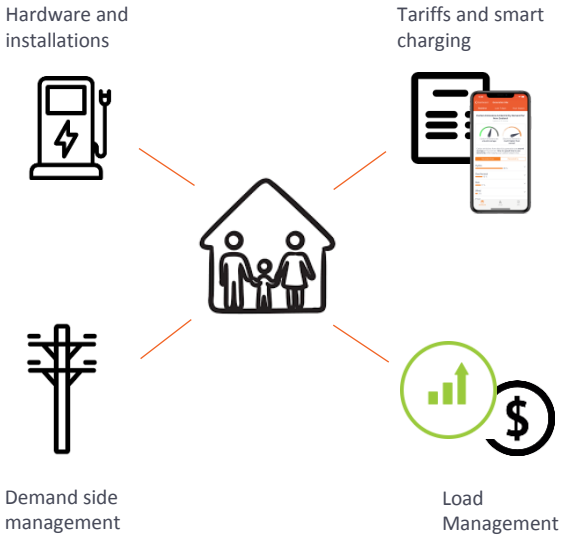
Delivering products and services that support the uptake of EV's in NZ

Solve the customer problems (not the network ones!)

Reframe impediments as an opportunity to unlock value

# Identify and unlock value

## — There are a range opportunities across the value chain




An evolving set of customer needs

Fundamental hurdles exists now to address the cost of participation

Understand value across the chain

# Partnerships

## — Collaboration key to identifying and unlocking value

Collaboration and partnerships to identify and share value

Unlikely to be linear

Supportive of tools (standards, agreements) that remove the barriers to unlock value

Invest into customer innovation

# Thank you!

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# Questions?

# Partners & Protocols

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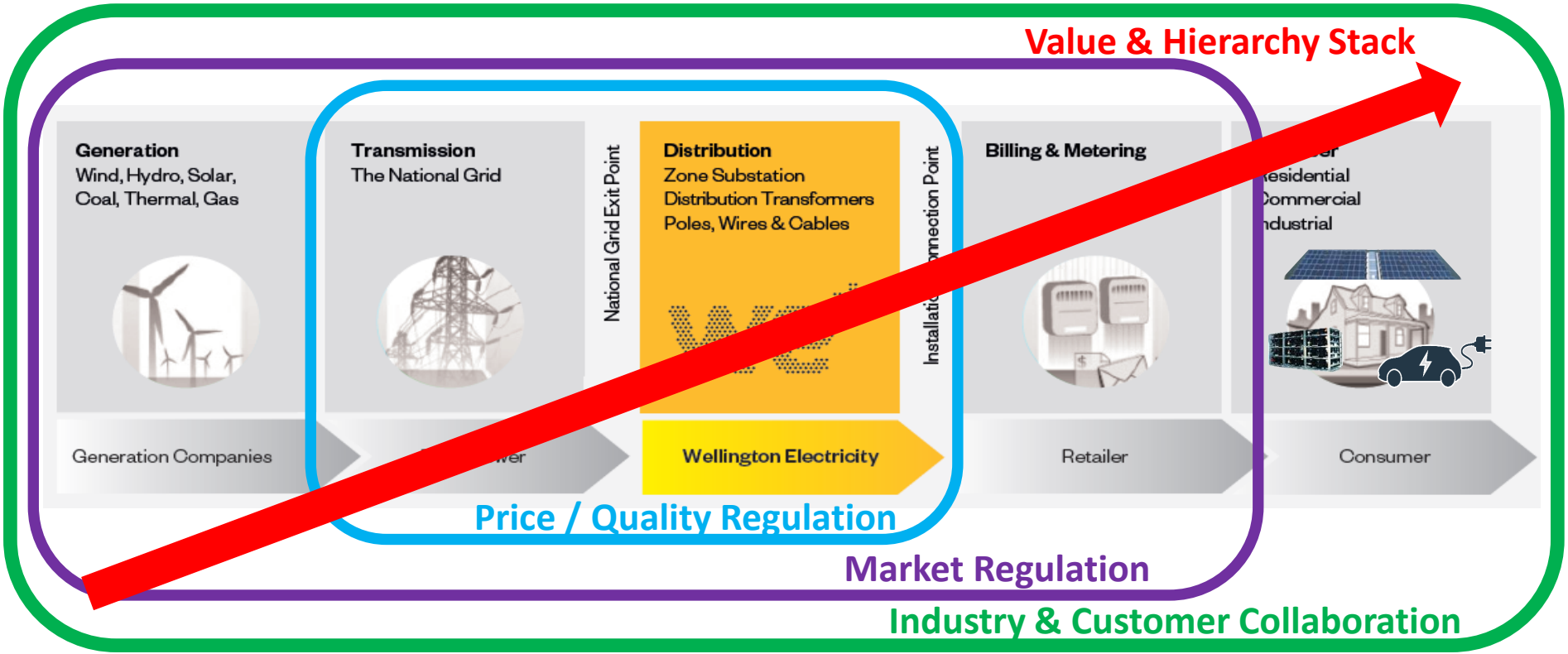
| | Section | Question |
|---|---|---|
| Q1 | 4.1 Dynamic Connection Agreements | Do you agree that development of DCAs is appropriate to EVs/EV chargers? Should there be a size/threshold minimum for their application? Should they be extended to other types of devices? |
| Q2 | 4.1 Dynamic Connection Agreements | If a Registry was established, what would you like to see underpinning it? (Incentive structures; regulatory requirements; Connection agreements / tariff + connection agreement incentive arrangements provided by EDBs; or something else?) |
| Q3 | 5.1 EV Charging Protocols/ Standards | To progress implementation/ adoption, what steps are appropriate for a network business, or others? |

