ENERGY IN NEW ZEALAND 25

2025 CALENDAR YEAR EDITION

Comprehensive information on and analysis of New Zealand's energy supply, demand and prices

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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Ministry of Business, Innovation and Employment (MBIE)
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Quick facts for 2024

45.5% New Zealand's primary energy supply came **from renewable sources, a record high**

45.5%

Renewable generation capacity increased by 556 MW in 2024. **Up 17% or 1262 MW from 2020**

556 MW

85.5% of electricity was generated from **renewable sources**, down from 88.1% in 2023

88.1%
IN 2023

85.5%
IN 2024

Electricity consumption in the **food processing sector** continued to increase

Aviation fuel use for domestic and international transport **continued to increase**, reaching 90% of pre-COVID-19 levels

90%

Total energy consumption **dropped 2.1 percent to 524.8 PJ in 2024**, driven by lower industrial demand

522.6 PJ

Natural gas consumption in the economy fell to **its lowest since 2011**

A

Energy overview

New Zealand's total energy supply decreased in 2024, mainly due to ongoing field depletion and lower supply of gas. At the same time, growth in domestic renewable energy production saw the share of energy supplied by renewable sources increasing to a record high.

Despite increases in energy demand in the residential and agriculture, forestry, and fishing sectors, national energy demand fell due to lower industrial energy demand.

Aviation fuel consumption continued to grow, nearing pre-pandemic levels as international travel activity recovered.

ENERGY SUPPLY FROM RENEWABLE SOURCES REACHES A RECORD HIGH

New Zealand relies on a combination of domestically produced and imported fuels to meet its energy needs.

New Zealand's total primary energy supply[1] was 835 petajoules (PJ) in 2024, falling 1.3 per cent, or 11.4 PJ, from 2023. Ongoing field depletion and lower supply saw natural gas production continue to decline in 2024, dropping 20.8 per cent to 118 PJ in 2024. Coal production and exports both fell, down 3.7 per cent and 9.8 per cent respectively, with closures to rail lines due to slips and a partial tunnel collapse contributing to these declines.

In contrast, domestic renewable energy production increased in 2024, up 4 per cent on 2023 levels. Growth in geothermal, solar, and wind energy for electricity generation saw total renewable energy supply reach 379 PJ, up 15.5 PJ. The combination of increased renewable energy supply and a decline in non-renewable energy production drove the share of renewables in total primary energy supply to a record high of 45.5 per cent.

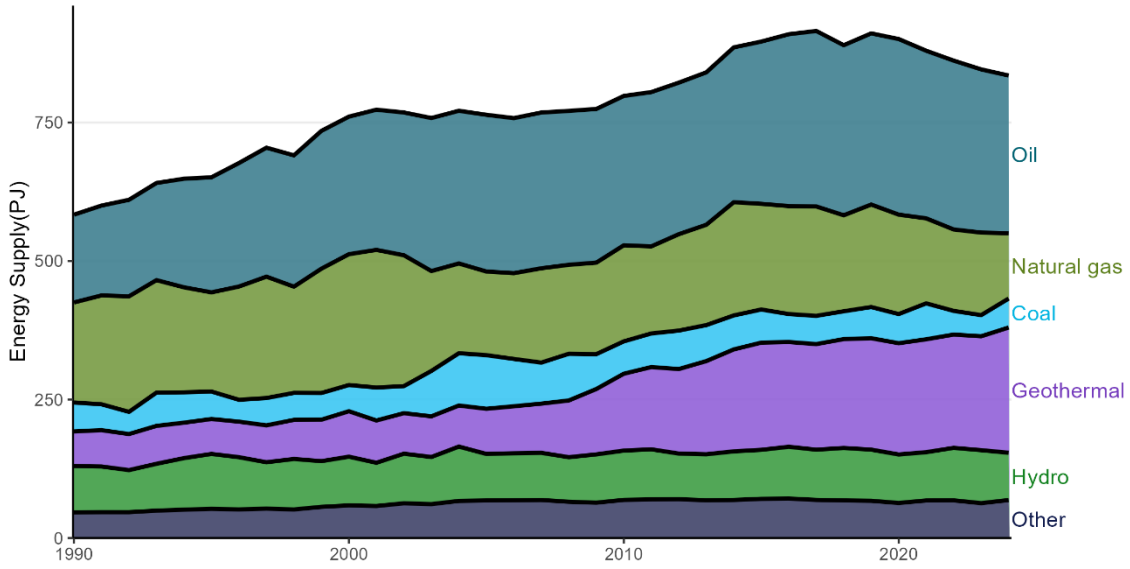


Figure 1. Total primary energy supply by fuel type, by year.

National electricity generation increased 0.9 per cent to 43,879 gigawatt hours (GWh) in 2024. Low hydro inflows and lower gas supply led to an increased reliance on coal for electricity generation in 2024. Hydro generation dropped to 23,490 GWh its lowest level since 2013. A 556 megawatt (MW) increase in renewable generation capacity helped fill some of the gap in supply left by lower hydro generation. Wind capacity nearly doubled over the past five years, rising from 691 MW in 2020 to 1269 MW in 2024. Capacity gains in solar and geothermal generation also helped to support generation from renewables. As a result, even with low hydro generation - which typically accounts

[1] Total primary energy supply refers to the total indigenous production plus imports, minus any exports or energy used in international transport. It also takes into account any changes in energy stock levels.

for over half of all generation - the overall renewable share of electricity generation only fell 2.6 percentage points to 85.5 per cent, down from 88.1 per cent in 2023 (Figure 2).

