Overview of the New Zealand Energy Market

An EY report prepared for New Zealand Trade and Enterprise

December 2024

Building a better working world

Contents

Summary

- New Zealand has strong growth potential with a 65% increase in electricity demand by 2050 – more if export potential is realised
- The New Zealand environment has world class wind and solar potential with capacity factors around 60% for offshore wind
- Our electricity market is open access and well-established with liquid hedging markets
- Bipartisan consensus around net zero 2050 and the need for new renewable generation creates a stable enabling environment for investors
- Over NZ$35B of projects have been announced across the country.

Why invest in the New Zealand energy sector?

New Zealand is a global leader in renewable electricity generation with 88% renewables

Energy Overview

- New Zealand is a net importer of energy but has a high degree of energy independence with a self-sufficiency index of 73% in 2023. While it exports coal, gas (in the form of methanol) and oil, electricity and biomass supply is indigenous and refined petroleum products are imported.
- About 30% of New Zealand's total energy consumption is derived from renewable sources, a notable contrast to the 12% average observed among OECD member countries.

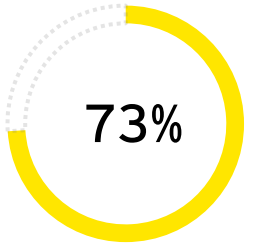
Electricity Outlook

- In 2023, New Zealand's total electricity consumption was relatively stable compared to the previous year, up 0.2% to 39,130 GWh.
- The majority of electricity generation is from renewable sources, particularly hydroelectricity and geothermal. 2023 saw a record high renewable share of electricity generation at 88%.
- New Zealand ranks among the top countries globally in terms of the proportion of electricity generation sourced from renewables. In contrast, Australia's share of electricity generation from renewables is below 40%, while the OECD average for renewable energy mix stands at 30%.
- Residential electricity consumption surpassed the industrial sector for first time to become the largest consumer of electricity, reaching 35%. This was due to the continued steady growth in the number of residential users, combined with a decline in industrial consumption.

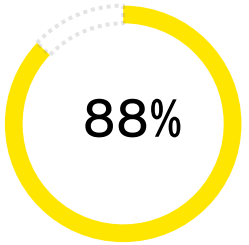
NZ Energy Overview (2023)

39,130 GWh
National Electricity Consumption

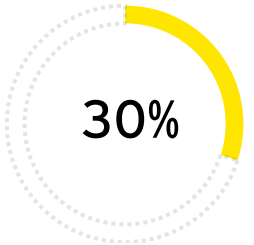
43,488 GWh
National Electricity Generation



National Self Sufficiency

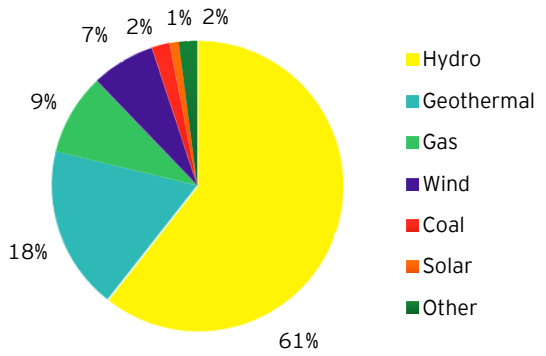


Share of renewables in electricity generation in 2023

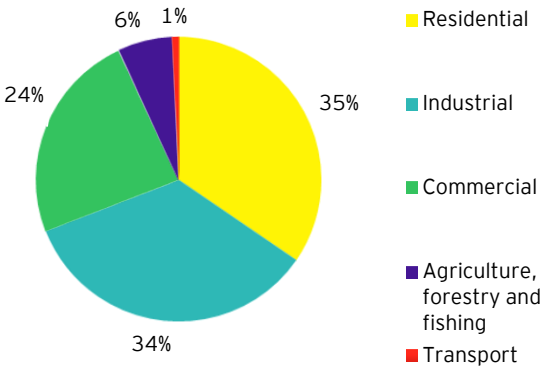


Total energy consumption coming from renewable sources in 2023

Electricity generation, 2023



Electricity consumption by sector, 2023



Source: Energy in New Zealand 2024.

The ‘Roaring Forties’ make New Zealand rich in wind potential while land for solar PV is accessible

Solar PV potential is high due to resource accessibility:

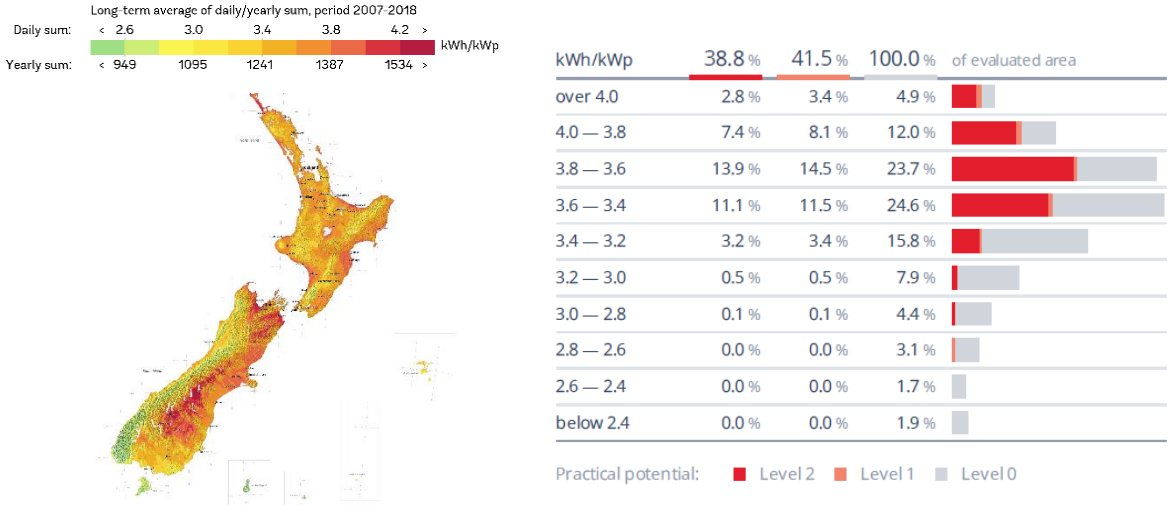
- Across the country the average theoretical Solar PV generation potential is moderate at around 3.540 kWh/m^2 [1]. To understand practical potential, the theoretical value is screened at three practical levels:
  - Level 0 overlooks any impediments to solar power plant development.
  - Level 1 excludes unsuitable land areas, such as rugged terrain, urbanized zones, forests, and remote locations.
  - Level 2 adds "soft" constraints, like regulatory limitations from national or regional authorities.
- 38% of New Zealand’s assessed land area is categorised as Level 2, with an average photovoltaic power output of 3.47 kWh/kWp.
- Despite not having the highest global solar potential, New Zealand's solar energy is competitive with an LCOE of 80-100 NZ$/MWh for large-scale PV[5].

Onshore wind resource is superior:

- New Zealand stands out with a significantly superior wind resource, as over 20% of its land boasts a high wind power density, in contrast to the global average of only 5% of land falling within this category. This positions New Zealand as a preferred destination for onshore wind projects[2].
- Located in the 'Roaring Forties', New Zealand benefits from strong, consistent westerly winds.

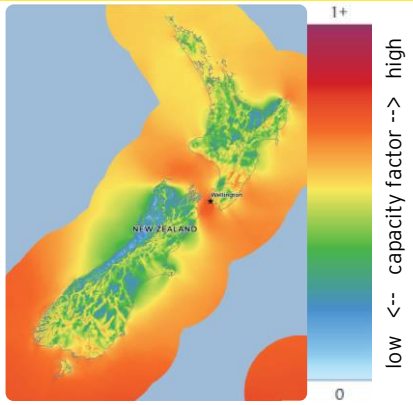
Offshore wind capacity factors are best in class

- New Zealand boasts one of the world's highest capacity factors for offshore wind, ranging between 50% and 65% [3].
- The large continental shelf area means that large areas relatively close to shore are less than 100 m water depth – making fixed and floating offshore wind attractive.



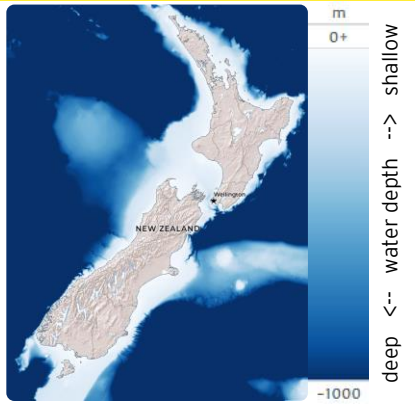
World Bank’s Global Solar Atlas Indicating New Zealand’s Potential Photovoltaic Power Output[1]

Offshore Annual Energy Yield Capacity Factor



New Zealand’s capacity factor of 50%-65% is amongst the best in the world, reflecting the potential for high offshore wind energy yield [4].

Bathymetry of seabed surrounding New Zealand



New Zealand is surrounded by a relatively shallow seabed, supporting the development of offshore wind generation[4].

