

New Zealand And Its Drive Towards Sustainability And The Pivotal Role Played By Industries And Government

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Government Role Towards The Renewable Sector

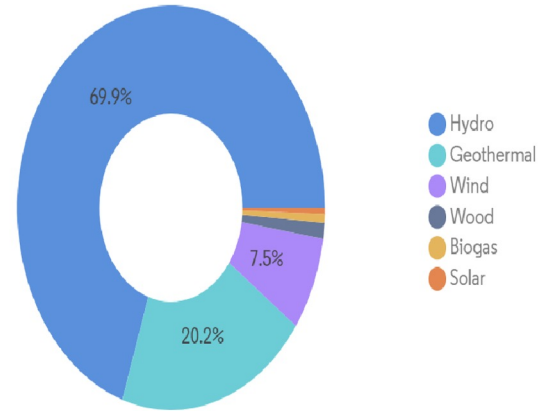
- By 2050 The New Zealand Government has decided to make their energy system highly renewable, sustainable, and efficient.
- The Government wants to support low emissions and high-wage economies.
- They are also looking at accessible as well as affordable methods that will support the New Zealand citizens.
- Energy Supply is secure , reliable and resilient even after all the global turmoil situations.

RENEWABLE ENERGY STRATEGY



Image Source : <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-strategies-for-new-zealand/>

Renewable Electricity Generation Mix, in %, New Zealand, 2021



Source: Ministry of Business, Innovation, and Employment, New Zealand

Image Source : <https://www.mordorintelligence.com/industry-reports/new-zealand-renewable-energy-market>

Privatization of Renewable Industries

- Partial Privatization Of Industries re began around 2012
- Companies Like Meridian, Mercury and Genesis.
- Privatization has helped the companies to expand its operations as well as work force management.
- These companies are able to execute major decisions without the interference of the government.
- The companies are working independently and are not getting any benefits like tax concessions, subsidies etc.

Private Practice

Australia, New Zealand are among global leaders in privatization, select deals:

DATE	COMPANY/SECTOR	COUNTRY	VALUE, IN BILLIONS OF U.S. DOLLARS
April 2013	Ports Botany & Kembla Infrastructure	Australia	\$5.3
Being considered	Medibank Private Insurance	Australia	3.8**
Jan. 2014*	Macquarie Generation Power	Australia	1.9
Oct. 2013	Meridian Energy Power	New Zealand	1.6
May 2013	Mighty River Power Power	New Zealand	1.4

*Final bids due on this date

**Estimated

Source: Dealogic

The Wall Street Journal

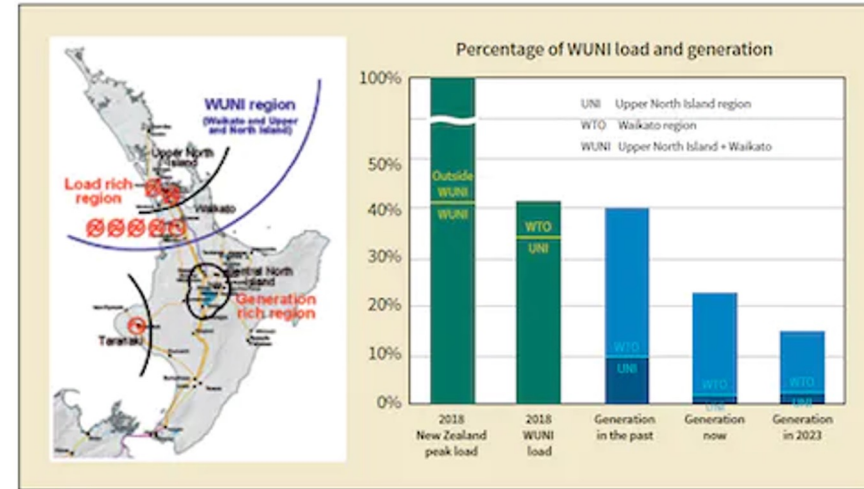


Image Source: <https://www.wsj.com/articles/SB10001424052702303482504579179362170155466>

