

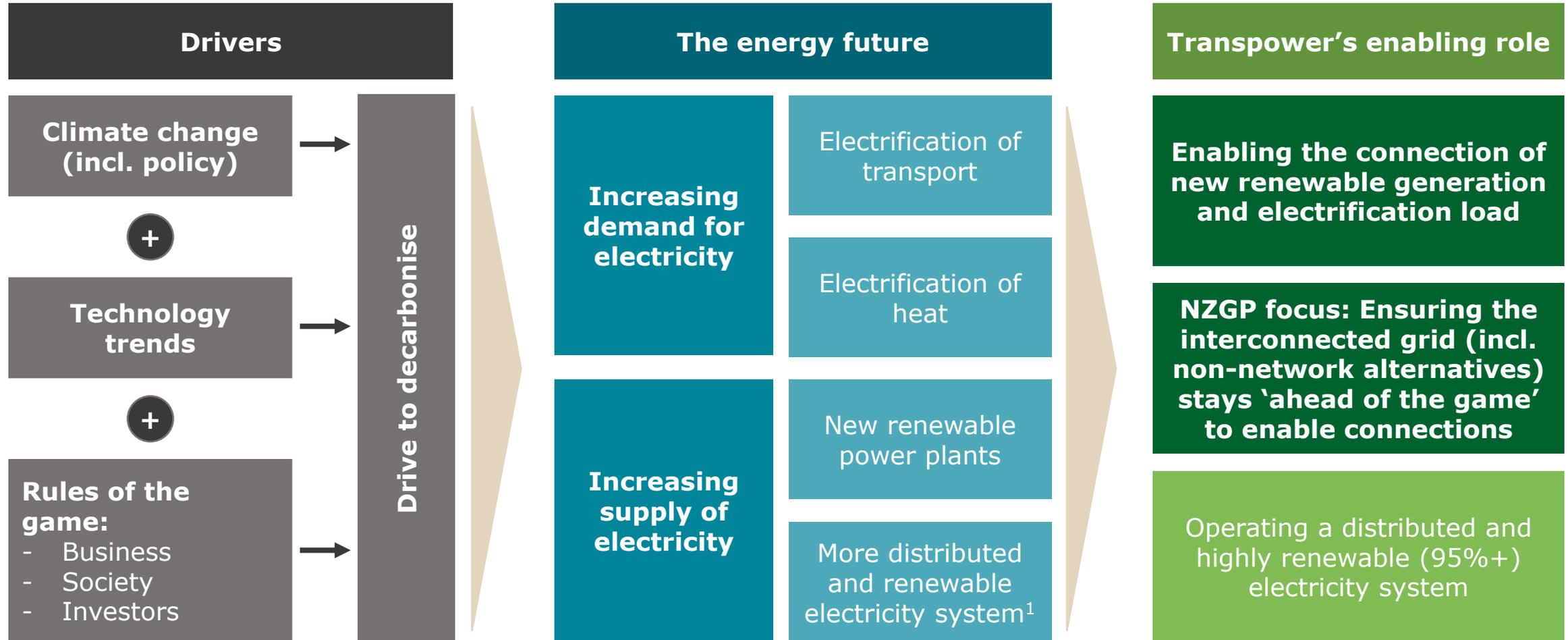


Identifying and Meeting the Challenge

*Andrew Renton – Senior Principal Engineer
Offshore Future Energy Forum – November 2021*