Source: [1] World Bank Global Solar Atlas, [2] New Zealand Energy Profile – IRENA, [3] Offshore Wind Capacity Factors – IEA, [4] Global Wind Atlas, [5] MBIE Utility scale solar forecast

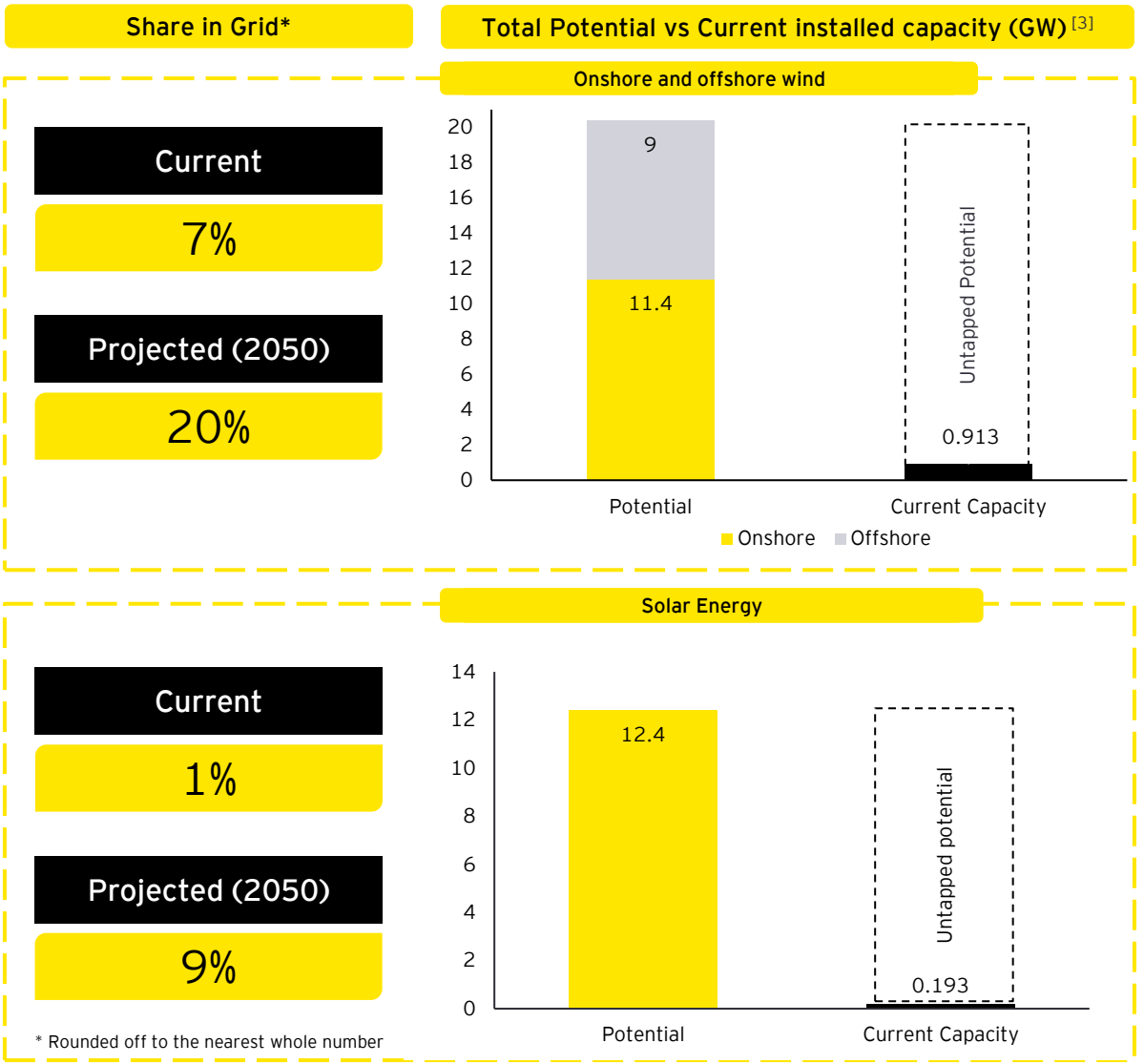
New Zealand has established renewable generation but large untapped potential

Onshore and offshore wind potential is world class:

- New Zealand's Ministry for Business Innovation and Employment (MBIE) undertake periodic assessments of wind potential in their Wind Generation Stack Update with the last update in March 2020[1]. This report identified promising sites for theoretical projects (as opposed to actual projects that have been announced). Key findings were:
  - 82 onshore potential projects totalling 11.4 GW and annual generation potential of 39 to 44 TWh
  - The true wind energy potential is anticipated to be even higher, as the study only included projects exceeding 100 MW in capacity
- A report on New Zealand's offshore wind industry identifies 9 offshore wind projects that are currently being investigated, totalling approximately 9 GW and generation potential of 40-50 TWh[2]
- In Transpower's (the New Zealand national grid operator) Whakamana i te Mauri Hiko[3] report, wind power plays a crucial role in New Zealand's electricity grid, growing from approximately 7% to 20% of total electricity generation by 2050.

Solar PV potential is significant and largely untapped:

- Globally, there has been a substantial increase in solar PV adoption over the past decade. However, there has been slow uptake in New Zealand due to:
  - A high penetration of renewable generation already existing
  - Limited electricity demand growth in the last decade
  - No government subsidies for new renewable generation
  - Additional technology costs due to supply chain and geography
- As electrification gains momentum, solar PV is poised to play a more significant role in New Zealand's electricity grid. Forecasts from New Zealand's Energy Efficiency and Conservation Authority (EECA)[4] indicate that by 2035, solar PV could account for 6% of the country's electricity supply, while Transpower forecasts solar PV could grow to 9% of overall electricity generation by 2050[3].
- New Zealand's proximity to Australia, arguably the most mature solar market, offers critical labour and development resources, supporting solar industry growth.
- Added to this, New Zealand has the opportunity to introduce agrivoltaic energy generation as a means of diversifying farming operations with minimal impact to stocking rates (depending on farm type) and no need to apply to change land use.



* Rounded off to the nearest whole number

Source: [1] MBIE, [2] New Zealand offshore wind industry national impacts study, Updated to reflect the departure of BlueFloat from the NZ market [3] Whakamana i te Mauri Hiko, [4] EECA.

Electrification is set to support emissions reductions amounting to around 30% of New Zealand's gross emissions

Increasing renewable integration will help meet emissions targets, with forecasts suggesting renewables will comprise 58% of energy consumption by 2050. The growth in renewable generation will be driven by electrification of demand from transport and industry. The Energy Efficiency & Conservation Authority has also developed a co-ordinated approach for regional decarbonisation through their Regional Energy Transition Accelerator (RETA) programme [3].

Transport

- EVs offer a proven strategy for reducing New Zealand's transport-related emissions, constituting 20% of the nation's gross emissions. Road transport accounts for approximately 91% of New Zealand's transport emissions.

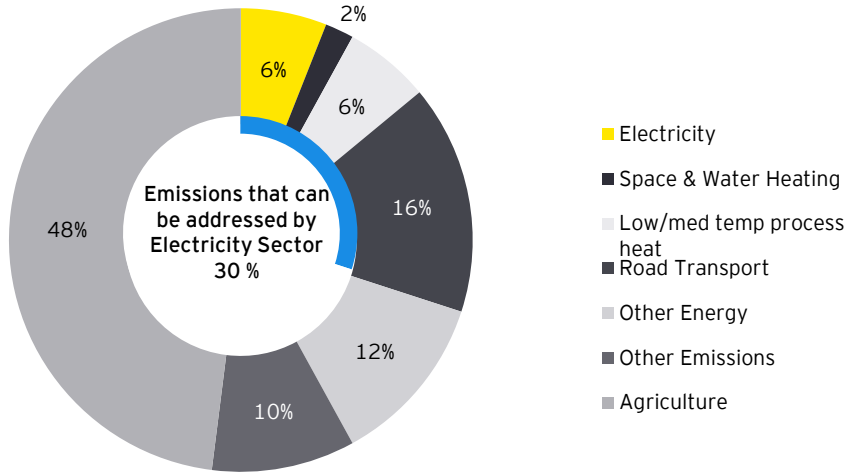
Process heat

- Electric heat pumps are suitable for displacing low- and medium-temperature heat, which constitutes 73% of New Zealand's heat emissions, while biomass serves as a viable decarbonisation solution for medium-temperature processes.

New Zealand's Electrification Opportunity[1]

Sectors	Abatement Potential (Mt CO_2e)	% of Current Gross Emissions	Primary Technologies
Ground Transport	13.3	16%	Electric vehicles for light transport, buses, light and medium trucks, and some heavy transport
Low to Medium Process Heat	5	6%	Electric heat pumps and electrode boilers
Heating Space and water for Buildings	2	2%	Electric heat pumps
Electricity Generation emissions	5.1	6%	Renewable electricity
Total	**25.4**	**30%**	

Percentage split of New Zealand's gross emissions by end-use[1][2]



Role of Electricity Sector in meeting Energy Demand[1]

Sources	2020	2050
Units	TWh (%)	TWh (%)
Electricity (80-90% renewable)	35.7 (19%)	65.5 (58%)
Renewables (non-electricity)	16.9 (9%)	26 (23%)
Oil	77 (41%)	11.3 (10%)
Natural Gas	43.2 (23%)	4.5 (4%)
Coal	15 (8%)	5.6 (5%)
Total Energy Demand	**188 TWh**	**113 TWh**

Source: [1] The Future is Electric - BCG, [2] EY analysis, [3] EECA RETA Programme introduction

Demand for electricity is projected to grow by 65% over the next 25 years

Long-term demand pathways are robust with consensus around demand growth

- The long-term demand pathway for electricity in New Zealand is strongly influenced by electrification initiatives in the process heat and transportation sectors.
- The conversion of coal and gas boilers is expected to contribute significantly to electricity demand growth:
  - Fonterra, New Zealand's largest dairy company, has committed to phasing out coal by 2037 at its 28 manufacturing sites across the country.
  - Open Country Dairy[2] and Synlait[3] have both installed electrode boilers at former coal-powered dairy factories in the South Island.
- New Zealand experienced record growth in EV adoption through the clean car discount scheme introduced in 2021[4]. EVs are now 2.1% of the New Zealand light vehicle fleet[5]. To continue support for EV adoption, the current coalition government proposes investment in EV charging infrastructure to provide 10,000 public EV chargers by 2030[6].
- Tiwai Point aluminium smelter signed a 20-year PPA, representing 13% of New Zealand's electricity demand. This agreement included significant demand response when the country has high demand[8].

