



MANAWA ENERGY

AOIC Panel

Dec 2023

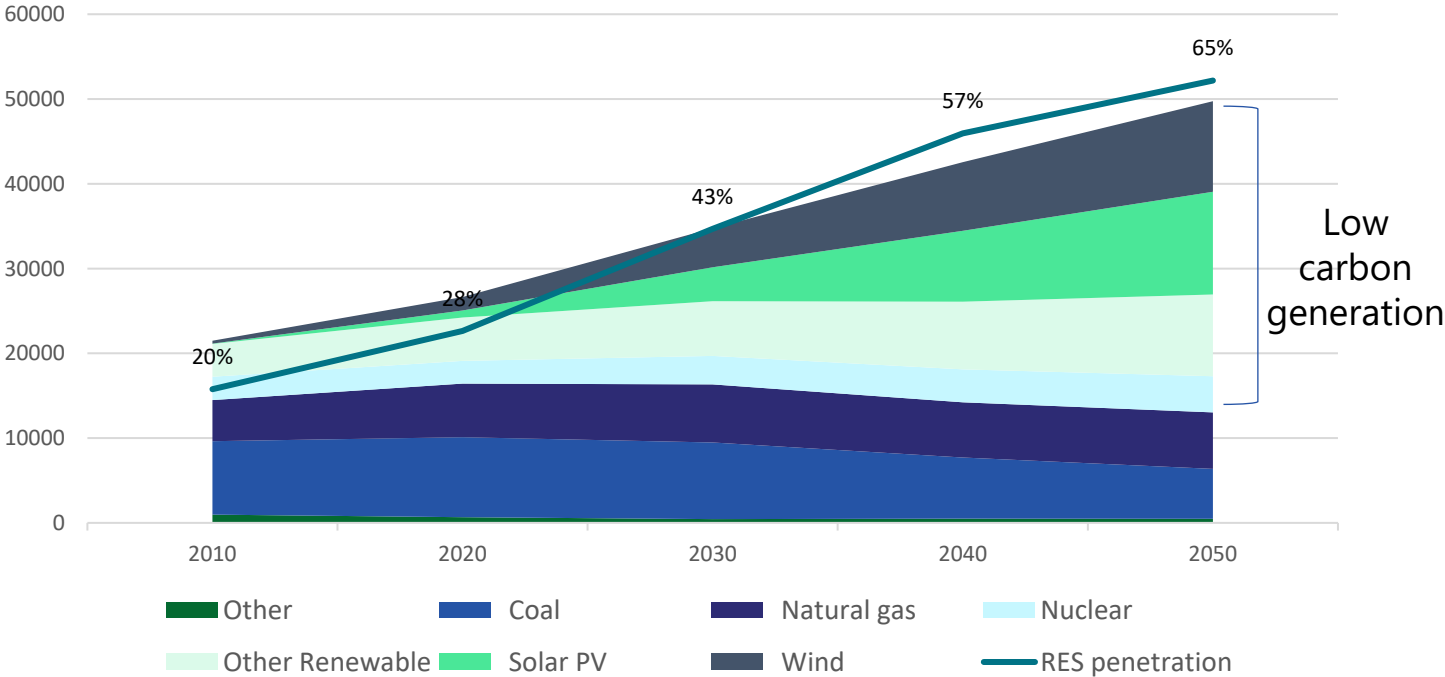
Deion Campbell
Board Chair



Global Net Zero Initiatives Creating Huge Renewables Growth

Renewable capacity expansion in the next five years will be much faster than what was expected just a year ago. The **upward revision is mainly driven** by China, the European Union, the United States and India, which are all **implementing policies, formalising regulatory and creating market reforms** as a response to the energy crisis and need to meet both **energy security** and **decarbonisation agendas**.

Forecasted global electricity generation by source (TWh)



15 year renewables growth by region (TWh)

Region	Capacity	Share
Asia	3899	58.2%
Europe	1735	25.9%
North America	851	12.7%
Australia	191	2.8%
NZ	29	0.4%