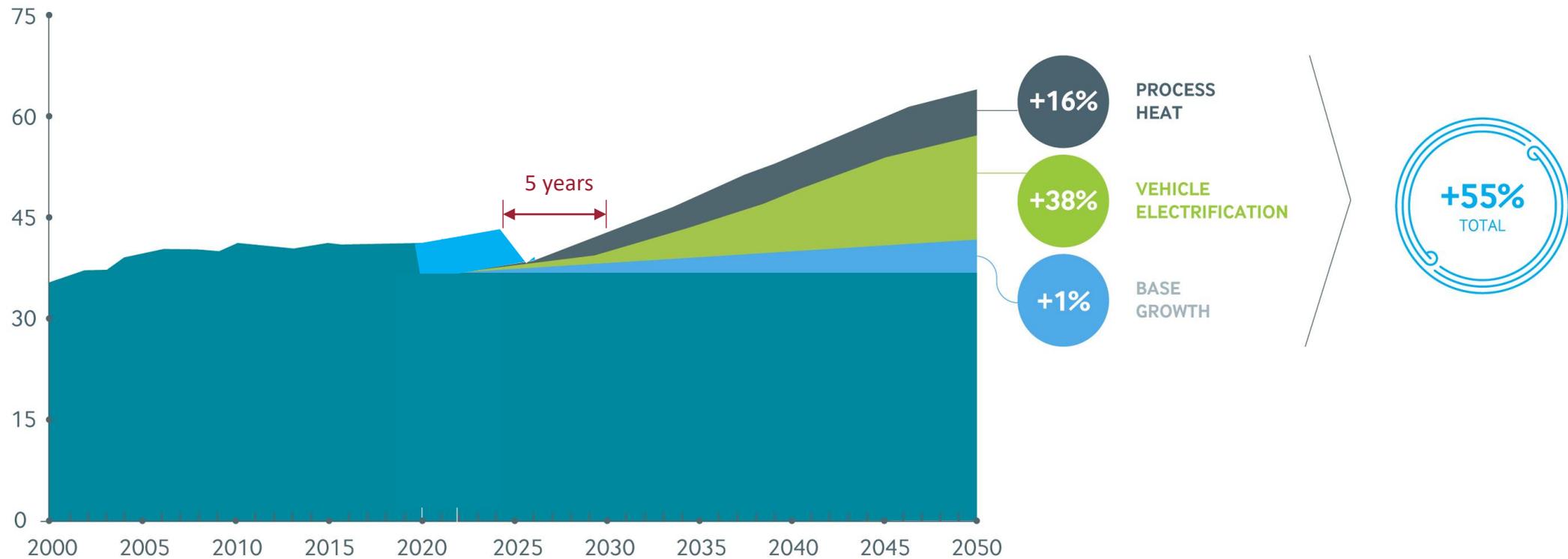
Empowering our energy future

The energy future has implications for the grid



Whakamana i Te Mauri Hiko shows that short-term Tiwai uncertainty is followed by mid to long-term load growth

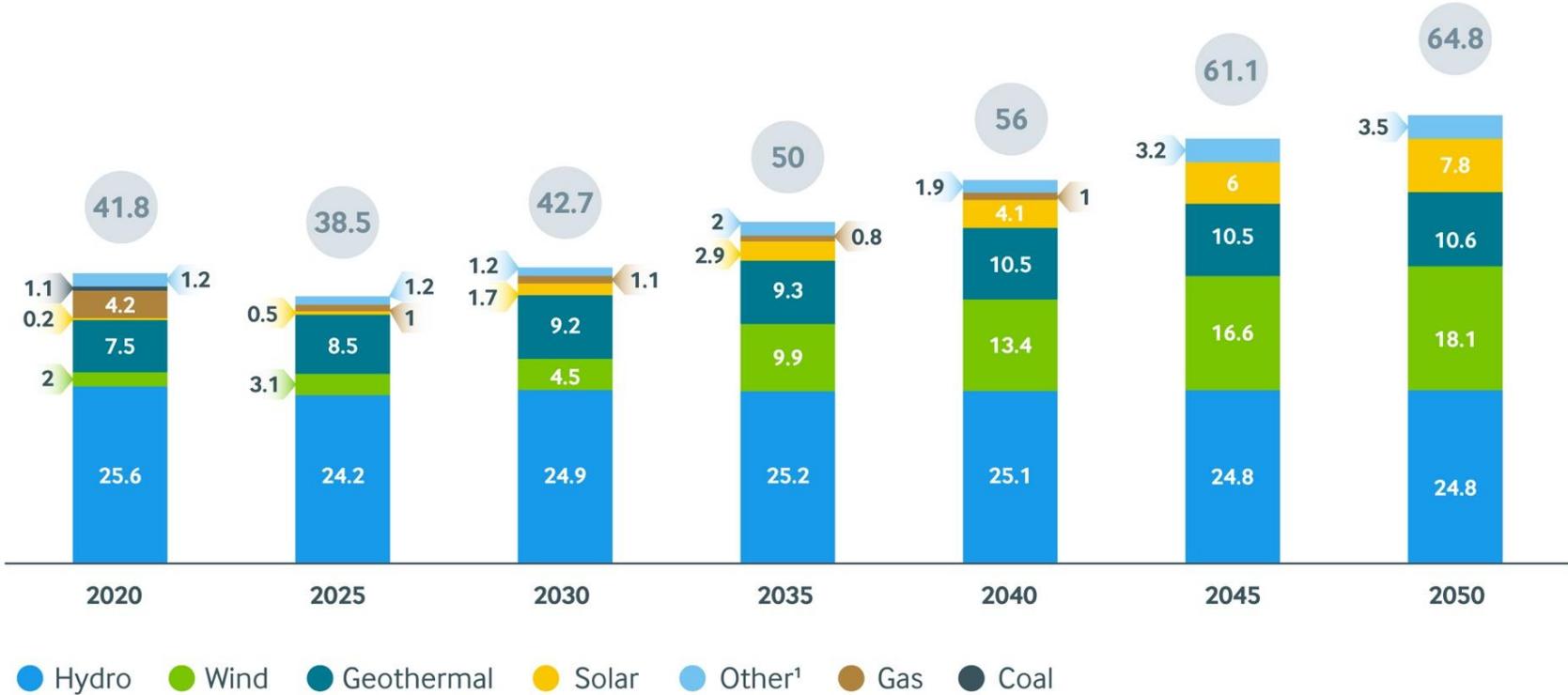
Electricity demand, TWh)