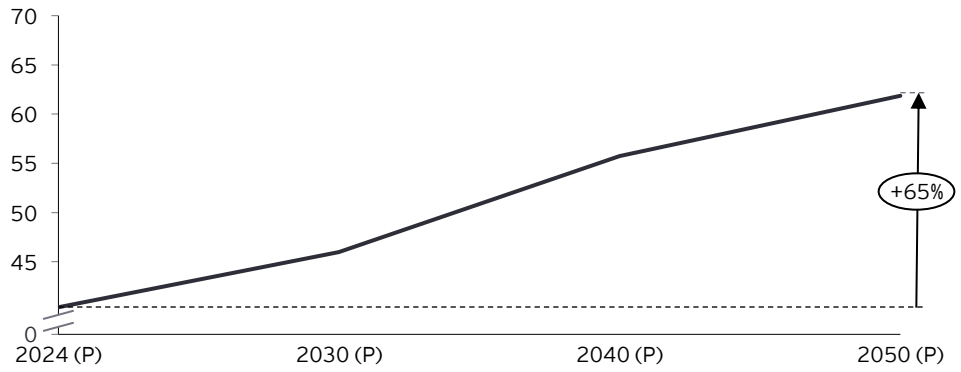
Hydrogen and export potential could significantly enhance demand growth

- Demand forecasting has generally been focussed on electrification of existing uses. However, modelling to support the NZ Hydrogen Roadmap in 2023 found that hydrogen production could increase 2050 electricity demand by 34 TWh in the base case and 73 TWh in the export focussed case [7].

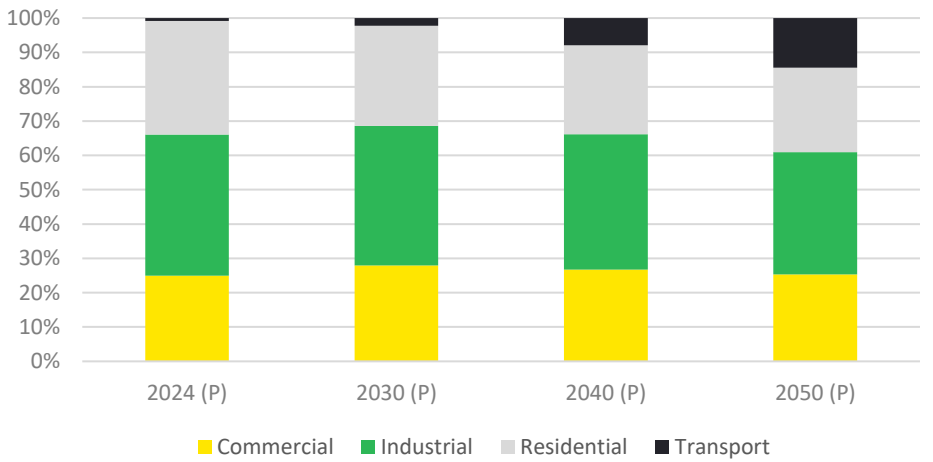
Short-term uncertainties exist

- Changes to government initiatives and reforms in resource management legislation could potentially shape investment landscapes and regulatory frameworks, influencing the trajectory of energy projects and market dynamics.
- The closure of thermal plants, alongside rising peak demand and potential for significantly increased demand for data centres, also creates market uncertainty in the short-term

Projected Total Electricity Demand (TWh) [9]



Demand by sector [10]

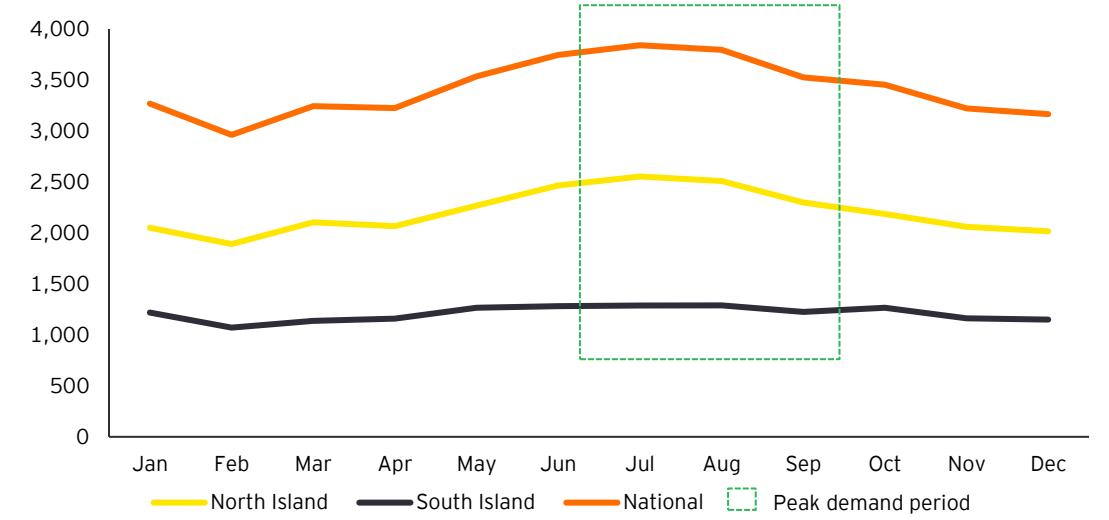


Source: [1] Getting out of coal - Fonterra, [2] Open Country achieves a world first in dairy - EECA, [3] Synlait has switched on New Zealand's first large-scale electrode boiler - Synlait Milk, [4] Clean Cars - Ministry of Transport, [5] EVs in Operation - EVDB NZ, [6] National-ACT Coalition Agreement - National Party, [7] Tiwai Point, 20-year power supply agreement, [8] Meridian NZAS Contract [9] EY ROAM Analysis, [10] Whakamana i te Mauri Hiko.

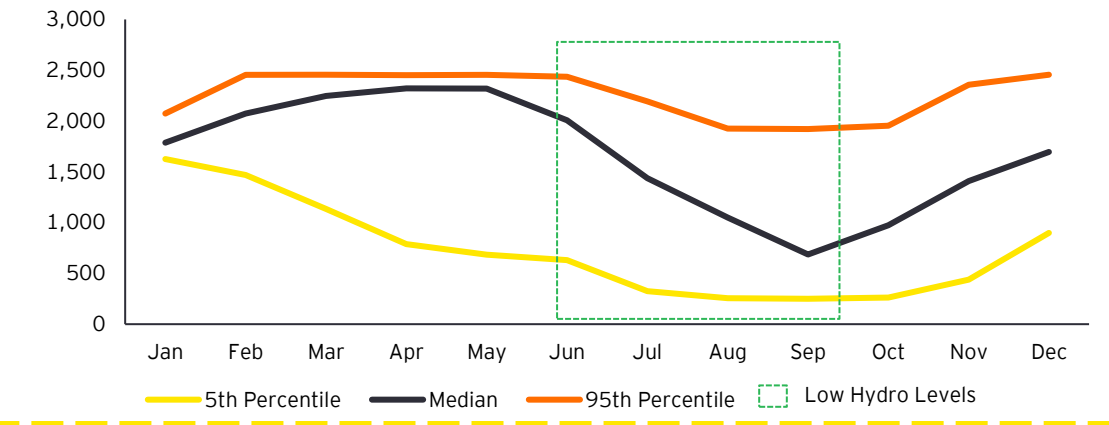
Electricity demand is dominated by winter loads and hydropower can reduce by 5 TWh in dry years creating challenges for the electricity system

- New Zealand relies heavily on hydroelectricity. In a typical year, hydroelectricity will provide between 25 and 26 TWh of energy [1].
- In years where there is sustained low precipitation (dry years), hydroelectricity may only provide as little as 20 TWh of energy, leaving a deficit of up to 5 TWh [1].
- Currently, this seasonal energy deficit is primarily covered by coal fired generation at the Huntly power station. Coal is used as opposed to gas because of its ease of storage, but biomass is being investigated as a replacement for coal over the medium- to long-term.
- Further compounding the issue, seasonal variability in demand is anti-correlated with hydro dam levels, meaning hydro storage is typically low during times of high demand. This results in very high spot market prices during dry years, and especially so during winter.
- Unlike peak demand challenges, dry years primarily present an energy deficit rather than a capacity issue, necessitating sufficient energy reserves to meet demand despite diminished hydro resources.
- Winter electricity demand in NZ has increased by an average of 0.4% annually between 2012 and 2022, doubling the overall average growth rate and quadrupling that of summer. This means the seasonal demand gap is growing, which exacerbates the problem [3].
- Historically, the weekly spot prices shows a clear correlation with hydro storage levels, with prices being low when storage was high and high when storage was low[4].
- In August 2024, a combination of low hydro storage levels, low wind, and low gas production resulted in extremely high prices. Where daily average national wholesale prices are usually between NZD$200-300/MWh in winter, these prices reached over NZ$800/MWh[5].