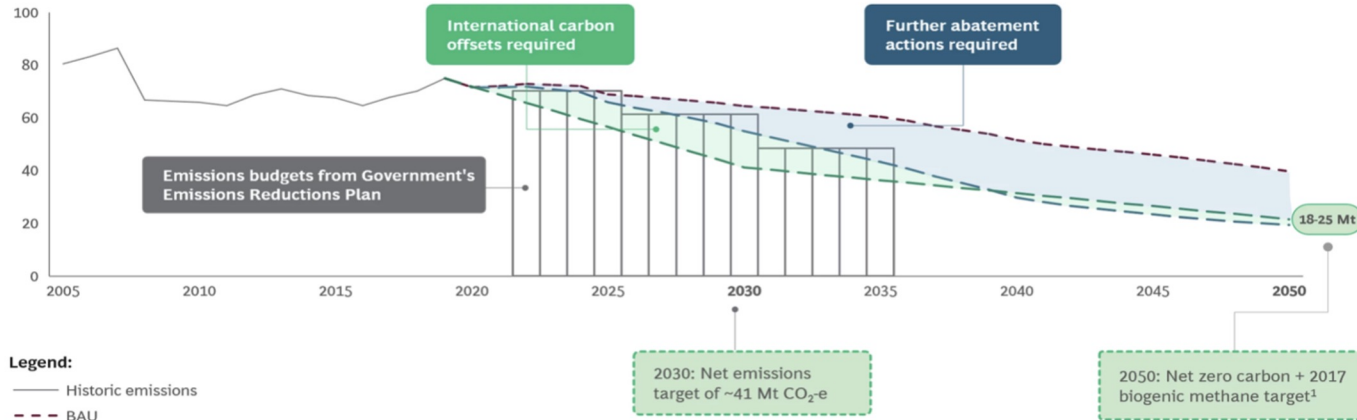
Image Source: <https://www.wsj.com/articles/SB10001424052702303482504579179362170155466>

Countries View Towards Low Carbon Emission

- The New Zealand Government updated their NDC in the year 2021.
- They Government decided the increase in emission reduction targets from 30% to 50%.
- These original targets are set to be effective by 2030.
- The renewable Electricity Target by 90% by 2025 and around 100% 2035.
- A target of 50% renewables for the total final energy consumption by 2035.
- The country also has a national energy strategy in place by 2024.

Exhibit 2 - New Zealand requires concerted effort to lower net emissions

Net emissions (Mt CO₂-e)



Legend:

- Historic emissions
- - - BAU
- - - Climate Change Commission demonstration path
- - - New Zealand's commitments at COP26
- Draft emissions budgets

1. 24-47% reduction on 2017 levels

Note: New Zealand has committed to reducing biogenic methane to 24-47% below 2017 levels (33.5 Mt CO₂-e), 21.6Mt CO₂-e is midpoint of 24-47% reduction

Source: Climate Change Commission, Ministry for the Environment

Job Security In Renewable Energy

- The New Zealand Government is extensively working on creating various Energy Programs.
- MBIE is developing the Energy Strategy and estimated to complete by the end of 2024.
- The government has already met with a wide range of Stakeholders/Investors to come forward to look at various industry options.
- The government also focuses on provided a great number of jobs to all the citizens as well as work hand in hand with the Maori community.