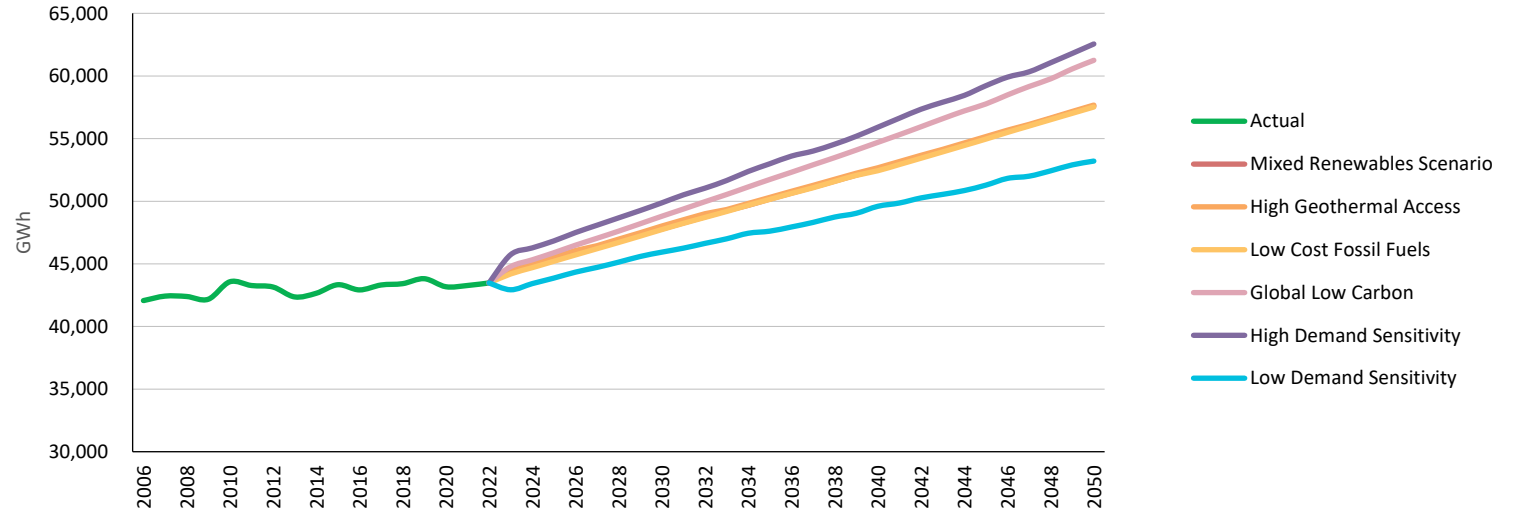
Source: S&P/MBIE estimates

NZ demand growth opportunity

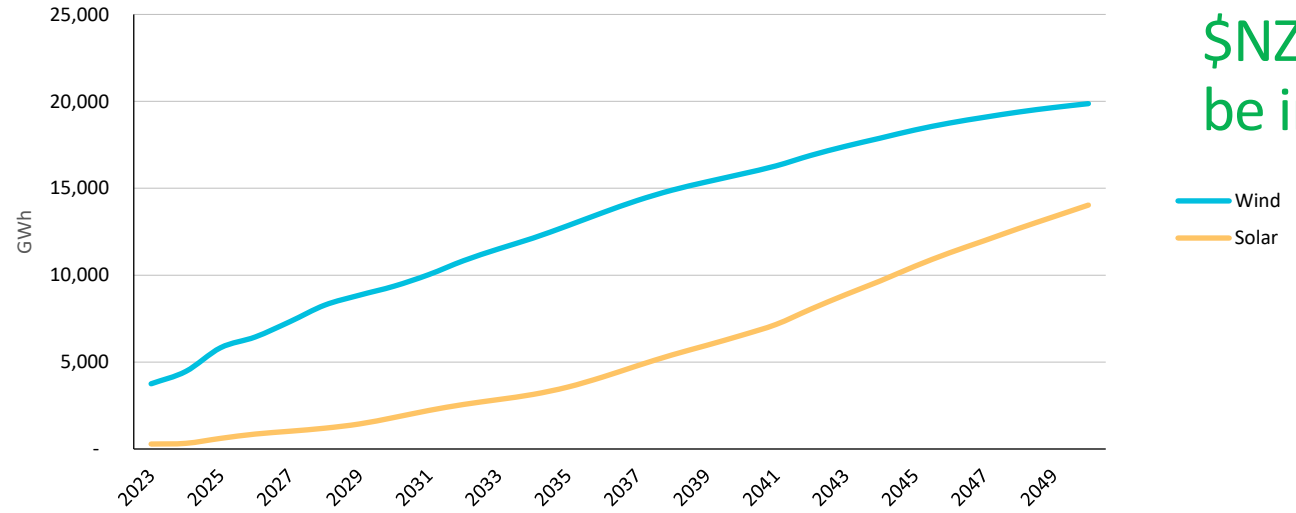
The electrification of New Zealand will create significant, increasing demand for new renewable energy generation, with supply from wind and solar expected to increase by more than 400% by 2050²

None of these scenarios deal with dry year risk, concentration and system stability – there will be other considerations.

NZ Electricity demand scenarios¹



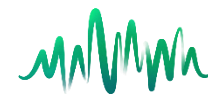
Wind and solar growth outlook²



\$NZ Billions to be invested

1. Source: MBIE: 'New Zealand's Energy Outlook: Electricity Insight'

2. Source: NZ Climate Change Commission: 'Updated demonstration path and current policy reference scenarios (2022)'



Investment Considerations

Strengths

- Wind & Solar PV
 - Technology proven
 - Costs forecasted to keep improving
- Good wind resource, adequate solar resource
- Useful hydro system for firming
- No incentives, so projects must compete on merit
- Grid already reasonably distributed (c.f. Australia, say)
- Grid operator very forward looking, and outcome focused

Opportunities

- Many Wind & Solar PV projects in development
- Can easily improve locational diversity
- Electrification plus Huntly closure will support growth

Threats

- Grid capacity and stability being carefully considered
- Potential for Govt. interference causing inefficient outcomes
- NZAS uncertainty is affecting pace
- What level of solar penetration can be tolerated?
- In the end will NZ need a nuclear future?

Weaknesses

- Very small market, with low energy prices
- Supply chain constraints, shipping bottlenecks and inflationary pressures have combined to reverse a decades long trend in declining costs.
- Delivery lead times
- Limited commercial/risk structure maturity
- Limited execution capability, incl. recent very poor outcomes
- Limited off-take opportunities for independent developers
- Locational concentration causes increased volatility

Normal distribution of annual generation volumes