2023 Monthly Demand 2023 (TWh) [2]



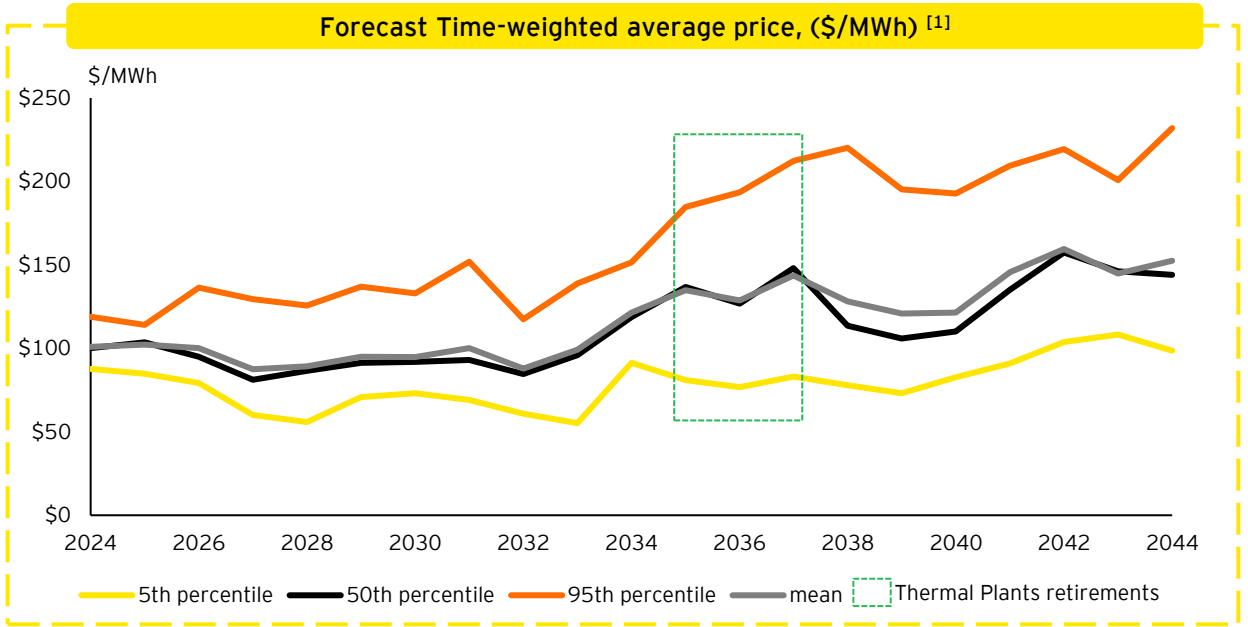
Seasonal Variation Hydro Dam Levels 2022, (Mm^3) [2]

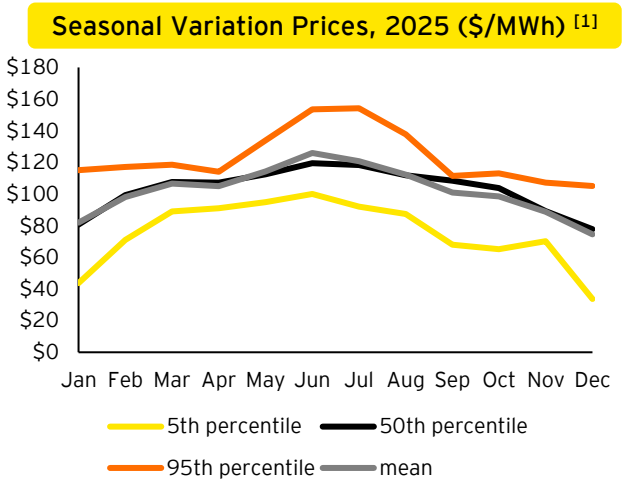


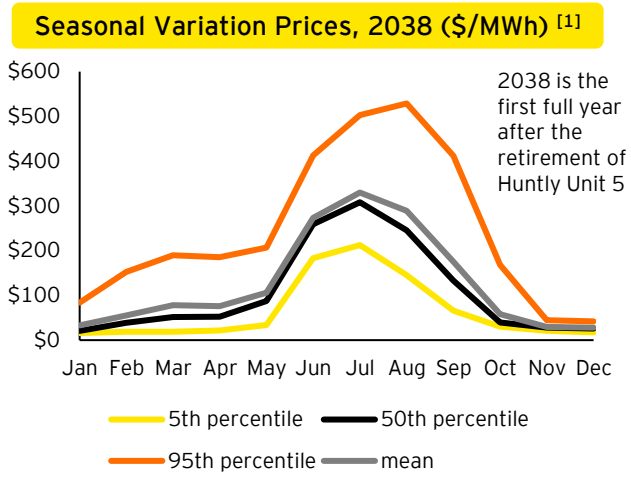
Source: [1] The economics of four future electricity system pathways for New Zealand – prepared for Parliamentary Commissioner for the Environment, [2] EY ROAM, [3] Whakamana i te Mauri Hiko Monitoring Report Sep 2023, [4] Electricity Authority, [5] EA high wholesale prices

Intermittency of renewables and retirement of thermal plant coupled with uncertainty around gas supply is leading to short-term volatility

- Historically, New Zealand experiences its highest electricity demand during winter. This has often resulted in tight electricity supply conditions.
- Recent instances have seen elevated spot prices as expensive fossil-fuel-based generation is required to satisfy the heightened demand.
- Despite the growing contribution of intermittent renewable sources like wind and solar, their variability during peak periods has resulted in the continued reliance on fossil-fuelled generation.
- Aging fossil-fuel power stations are reaching end of life. Te Rapa 44 MW cogeneration plant closed in June 2023. There are potential retirements of the three Huntly 250 MW Rankine and 403 MW CCGT unit 5 by 2035 and 2037, respectively. Furthermore, Taranaki 377 MW combined cycle is expected to only have 3,000 hours of operation left and is being kept operational solely to ease security of supply concerns[2].
- Short- and long-term options are being explored to address this. In the long term, Huntley coal power station is looking at options to convert to biomass. In the shorter term, establishing LNG imports is being considered to address declining domestic supply.
- New Zealand's gas production has been declining. From 2023 to 2024 there was a ~20% reduction in gas reserves forecasts. Due to current and projected gas shortages, Government and businesses have started exploring the feasibility of importing LNG to make up the shortfall.
- Approximately 2.6 TWh/year of additional renewable electricity generation is projected to come online by 2026, primarily from solar, wind, and geothermal sources. However, there are uncertainties regarding commissioning timelines due to various challenges[3]. For this reason, it is critical that new entrants to the New Zealand energy market connect with experienced local industry members and/ or consider partnering with a New Zealand operation to support the development process.
- Consequently, there is mounting ambiguity regarding the availability of new generation capacity to meet winter demand fluctuations potentially leading to a volatile spot market in the near term.







Source: [1] EY ROAM analysis, [2] Thermal Generation Stack Update, MBIE, [3] Future Generation and Future Prices: Electricity Authority.

NZ provides a stable investment environment with clear, enduring objectives for climate change

NZ compares favourably on many global rankings

World Economic Forum

Global Competitiveness Report [1]

Overall Ranking
18th

Strong governance Principles Ranking
3rd

Energy transition and broaden access to Electricity
32nd

World Energy Council

World Energy Trilemma Index [2]

Overall Ranking
9th

Energy Security
18th

Grade
AAAa

Energy Equity
15th

Environmental Sustainability
18th

The GSCI

Global Sustainable Competitiveness Index [3]

Overall Ranking
27th

Global Governance Index
7th

Governance Efficiency Score
10th

Our Energy and Electricity Markets are mature and open access

- The New Zealand electricity market is characterized by its transparent and structured arrangements
- While vertical integration of retail and wholesale is permitted, transmission and distribution are regulated, open access providers unable to hold material generation[4]
- The gross pool wholesale electricity market was established in 1996[5] and has 142 participants
- Access to the market is open to all those meeting prudential and information disclosure requirements[6]

Zero Carbon Act 2019: A bipartisan framework for decarbonisation[7]

Provides four pillars to address climate change with support across parliament:

- sets domestic greenhouse gas emissions reduction target for New Zealand to:
  - Zero net emissions of all greenhouse gases (except biogenic methane) by 2050
  - Reduce emissions of biogenic methane to 24-47 per cent below 2017 levels by 2050, and 10 per cent below 2017 levels by 2030
- establishes a system of emissions budgets to guide reduction targets
- requires the Government to develop and implement policies for climate change adaptation and mitigation
- establishes an independent Climate Change Commission to advise government and track targets

Consensus building new generation and providing the right investment environment

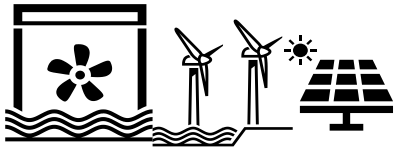
The government's coalition agreement commitments include[8]:

- Amend the Resource Management Act 1991 to make it easier to consent new infrastructure including renewable energy.
- Identify opportunities for energy market competition and innovation
- Examine transmission and connection pricing to facilitate cost effective connection of new renewable generation resources.
- Subsidise rollout of 10,000 public EV chargers by 2030

Source: [1] Global Competitiveness Report: WEF, [2] World Energy Trilemma Index, [3] Global Sustainable Competitiveness Index, [4] Electricity Industry Amendment Act 2022, [5] MBIE:New Zealand Electricity Reform, [6] Electricity Authority, [7] Climate Change Response (Zero Carbon) Amendment Act 2019, [8] National, ACT and New Zealand First to deliver for all New Zealanders.

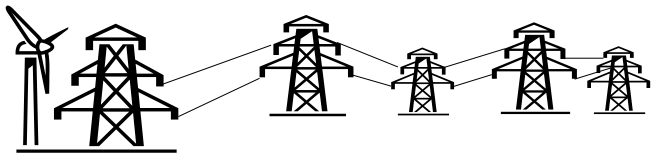
2 How does the New Zealand energy sector work?

The New Zealand electricity market structure is well-established and open access



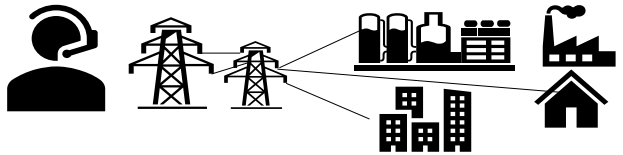
NZ has 5 major Generators[1]

- NZ's electricity is generated by approx. 87% renewables (60% hydro, 18% geothermal, 6% wind).
- NZ has 4 major generators who contribute:
  - Meridian (33%)
  - Contact Energy (25%)
  - Mercury (21%)
  - Genesis (14%)
  - Others (6%)
- Generators sell their electricity on the NZ wholesale electricity market. Approx. 32% of household electricity bills comes from generation costs.