# SECTION SIX

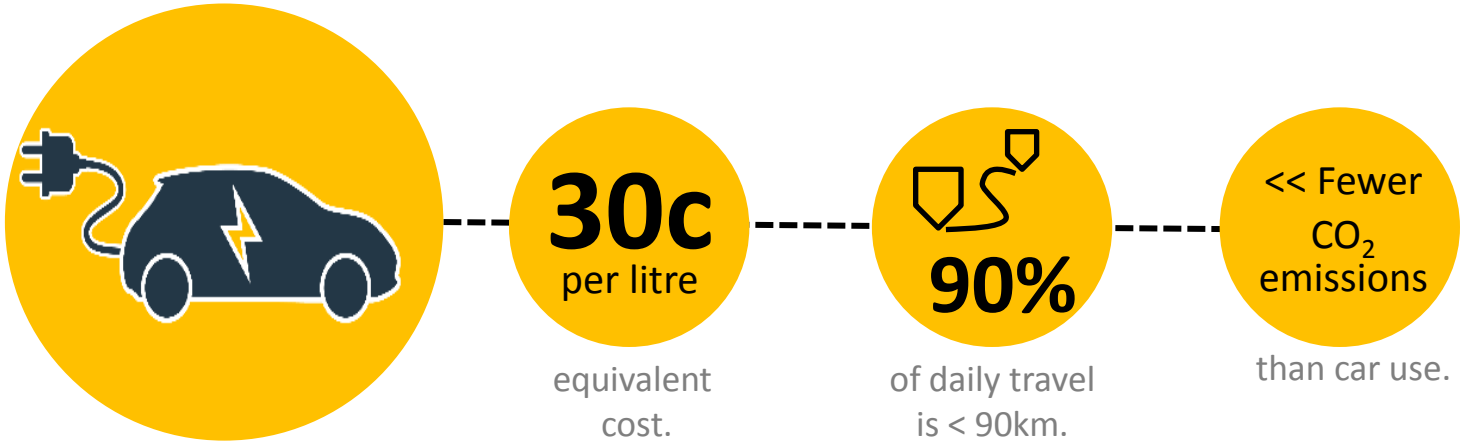
Preserving Structures while Maintaining Standards