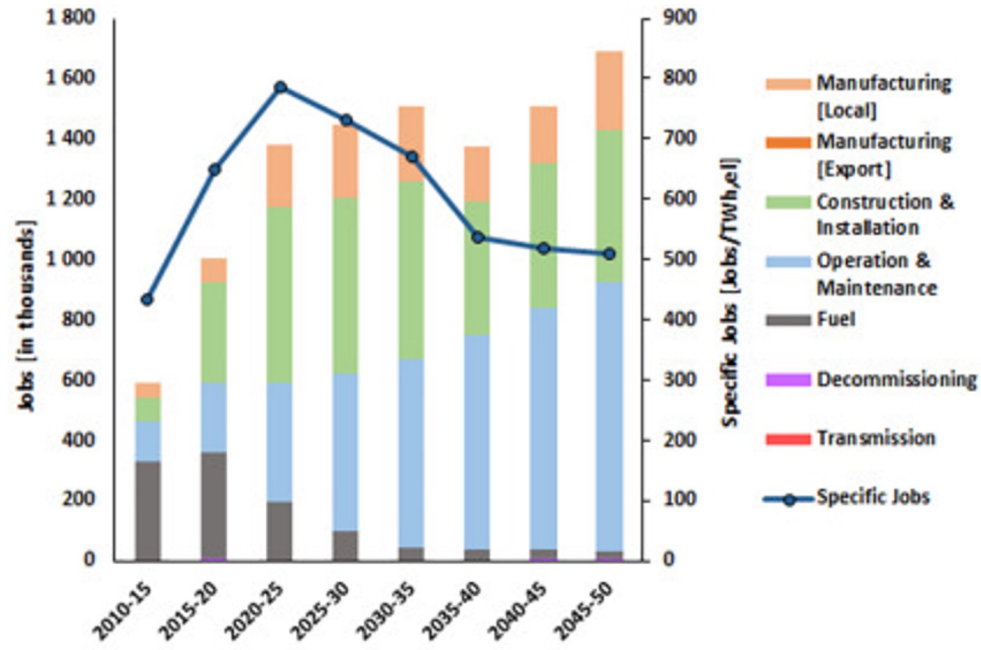
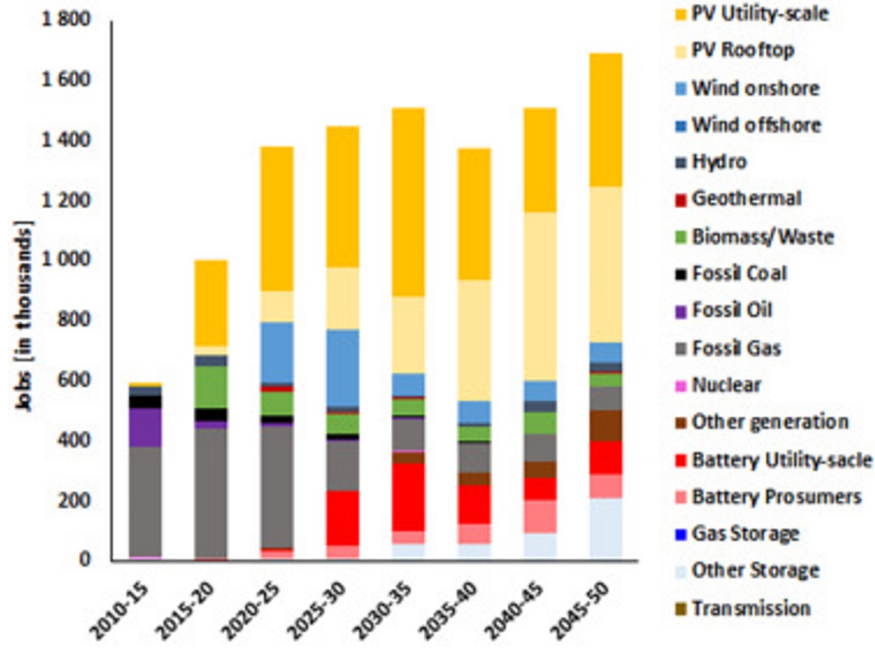


Image Resource: <https://www.sciencedirect.com/science/article/abs/pii/S0040162518314112>

Contribution Of Various Modes Of Power Generation In The Future

Future technologies - Wind

Future wind technologies have been split into the following six tranches:

- Onshore Wind – Consented/planning underway
- Onshore Wind – Small/locally embedded
- Onshore Wind - Large, high capacity factor (>40%)
- Onshore Wind – Large, low capacity factor (<=40%)
- Offshore Wind – Fixed foundation offshore wind farms
- Offshore Wind – Floating foundation offshore wind farms

Future technologies - Solar

Future Solar Photovoltaic technologies were split into the following five tranches:

- Residential Solar - rooftop
- Commercial Solar - rooftop
- Distributed/Community Solar – ground mount
- Utility Scale Solar – Fixed Panels – ground mount
- Utility Scale Solar – Tracking Panels – ground mount

Future technologies - Geothermal

Geothermal technologies were split by the following tranches, based from the MBIE Geothermal Stack²²:

- Large Consented Flash Plants
- Consented Binary Plants
- Large Non-consented Flash plants
- Non-consented Binary plants

Future technologies - Hydro

Hydro is split into the following three tranches, defined using information from the MBIE “Embedded Hydro Generation Opportunities in New Zealand”³³ and the “Hydro Generation Stack Update for Large-Scale Plants”³⁴ reports:

- New Dams
- New Run-Of River – Embedded Small
- New Run-of-River – Large

Future Technologies - Thermal

New thermal plants available for consideration by the model include:

- Natural Gas Turbines – CCGT, OCGT (with/without CCS)
- Coal Plants (with/without CCS)
- Oil Plants
- Biomass Plants
- Biogas Plants

Future Technologies - Batteries

Battery tranches include:

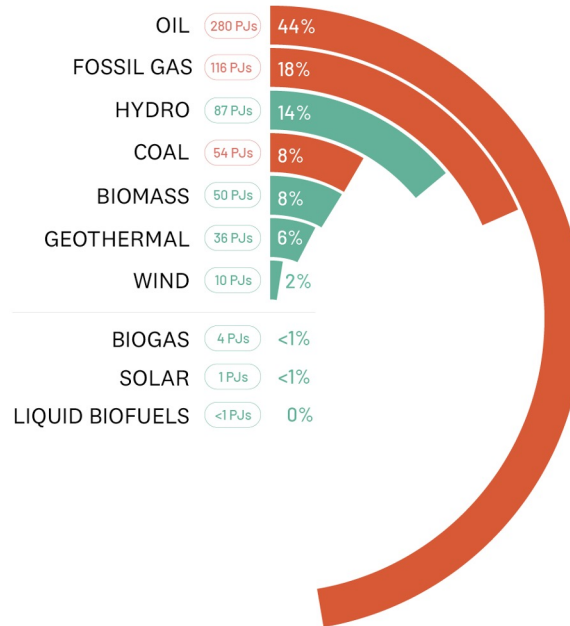
- Distributed (commercial scale 0.5-1 MW, into LV network) batteries – Li-Ion
- Utility scale (100 MW, into HV network) batteries – Li-Ion
- Utility scale (100 MW, into HV network) batteries – Flow

Future Technologies - Pumped Hydro

Pumped hydro tranches include large and small projects with large projects “mimicking” the estimated parameters of a Lake Onslow scheme.

- Large Pumped Hydro (Lake Onslow)
- Small Pumped Hydro (other potential projects)

Primary energy consumption in New Zealand



Graphic shows primary energy consumption in New Zealand for the 2021 calendar year (source: MBIE). Primary energy is energy that is harvested directly from natural resources – these can be renewable energy sources (as explored in this page) or non-renewable (such as gas, oil and coal).

Opportunities For New Business Ventures In the Energy Sector In New Zealand

Abundant & secure supply

New Zealand currently has the fourth-highest renewable electricity percentage in the OECD, currently at around 84% and growing. Furthermore, the New Zealand Ministry of Business, Innovation and Employment estimates there is approximately 14,700 MW of potential additional capacity – providing ample scope for investment opportunities across the clean-energy value chain.

Prices are globally-competitive, supported by New Zealand's high annual average capacity factors of around 50% for hydro, up to 95% for geothermal, and 40% for wind (which is among the highest in the world).



Track record of innovation

New Zealand has always been at the forefront of renewable energy development. It opened the Southern Hemisphere's first industrial hydro-electric power plant in 1885; and led the world in harnessing geothermal energy at scale.

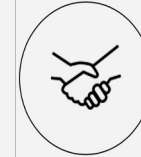
Our modern-day innovators continue this pioneering spirit. New Zealand recently became the second country in the world to use geothermal for hydrogen production. It is also the launchpad for a range of ground-breaking new technologies.



Strong government support

The International Energy Agency (IEA) notes that New Zealand's renewables sector is succeeding on its own merits, without being reliant on government subsidies. There are strong levels of public and government support for the sector – with New Zealand aiming to achieve 100% renewable electricity by 2035, and to transition to a carbon-neutral economy by 2050.

To support these targets, the government has established a \$400 million Green Investment Fund, a \$27 million National New Energy Development Centre, and multiple renewable energy investments via the \$3 billion Provincial Growth Fund.