NZ has 1 state owned transmission grid and 29 distributors

- Transpower, a state-owned enterprise, manages New Zealand's national electricity transmission system, encompassing substations, high-voltage cables, transformers, and overhead lines.
- 29 distribution companies operate with various ownership structures[2]:
  - 5 Council-owned
  - 20 Trust/community owned
  - 3 Privately held
  - Other (Vector is 75% owned by Entrust (Trust) and 25% listed)
- Subject to price-quality regulation under Part 4 of the Commerce Act 1986



NZ has 40 retail brands and over 2.1 million consumers

- In New Zealand there is high vertical integration between electricity generation and retail as the 4 main retail companies are also the main generating companies - the 4 companies account for 85% of market share[3]
  - Meridian (16%)
  - Contact (19%)
  - Mercury (25%)
  - Genesis (24%)
- The retail electricity market is regulated by the Electricity Authority. Approx. 13% of household electricity bills comes from retail costs.
- Industrial users are typically on fixed-price variable volume contracts; more time-of-use pricing is emerging.

Government policy and regulatory agencies

Central government policy and regulatory agencies

- **Ministry for Business, Innovation and Employment (MBIE):** sets policy for the energy and resource markets, incl. the electricity market and upstream gas development
- **Ministry for the Environment:** sets policy for emissions reduction (including the emissions trading scheme (ETS)) and land/ resource use
- **Climate Change Commission:** advises the Government on climate change measures to meet national targets
- **WorkSafe:** health and safety regulator in NZ

Energy sector specialist agencies

- **Electricity Authority:** regulates the wholesale and retail electricity markets; monitors industry code compliance.
- **Commerce Commission:** regulates monopoly infrastructure (revenue setting under a price-quality path regime) and investigates competition issues.
- **Gas Industry Co.:** regulates gas market and sets energy security targets.
- **Energy Efficiency and Conservation Authority:** promotes efficiency and decarbonisation efforts (e.g., EV rollout).

Local and regional government

- **Territorial authorities (city and district councils):** manage and deliver water, waste and sanitation, local transport infrastructure and public recreational facilities.
- Territorial authorities also regulate building consents, determine urban planning bylaws, and maintain public health standards.
- **Regional councils:** environmental regulator responsible for air and water quality, water catchment management, regional transport planning and public transport services.

Source: [1] Electricity Authority, [2] MBIE, [3] Electricity Authority.

NZ's grid infrastructure is designed to move power from large hydro generators in the South Island to large demand centres in the North Island

The New Zealand grid runs the length of the country connecting large hydro schemes in the South Island with major demand centres in the North

- During normal operating conditions, power flows run northwards through the grid.
- During extended dry periods, or when dam levels are low, power flows run southwards through the grid.
- The increase in distributed generation such as wind and solar and changes to industrial demand is impacting patterns in power flow, particularly in regional parts of the grid.

Hydro in the South Island and Central North Island[1]

- The 5 major hydro schemes provide around 67% of total annual generation
- The total storage capacity of the hydro schemes is around 5 TWh (approximately 6-8 weeks of national demand).

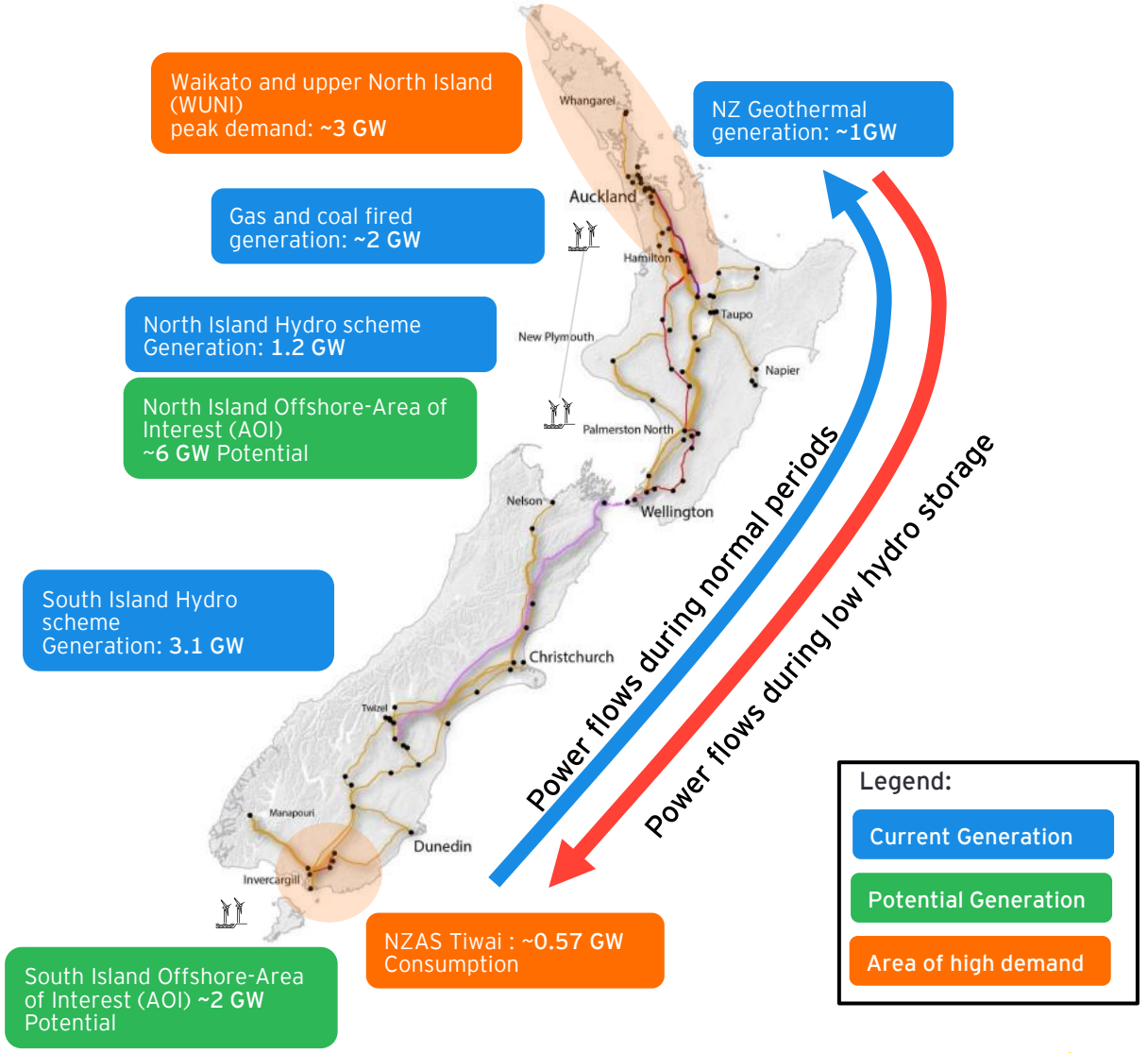
Large demand centres

- The Waikato and the upper North Island (WUNI) region has the highest concentration of demand, with an annual peak of approximately 3000 MW during winter.
- Around 1000 MW of thermal generation has been decommissioned from within the WUNI region since 2012, increasing the need for imported generation from the south.[2]
- The aluminium smelter in the lower South Island is the largest single user of electricity with a demand of approximately 572 MW[3].

Thermal generation in the North Island in Taranaki and Huntly

- Gas and coal fired generation in Taranaki and South Auckland provide power during the winter, peak periods, and when hydro lake levels are low.

Accommodating large offshore wind projects would likely require significant grid upgrades



Source: [1] TPM BBC - Transpower, [2] Waikato & UNI voltage management - Transpower, [3] Briefing for the Incoming Minister for Energy - MBIE.

Liquid spot and hedge markets exist to allow generators to actively manage price risk

The Wholesale Electricity Market (aka the Spot Market)

- The nodal price of electricity reflects the marginal cost of supply. This means it is determined by **the cost of supplying the last MWh at that node.**
- There are **220 nodes** in the market and prices are determined **every half hour**.
- Generators can offer up to 5 tranches of generation at different price points.
- **Two types of reserve capacity** are also procured by the market: fast instantaneous reserve and sustained instantaneous reserve.
- Reserve requirements are set for the North and South Islands separately but **reserve sharing is available across the HVDC**.
- **Energy and reserves are co-optimised** through the market.
- A DC load flow model of the transmission grid is used to estimate line losses and congestion constraints which feeds into **locational price differences between the different nodes**.