Generation will need to expand significantly to meet long term demand growth

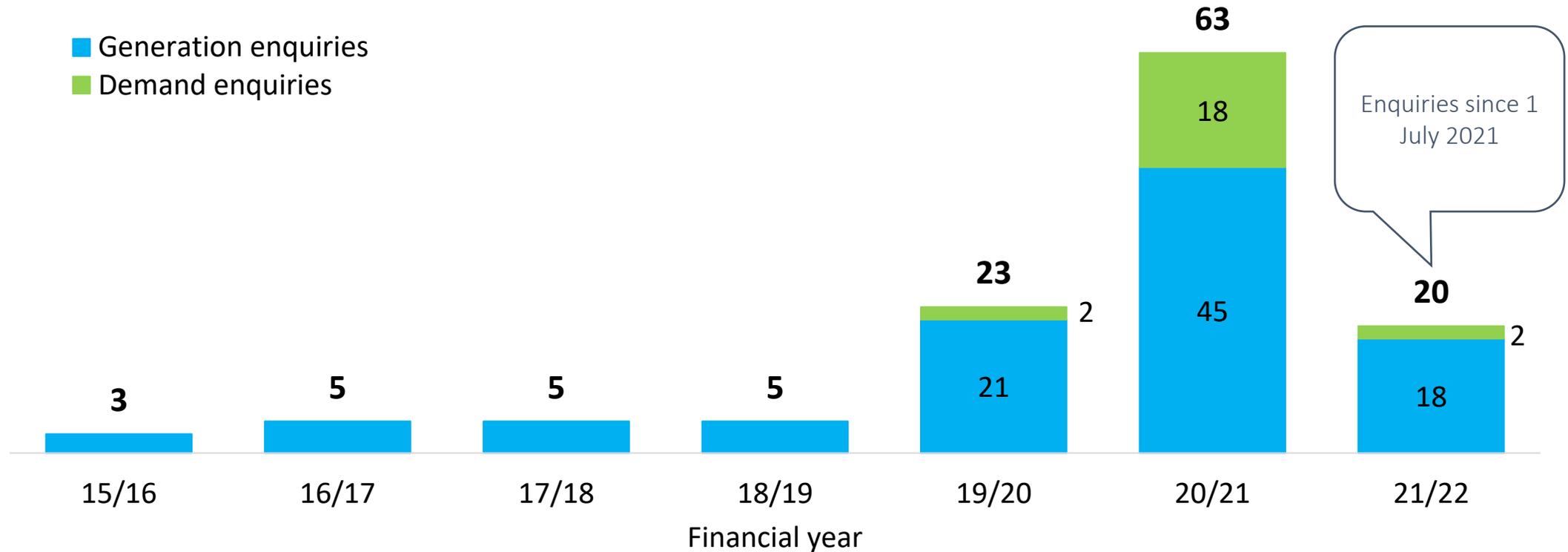
Delivered electricity by generation type
(TWh, Accelerated Electrification)

% Renewable	86%	96%	97%	98%	98%	100%	100%
GW Wind	0.6	0.9	1.4	3.0	4.3	5.3	5.9



Connection enquiries have been growing significantly

Number of new enquiries to Transpower



Note: Excludes GXP enquiries from EDBs. Grid scale batteries are included in demand enquiries but in reality would play a demand and supply role.