By the numbers



84%

**of electricity usage
is renewable in New
Zealand**

Source: Ministry of Business,
Innovation & Employment (2020),
Energy in New Zealand



2nd

**in the world
for energy security**

Source: International Index of
Energy Security Risk (2020)



2035

**target year for NZ
to reach 100% renewable
energy**

Source: Beehive (2019), NZ
embracing renewable electricity
future

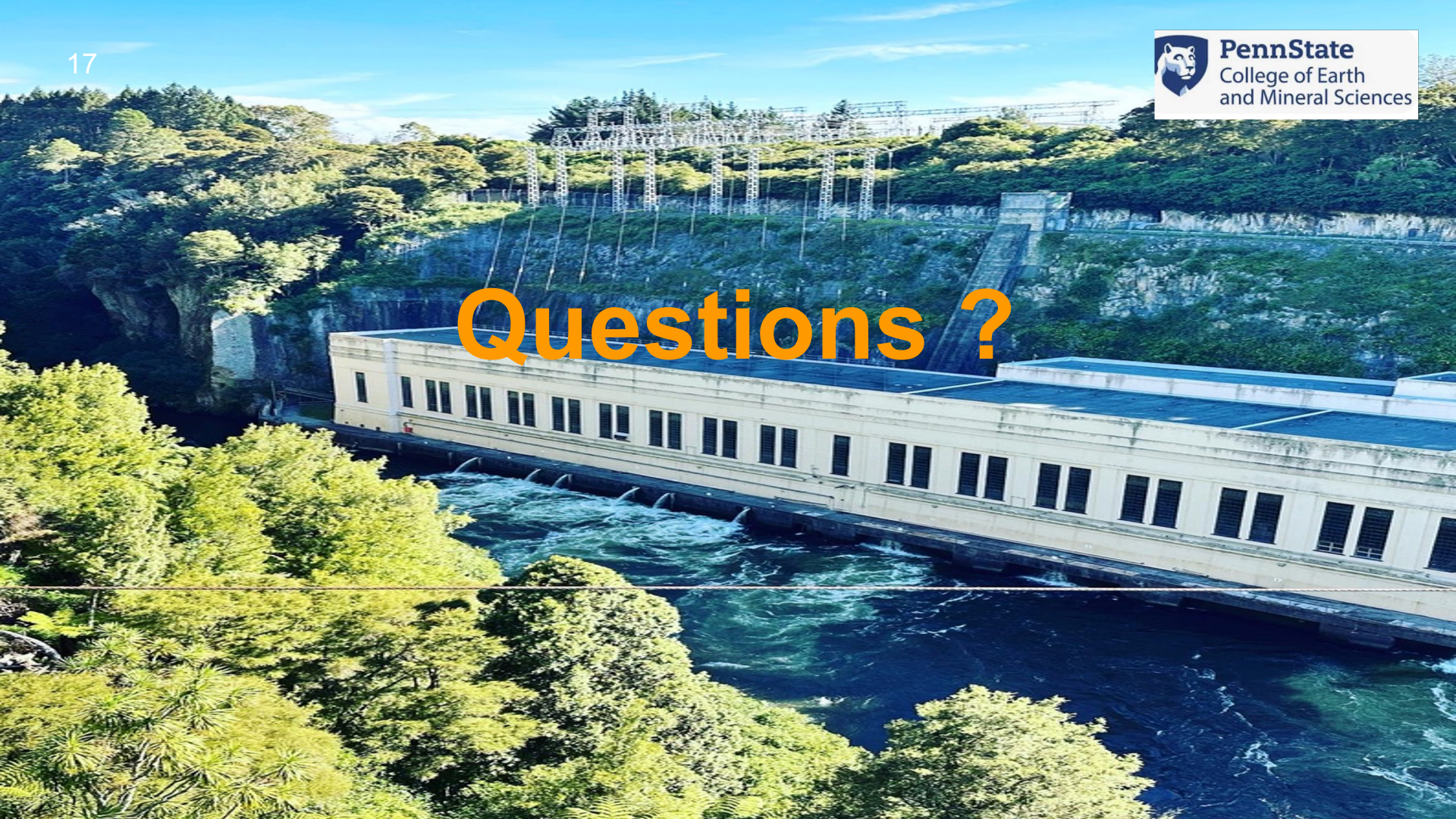


2^{k+}

**MW of additional
wind generation
consented**

Source: Ministry of Business,
Innovation & Employment (2019),
Energy in New Zealand

Questions ?





Thank You