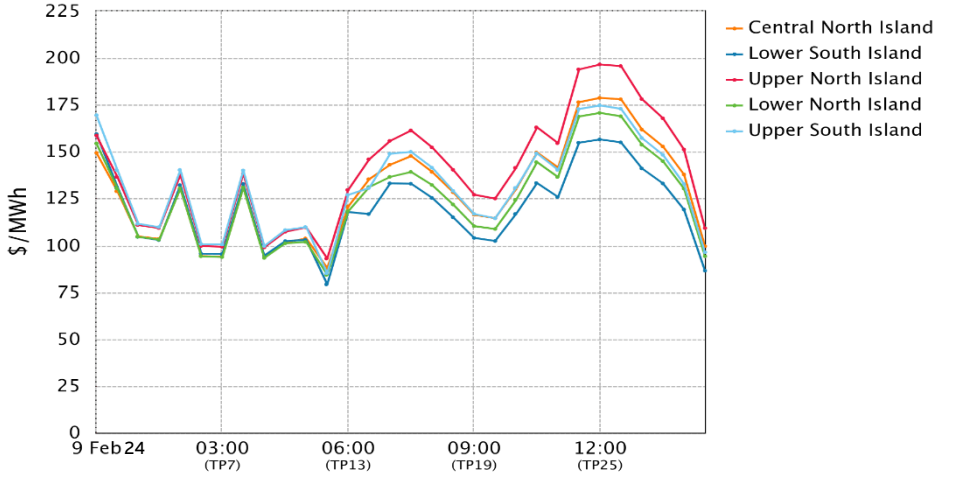
The Hedge Market:

- The hedge market allows participants to manage risk associated with movements / fluctuations in the spot market.
- All electricity must be sold through the spot market, so hedges always manifest as a Contract for Difference (CfD).
- It comprises three key markets:
- **Futures and options exchange (ASX):** Standardized contracts for a future price up to 3 years out settled against the Otahuhu and Benmore pricing nodes.
- **Over-the-counter (OTC) hedges:** Involve direct negotiation between buyers and sellers, offering flexibility with various contract types.
- **Financial Transmission Rights (FTR) market:** Allows participants to purchase the right to the difference in price between two pricing nodes. Helps in managing locational price risk.

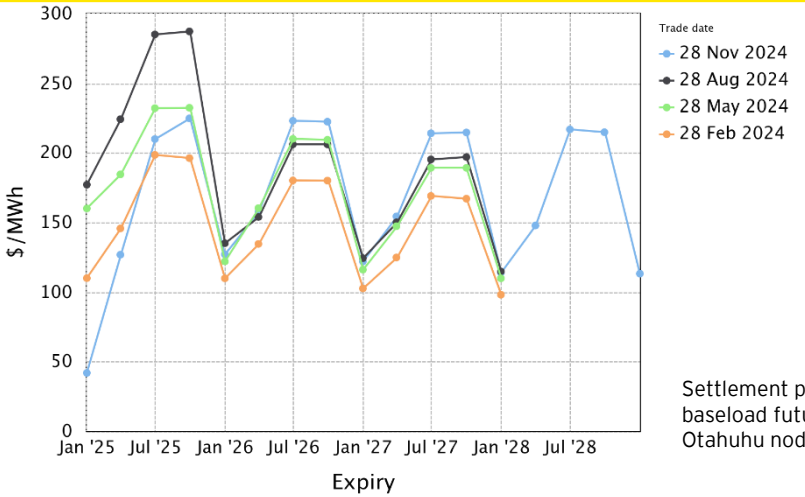
Potential enhancements:

The Market Development Advisory Group (MDAG) [1] suggests enhancing transparency in hedge market activities, particularly for non-baseload contracts, by disclosing contract offers, bids, and executed contracts. This urgent recommendation aims to address emerging challenges in transitioning to renewable-based systems, aiding stakeholders in risk management and investment decisions.

Wholesale energy prices, electricity spot market ($/MWh) [2]



New Zealand electricity futures contracts traded on the ASX platform [2]



Settlement prices for baseload futures at Otahuhu node

Source: [1] Final Recommendation Paper Price discovery in a renewables-based electricity system, MDAG, [2] Electricity Authority.


3
What do you need to know to invest?

The New Zealand renewables development pathway is well established with clearly defined steps

Resource consents

- Resource Management Act 1991 (RMA) sets NZ's planning framework
- A recent reform introduced the fast-track approvals process to the RMA. This acts as a "one-stop-shop" for consent approval for projects of national and regional significance.
- Consents can be granted for up to 35 years
- Visual impacts key for projects
- Transmission/distribution infrastructure under separate consents as grid owners have requiring authority rights under the RMA
- Offshore wind framework more complex and will require time to develop

Regulators: territorial authorities

Advisers required: engineering, legal, resource management

Timeframe: 2-3 years

Community and iwi engagement

- Engagement with neighbouring landowners (where applicable) to help manage expectations and to meet resource consent requirements regarding notification of impacted people and properties
- General community engagement with nearby population bases (generally within the territorial authority area)
- Build relationships with iwi/ mana whenua, the indigenous people who have historic and territorial rights over the land

Regulators: territorial authorities

Advisers required: mana whenua representatives, communications

Timeframe: ongoing to construction completion

Transmission/ grid connection

Transpower has a 9-step process to connect generators to the grid[1]:

1) Initial inquiry
2) Concept assessment
3) Application
4) Investigation
5) Delivery (detailed design)
6) Delivery (build & commission)
7) Operations & maintenance
8) Replacement & refurbishment
9) Enhancement & Development

Regulators: Transpower

Advisers required: engineering, construction, legal

Timeframe: ~2-3 years

Electricity code requirements

- There are multiple codes and legislation industry participants must be compliant with[2]

Electricity Industry Act 2010

- This EIA provides a framework for regulation of the electricity industry
- The Act provides the Electricity Authority its power to regulate and the processes it must follow

Related EIA regulations

- There are five regulations industry participants must follow relating to code breaches, industry participant levies, domestic retail tariffs, and exemptions to regulations

Industry Participation Code 2010

- The Code sets out the duties and responsibilities for all industry participants

Regulators: Electricity Authority

Advisers required: engineering, legal, assurance/ compliance

Timeframe: ongoing

Overseas Investment Office (OIO) approval

- The Overseas Investment Office (OIO) assesses applications for foreign investment to ensure they are in the best interests of New Zealand. In some circumstances consent needs to be granted [3].
- The approval process confirms that the investment doesn't pose an outsized risk to New Zealand or a specific region of the country.
- This approval process includes:
  - An initial check of the application,
  - An assessment of the investor and investment,
  - Either the OIO approves the decision or recommends a decision to the Minister.
- As part of the fast-track approvals process the overseas Investment Act is being amended to make it easier for foreigners to invest.[4]

Regulators: Land Information New Zealand (OIO)
Advisers required: legal, commercial

Timeframe: up to 100 days

Source: [1] Grid connection process – Transpower, [2] Electricity Industry Participants regulations – NZ Govt, [3] Overseas investment guidance – Overseas Investment Office, [4] Overseas investment changes

NZ PPA market is nascent but gaining speed to help underwrite new developments

PPAs have been a catalyst for renewables in many markets

- PPAs provide price certainty for investors and developers.
- In overseas jurisdictions, PPA market development has often been supported by government incentives such as feed-in tariffs, contracts for differences and renewable market obligations.
- Government intervention has been aimed at increasing the renewable penetration within electricity systems.
- Underpinned by certification systems, PPAs have allowed corporates to meet their scope 2 carbon reduction targets.

PPAs have not been a large feature of the NZ market to date

- With most of the electricity generation in New Zealand stemming from renewables, at 85%, the need for government intervention to mitigate electricity emissions is lower and historically, renewables have proven to be cost-effective and are supported by the Emissions Trading Scheme (ETS), rendering certificates less critical for their viability.
- The market's structure has created barriers to the development of PPA markets, chiefly due to the prevalence of generation projects being undertaken directly by major established players. Additionally, the market's limited size and historical lack of substantial growth further exacerbate these challenges. However, the EA is currently undertaking activities to provide greater transparency into hedging information, including PPAs.

The slow growth in generation is prompting government action, which is expected to drive market activation

- Transitioning to a highly renewable electricity market has key issues that look to change this approach:
  - Price discovery
  - Firming capacity for peak and dry year cover
  - Encouraging rapid growth of generation capacity
- **MBIE**[1] is reviewing several aspects, including the development of generation projects primarily by established industry players and the challenge posed by the vertically integrated 'Gentailer' model. Additionally, the Government has initiated a review into the performance of the electricity market, including reviewing how to better incentivise timely investment in infrastructure and resources to reliably meet current and future demand (by existing market participants and prospective new entrants)[4].
- The **Electricity Authority**[2] has proposed various measures to enhance the electricity market. These include advocating for increased transparency in contracting processes, the establishment of standardized flexibility contracts, and the introduction of market-making initiatives in both futures and flexibility markets. Additionally, the Energy Competition Taskforce is considering options to support new generators and independent retailers to enter the market.[5].

Announced New Zealand PPA deals to date [3]

Developer	Project Name	Technology	Capacity (MW)	COD	Offtake (MW)	Offtaker type
Genesis	Lauriston solar farm	Solar	63	2024	NA	Corporate
Mercury	Turitea South	Wind	103	2023	62 MW	Tech
Mercury	Kaiwaikawe Downs	Wind	73	2024	NA	Retailer
Lodestone	Edgecumbe	Solar	32	2023	32	Retailer
Lodestone	Kaitaia	Solar	39	2023	39	Retailer
Contact	Tauhara	Geothermal	174	2023	62.5 25	Retailer Industrial
Contact	Te Huka unit 3	Geothermal	51	2024	NA	Tech
Lightyears Solar	Waiuku	Solar	2.4	2023	2.4	Retailer
SolarBay	Maungaturoto	Solar	20	-	20	Corporate
Energy Marlborough	Rooftop solar	Solar	41	2022	41	Corporate*
Tilt Renewables	Waipipi windfarm	Wind	133	2021	133	Retailer

- Power purchase agreement broker EVA reported "strong engagement" in Mercury's 100 MW solar PPA expression of interest process, with the gentailer now having shortlisted three developers.
- Additionally, Auckland-based Lightyears is in the advanced stages of negotiating PPAs for the solar farms it is constructing in Wairarapa and Canterbury.