Ray Hardy | WELL

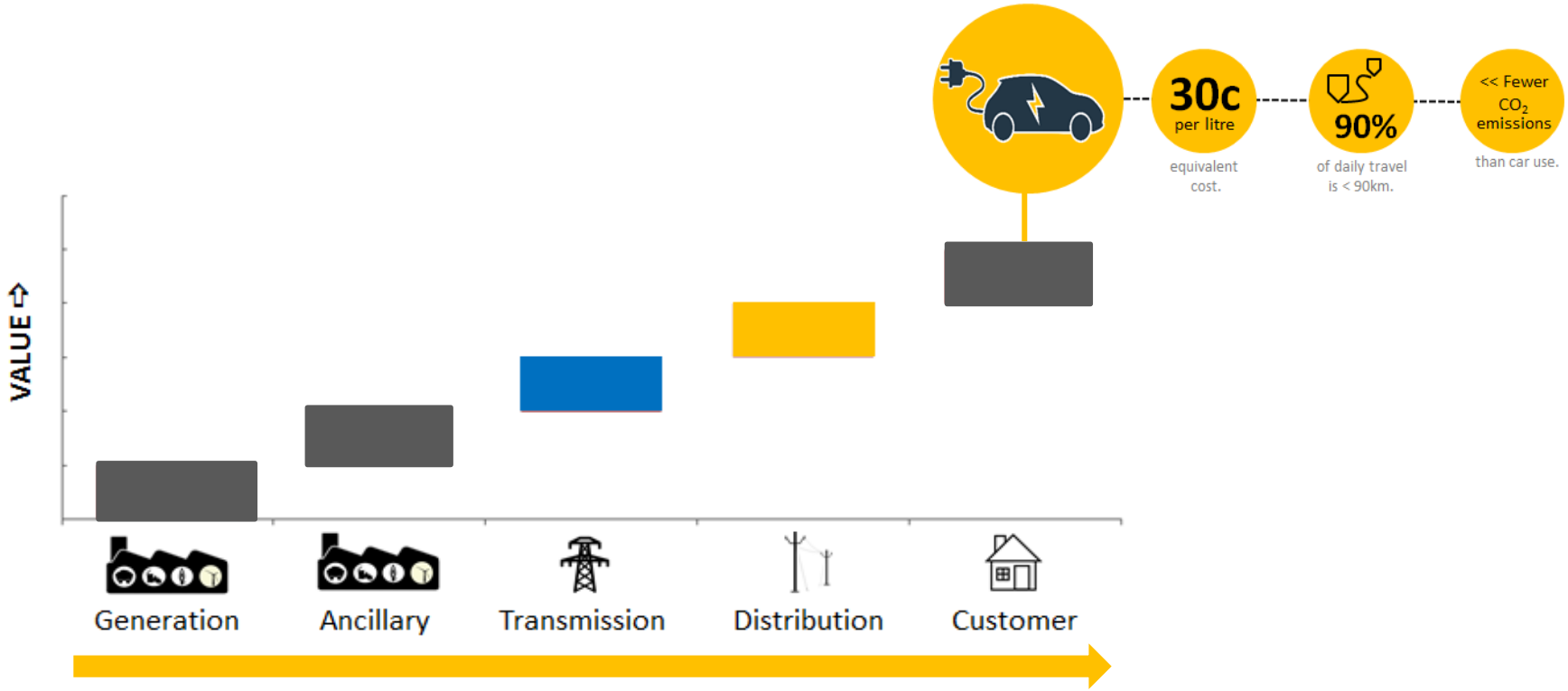
# Consumers Part of a Co-ordinated Supply Chain