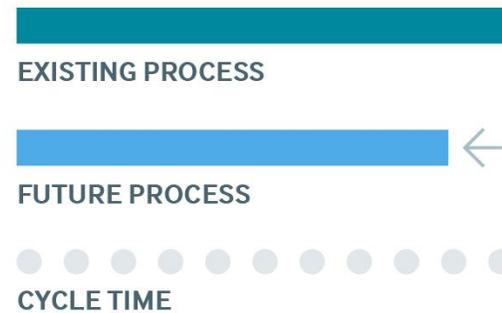


Enabling a renewable energy future requires us to adapt and improve

Unprecedented demand for new connections



Improved connection process and information provision



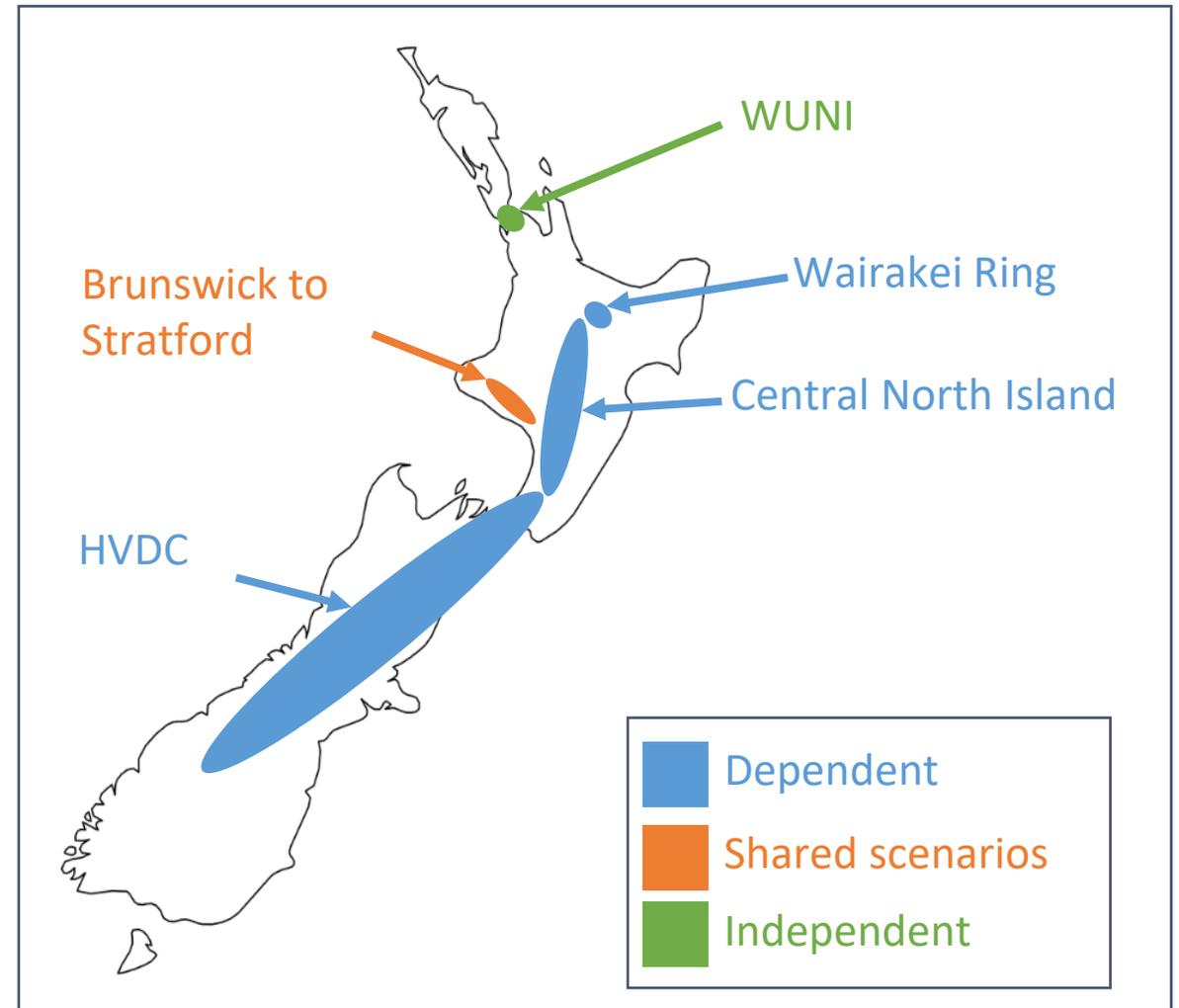
What further role could we play in easing connection?