*Sleeved PPA through Mercury Energy

Source: [1] Measures for Transition to an Expanded and Highly Renewable Electricity System - MBIE, [2] Price discovery in a renewables-based electricity system: Final Recommendations - Electricity Authority, [3] EY analysis. [4] Electricity Market Performance Review press release. [5] Energy Competition Taskforce

Overview of New Zealand's fast track bill and announced energy projects

The purpose of the legislation

- The Fast-track Approvals Bill aims to establish a permanent, streamlined process for approving significant infrastructure and development projects with regional or national benefits. It introduces a **"one-stop shop"** approach for obtaining consents for major projects such as mines, roads, marine farms, and renewable energy projects.
- The Fast-track Bill provides an expedited consenting process for projects requiring approvals under the Resource Management Act, Wildlife Act, Conservation Act, Reserves Act, or the Public Works Act for land acquisition.

Fast-track approvals process

Project owners apply to Joint ministers to access the fast-track approvals process → Joint ministers refer eligible projects to an expert panel for detailed assessment → Expert panel evaluates the project and make the recommendations to Joint ministers

Joint ministers make the final decisions on whether to approve or decline the project.

Project Eligibility

A project will become eligible for fast track by either being:

1. Referred to expert panel by joint ministers
2. Listed as a project under Part A (automatic referral) or Part B (requires referral) of Schedule 2 of the Bill.

Once referred, an expert panel has **six months** to review a project and recommend conditions for consent or permits, after which the Joint Ministers make the final decision.

24 Energy projects listed in the Schedule 2 of the Bill.

Implications for the sector

The Fast-track Approvals Bill will enable 22 renewable generation projects, totalling 3 GW of capacity, to support a clean, reliable, and affordable electricity supply.

The Fast-track Approvals Bill will allow more projects to use the fast-track process, encouraging generators to propose additional projects once enacted.

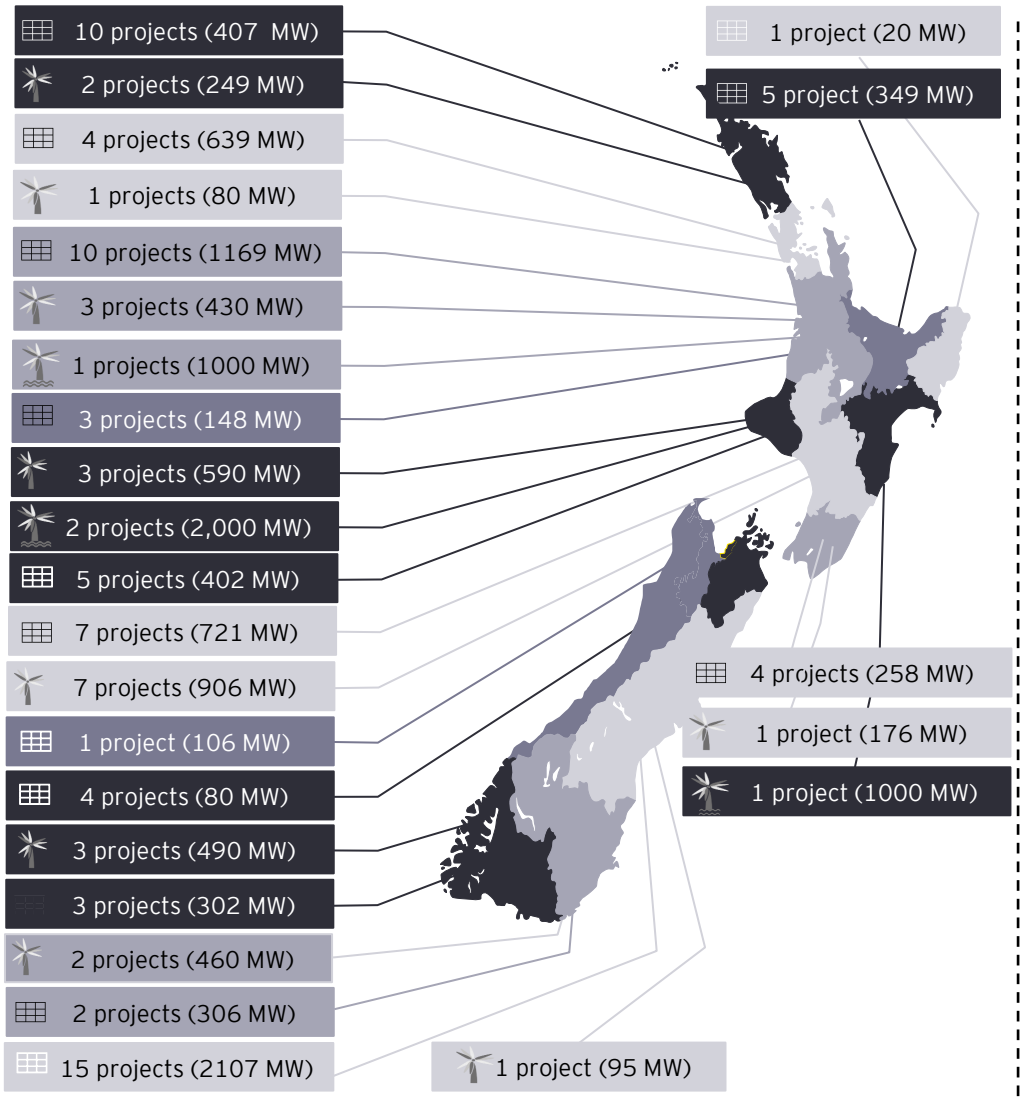
Projects not eligible for the fast-track process are still able to be progressed under the standard RMA process.

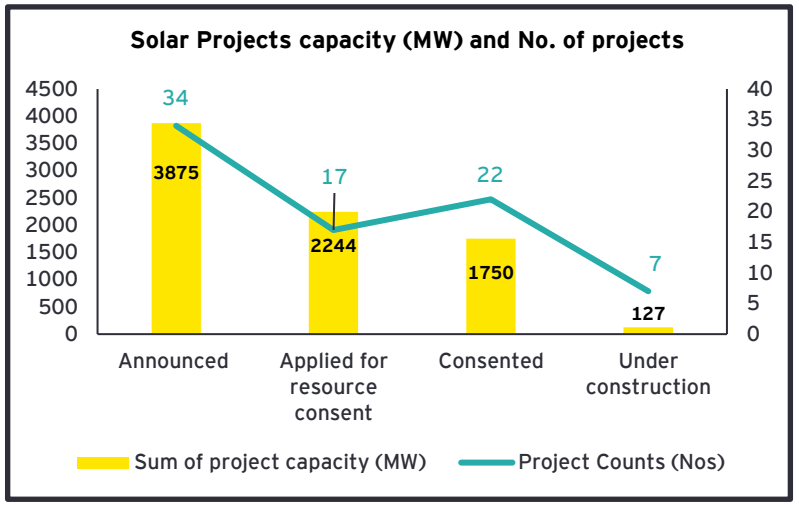
Fast Track Energy sector projects overview

Project	Generation Type	Location	Expected Size (MW)
Point Solar Farm	Solar	**Canterbury**	**420**
Rotokawa Solar Farm	Solar	Waikato	105
Wheao Hydroelectric Power Scheme Reconsenting	Hydro	Bay of Plenty	26.1
Bunnythorpe Solar Farm	Solar	Manawatū Whanganui	400
Huriwaka Wind Farm	Wind	Manawatū Whanganui	300
Kaimai Hydro-electric Power Scheme Reconsenting	Hydro	Bay of Plenty	42.1
Kaihiku Wind Farm	Wind	Otago	300
Huirangi Solar Farm	Solar	Taranaki	100
Hinuera Solar Farm	Solar	Waikato	110
Black Point Solar Farm	Solar	Canterbury	-
Balmoral Station Solar Array	Solar	Canterbury	88
Mahinerangi Wind Farm	Wind	Otago	164
Waitaha Hydro Project	Hydro	West Coast	20
Waikokowai Wind Farm	Wind	Waikato	-
Waihi Hydroelectric Power Scheme Reconsenting	Hydro	Hawkes Bay	5
Tararua Wind Farm Repowering Project	Wind	Manawatū Whanganui	60
Central Park Resilience Project	Energy Infra	Wellington	-
Haldon Station Limited	Solar	Canterbury	180
High Voltage Direct Current (HVDC) Cable Replacement and Capacity Project	Energy Infra	Multi-Region	-
Kaimai Wind Farm	Wind	Waikato	168
Puketoi Wind Farm	Wind	Manawatū Whanganui	228
Foxton Solar Farm	Solar	Manawatū Whanganui	-
Wellsford Solar Farm	Solar	Auckland	76
Tekapo Power Scheme - Applications	Hydro	Canterbury	190

Source: Fast-track Approvals Bill 31-1 (2024), Government Bill - New Zealand Legislation