# EV – Cost and Carbon



# Value Stack




ASSETS WITH CLOSER PROXIMITY TO CUSTOMERS CAN STACK THE MOST VALUE

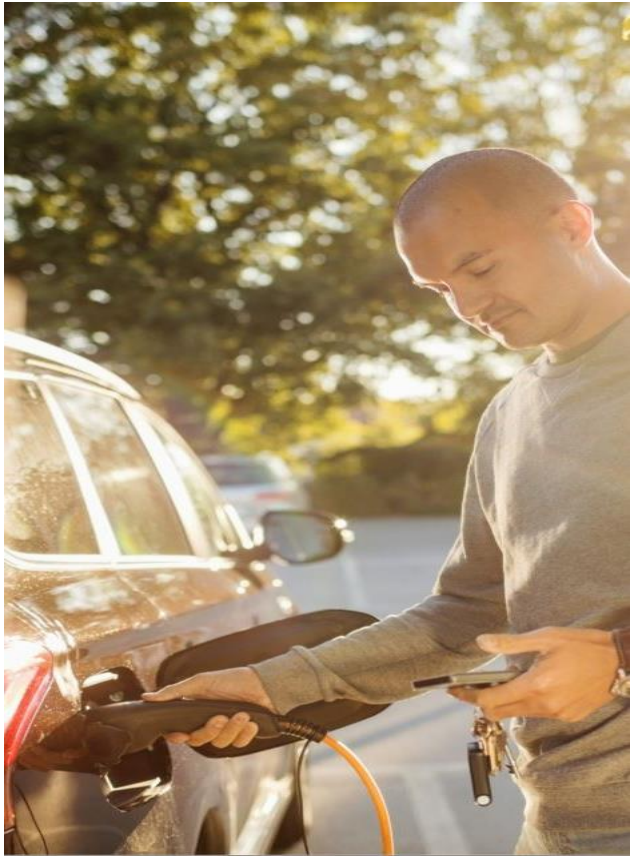
# 50 Years

# 3 Year Focus

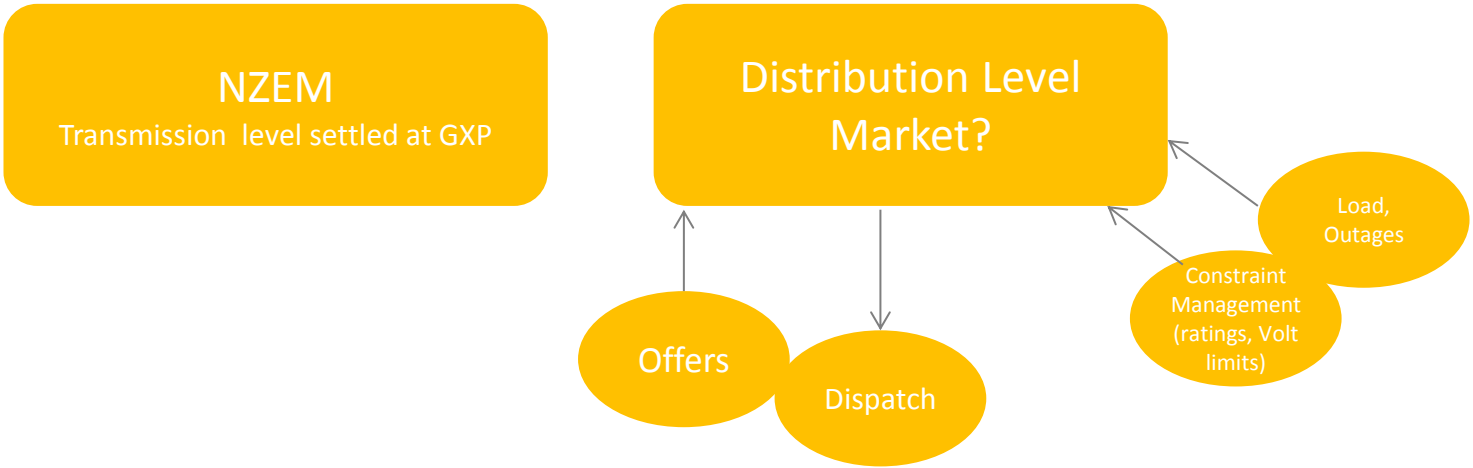
- Standards, Monitor, Collaborate…

# Options Analysis

- Asset upgrades
  - Not efficient or fair or timely?
- Cost reflective tariff only
  - Will these be passed on effectively, customers respond
  - Will these cause a new peak?
- Cost reflective tariff + Management (water heating model)
  - Can control network loading
  - Will not unlock load for other uses!
- Management via incentive payments or greater access
  - Allows load to participate in wider markets over time
  - Allows multi provider model (aggregators, retailers…)