Net Zero Grid Pathways is simultaneously investigating a number of potential investments

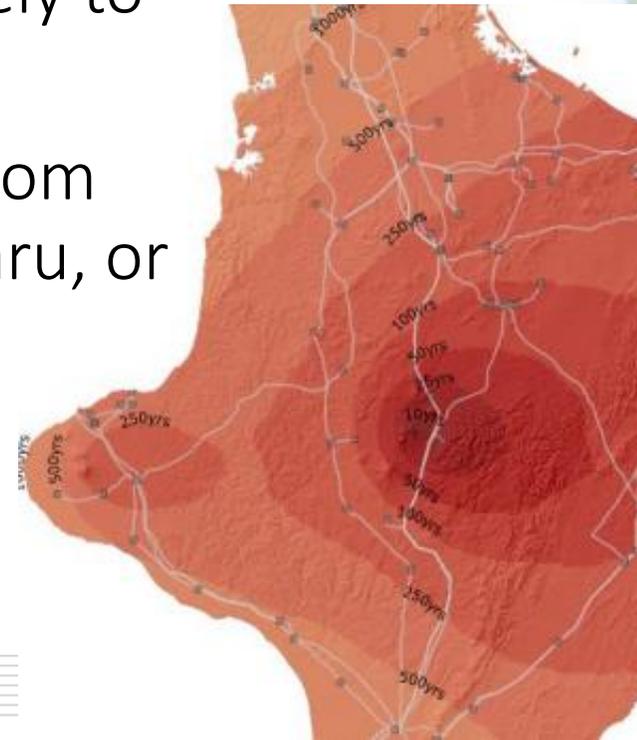
Investing under uncertainty

- Enhancements to the grid backbone driven by new renewable connections
- Both demand and supply are uncertain a range of scenarios
- Some enhancements are triggered under specific scenarios others are least regrets under most scenarios
- All areas of investigation are likely to need some kind of enhancement, but the scale is uncertain
- Tactical initiatives and non-transmission solutions have a role



Central North Island Circuits (CNI)

- Taranaki approx demand 200MW, generation 1,060MW, transmission export 800 – 1100MW depending on HVDC transfer
- Three 220 kV lines between Bunnythorpe and Whakamaru
- As generation installed, line capacity likely to constrain
- Largest potential investment new line from Bunnythorpe or Brunswick to Whakamaru, or Huntly. Approx \$800m, 10 years
- [Brunswick to Stratford Capacity Investigation | Transpower](#)
- [Transmission Planning Report 2021.pdf \(transpower.co.nz\)](#)



Different uncertainties impact our need for enhancement to the grid backbone to enable renewables and electrification

Different uncertainties impact our interconnection investment decisions in different ways

High need for SI to NI transfer

- Tiwai exit in 2024
- Thermal generator retirements
- Urban transport electrification
- NI process heat electrification
- Hydrogen production in Taranaki
- Generation expansion far from load

Lower need for SI to NI transfer

- Tiwai remains
- Datacentre in Southland
- NI industrial closures
- SI process heat electrification
- Hydrogen production in Southland
- Generation expansion near load

Uncertainties (uncertain impact)

- NZ Battery project findings
- Impact of TPM on peak demand
- 100% renewables target
- Gas availability

Industry support and engagement – demand and supply scenarios for NZGP work

Variations to EGDS to align with current context

- Identifying variations to MBIE EDGS to support portfolio approach for grid investments
- Demand scenarios – Industry working group and consultation on results. Valuable input, thank you
- Generation scenarios – many options for wind and solar build. Need industry input on build timing to inform investment test scenarios
- Feedback is crucial to evaluation and approval.