New Zealand development pipeline has over NZ$35B of announced projects



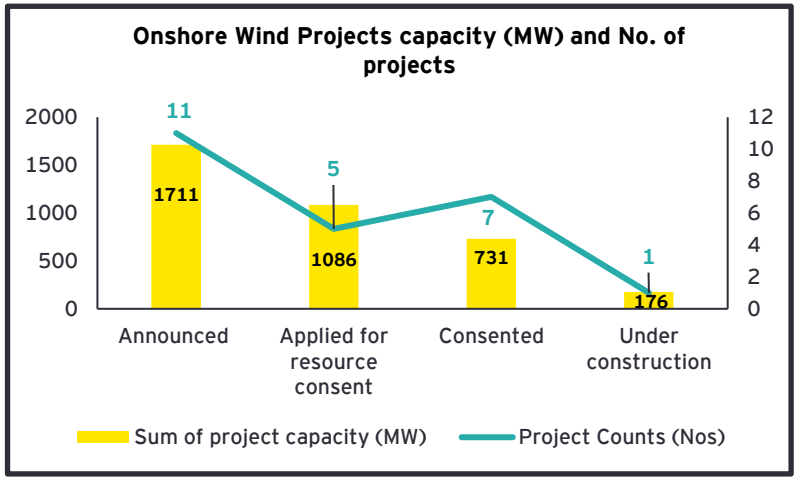


Key Highlights

CAPEX Investment[1] — $14,621 m

Pipeline Capacity — 7,996 MW

No. of Projects[2] — 80



Key Highlights

CAPEX Investment[1] — $10,642 m

Pipeline Capacity — 3703 MW

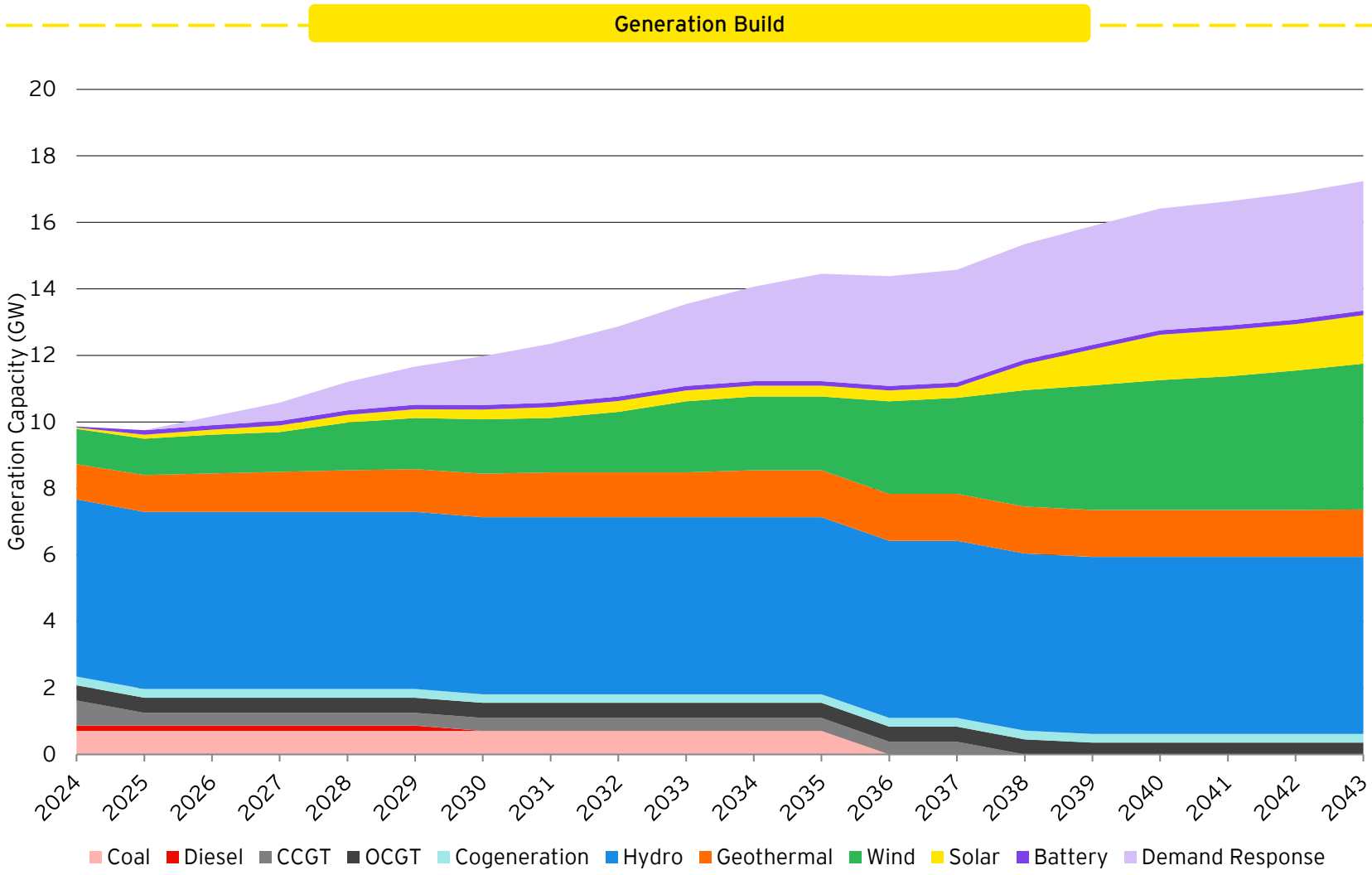
No. of Projects[2][3] — 24

There are currently **four offshore wind projects** in the pipeline, having a combined capacity of **4,000 MW** and representing a capital expenditure investment of **$11,493 million.**

Source: [1]This projection is based on data from EY-ROAM, using 2023 CAPEX NZD/kW figures of $1,682.33 for solar projects and $2,873.33 for wind projects. [2] Generation Stack - MBIE, [3] Electricity Authority.

Appendix:
Electricity market forecast details

Forecast generation capacity by technology

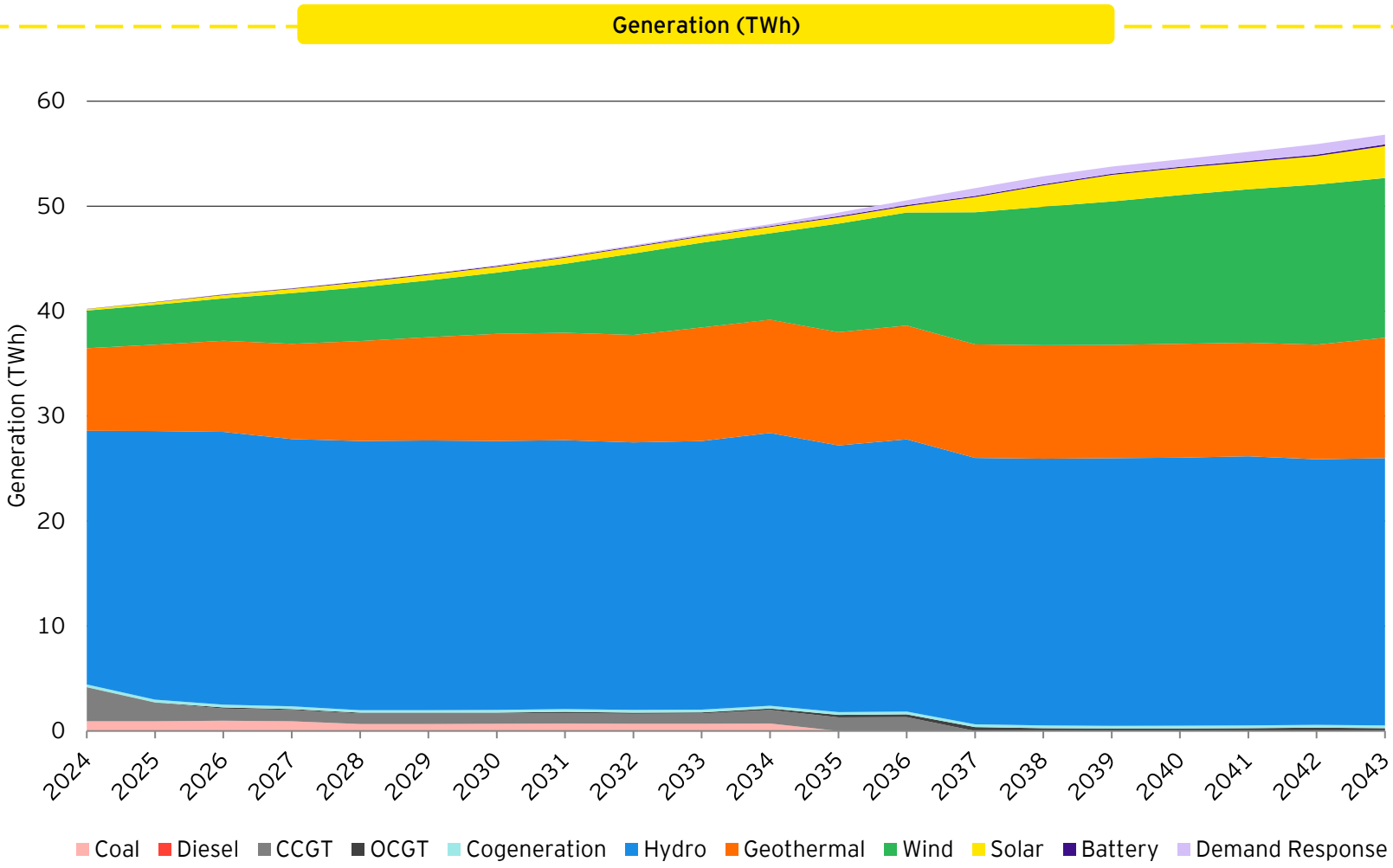


Assumptions:

- It is assumed that demand response increases over time, to around 40% of assumed peak demand, which is assumed to become available at prices from $200/MWh to $3,000/MWh.
- Tiwai Aluminium Smelter is still in operation.
- It is expected that there will be four times the wind generation capacity that there is today.
- The generation capacity shown here only includes grid-scale generation - rooftop solar is excluded.

Note: These values are based on EY ROAM's energy modelling. The model plans generation expansion based on the most cost-effective outcomes. The previous New Zealand development pipeline slide is based on announced projects.

Forecast generation by technology



Assumptions:

- Demand from the grid will increase by 40% in the next 25 years.
- Demand response has a low capacity factor but is there for the unlikely situations where hydro, wind and solar do not meet demand.
- With increasing intermittency over the next 30 years, there is expected to be increasing development and use of batteries.
- The amount of hydro generation is expected to remain constant over time, while overall demand increases. This results in a drop in the proportion of hydro generation, from 61% of total generation in 2024 to approximately 40% in 2050.
- The decreasing cost of installing new wind and solar generation is expected to drive the replacement of coal and gas fired generation as thermal running costs rise.
- The generation shown here includes only grid-scale solar generation - rooftop solar is excluded from this figure and is modelled instead as reduced overall demand.

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