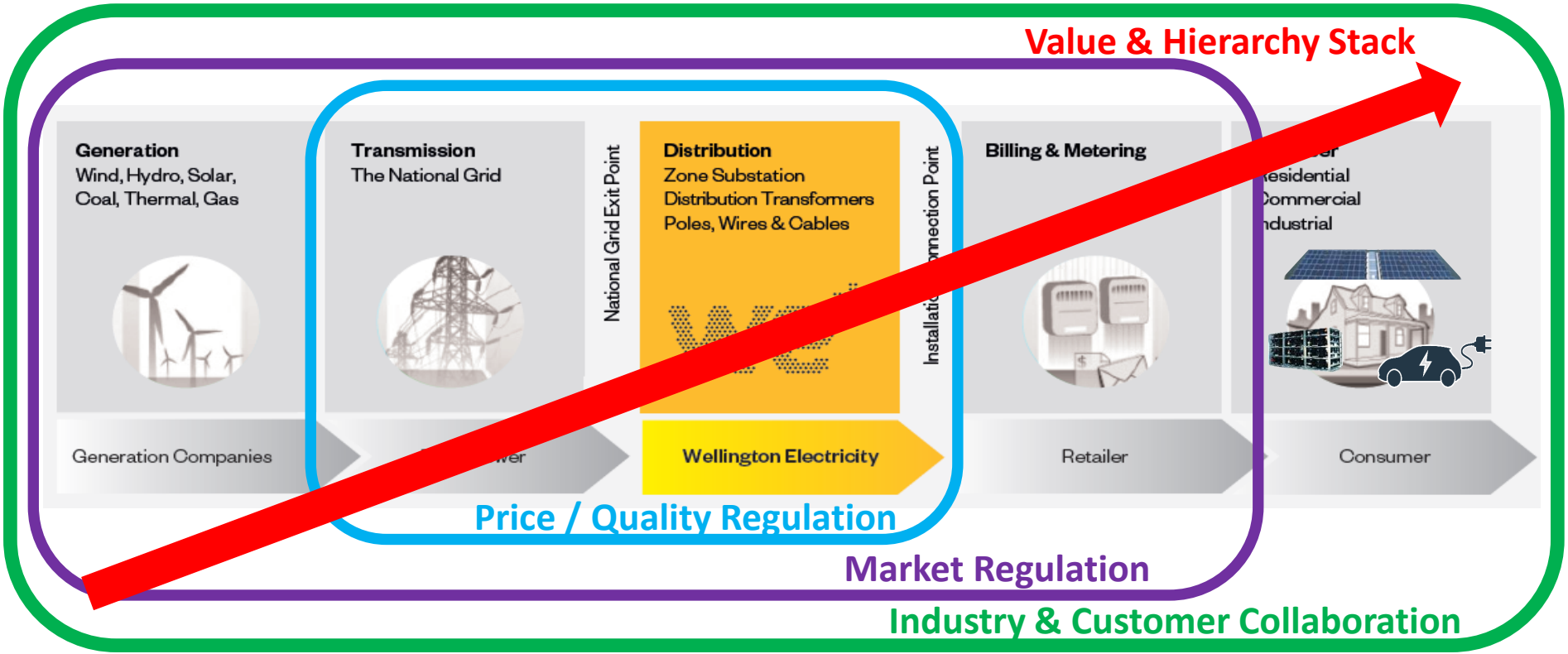


# Market Structure?




Run two markets in the interim…

# Consumers Part of a Co-ordinated Supply Chain



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# Questions?

# Markets & Regulation

| | Section | Question |
|---|---|---|
| Q1 | 6.1 Market Structures | How will the competing benefits of separate market participants be managed to preserve customer supply quality? |
| Q2 | 6.3 Market Evolution | Is the industry aligned, as yet, on the path and timeframe required to move? How would you suggest this is addressed/enabled most effectively? |

# WRAP UP

John Hancock | Signature Consulting

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# Thank you!