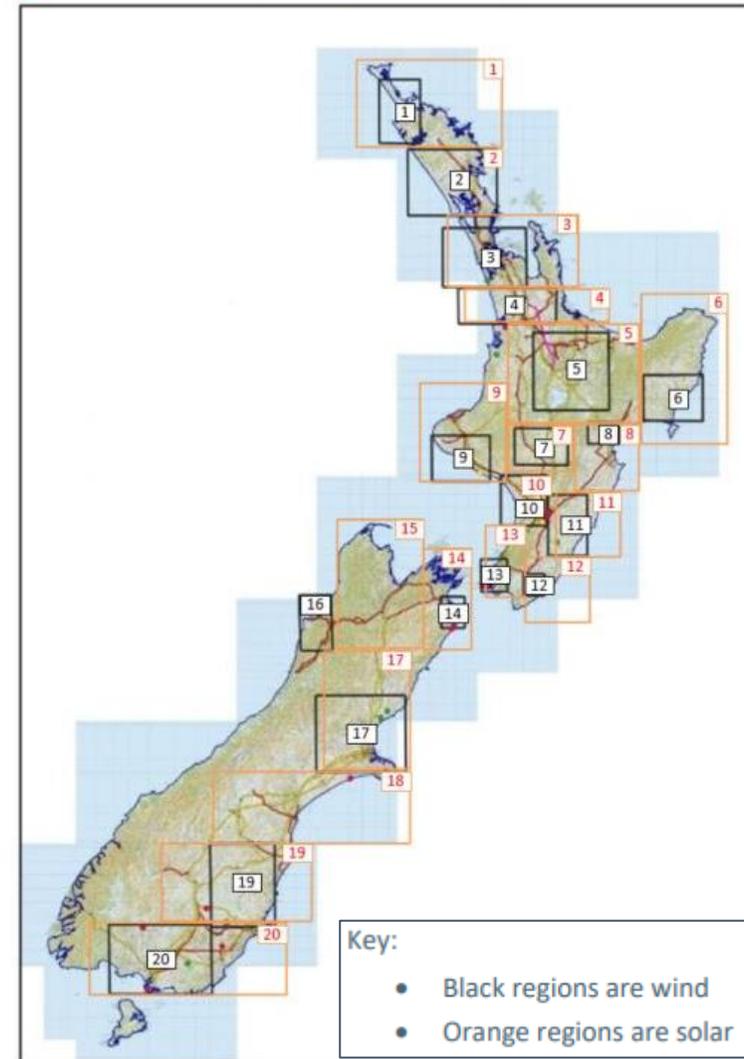


Generation Scenarios consultation

Consultation will influence where we enhance the Grid to support generation

- All responses confidential (but disclosed to Commerce Commission to ensure rigour in our analysis)
- How much central & distributed generation?
- How fast and where built?
- How much wind vs solar?
- Are our regional cost assumptions representative?
- How should we prioritise the generation stack?

Figure 1 – New Zealand map showing wind and solar regions as referred to in Table 2



Any info you can provide helps – More evidence of future generation suggests that region should be better served

Region		Committed	2021-2030		2031-2040		2041-2050		2021-2050		Total
			Wind	Solar	Wind	Solar	Wind	Solar	Wind	Solar	
1	Far North	0	0	150	0	150	100	0	100	300	400
2	Northland	0	0	150	400	150	200	0	600	300	900
3	Auckland	0	50	0	0	0	200	0	250	0	250
4	Waikato	0	250	100	400	150	0	0	650	250	900
5	BOP-Taupo	0	150	100	500	0	350	200	1000	300	1300
6	Eastland	0	0	0	0	0	300	0	300	0	300
7	Central Plateau	0	200	0	0	0	400	0	600	0	600
8	Hawkes Bay	176	0	0	0	0	0	200	176	200	376
9	Taranaki	133	0	0	0	0	0	0	133	0	133
10	Manawatu	222	150	0	200	0	100	0	672	0	672
11	North Wairarapa	0	500	0	700	0	100	0	1300	0	1300
12	South Wairarapa	0	0	0	0	0	100	0	100	0	100
13	Wellington	0	0	0	100	0	100	0	200	0	200
14	Marlborough	0	0	0	200	0	0	0	200	0	200
15	Nelson	0	0	0	0	100	0	100	0	200	200
16	West Coast	0	0	0	0	0	0	0	0	0	0
17	North Canterbury	93	200	0	0	0	0	0	293	0	293
18	South Canterbury/ North Otago	0	0	100	0	150	0	200	0	450	450
19	Central Otago/ South Otago	0	300	0	100	0	400	0	800	0	800
20	Southland	0	200	0	150	0	400	0	750	0	750
Totals		624	2000	600	2750	700	2750	700	8124	2000	10124

Enabling New Zealand's decarbonised energy future needs to be an industry effort

- Renewable generation enables energy sector decarbonisation
- Wind is a key part of the future generation mix and ease of connection is paramount
- The grid backbone has a critical role in enabling renewables and electrification
- We need your input to make sure we build a least regrets Grid for the future





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Questions?

[Brunswick to Stratford Capacity Investigation | Transpower Transmission Planning Report 2021.pdf \(transpower.co.nz\)](#)