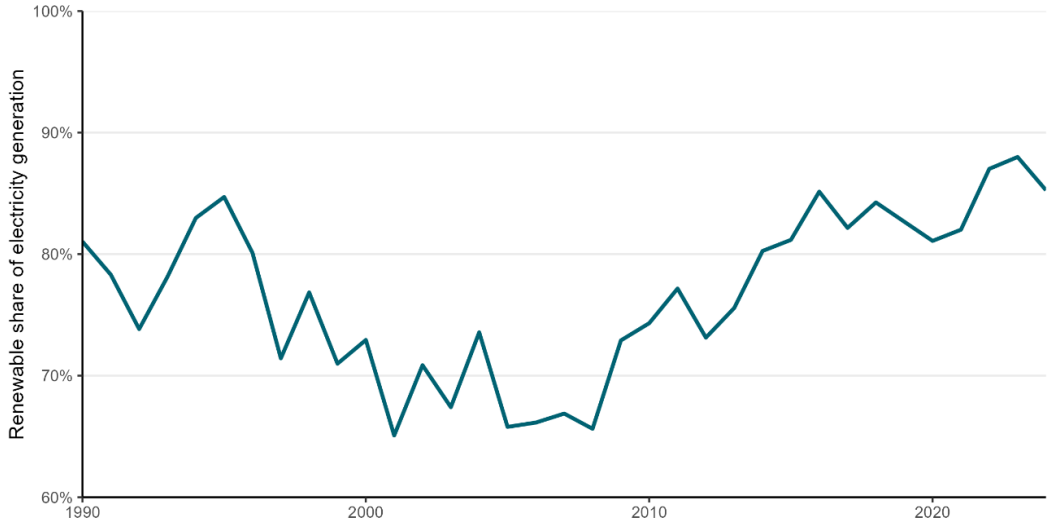


Figure 2. The proportion of New Zealand's electricity that is generated from renewable sources, by year.

Energy self-sufficiency, the ability of a country to meet its own energy supply needs through domestic production, was 72.1 per cent in 2024, down 1.5 points from 2023. Coal self-sufficiency dropped from 172 per cent to 121 per cent, reflecting an increase in coal imports. Coal imports increased 311 per cent as Genesis Energy rebuilt its stockpile for the Huntly Power Station to support national electricity generation. Overall, energy imports accounted for 359 PJ of the country's primary energy supply for the year.

THIRTY PER CENT OF NATIONAL ENERGY CONSUMPTION CAME FROM RENEWABLE SOURCES

Energy consumption dropped 11.1 PJ (2.1 per cent) to 525 PJ in 2024 (Figure 3). This was mainly due to a 12.2 PJ (7.5 per cent) fall in industrial energy demand, particularly in the chemicals subsector. Commercial energy demand also fell, down 4.1 per cent on 2023 levels. In contrast, energy use in the agriculture, forestry, and fishing sectors grew 7.1 per cent, while residential energy demand grew 1.9 per cent. Energy demand for transport remained stable with a slight decline of 0.1 per cent in 2024.

Overall, the share of modern renewables in total final consumption also remained stable, increasing slightly from 29.7 per cent to 29.8 per cent.

Gas consumption for 2024 was 58.5.2 PJ, a decrease of 14.9 per cent on 2023 and the lowest since 2011. Reduced gas supply led to price increases and lower industrial usage from early 2024, with Methanex (the largest gas user in New Zealand) idling production completely between August and October.

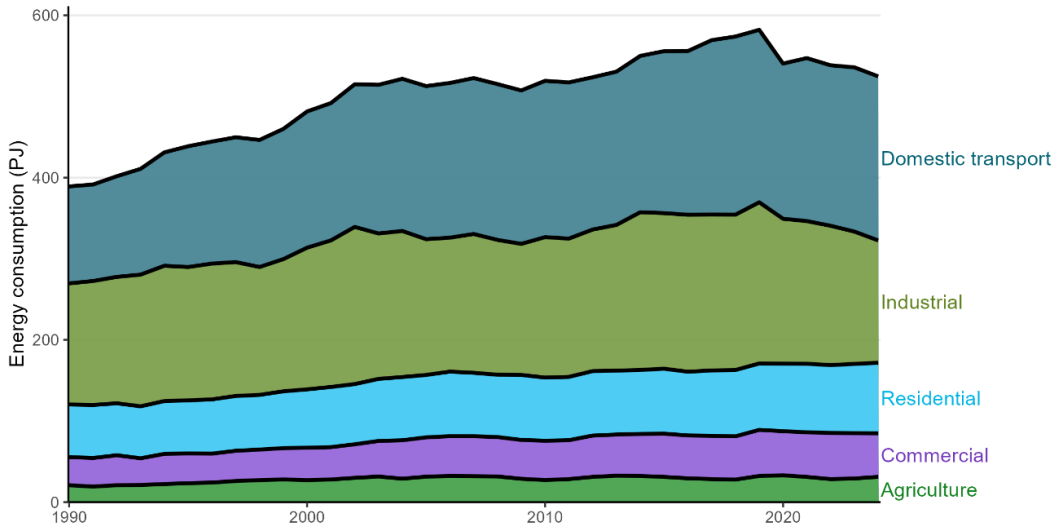


Figure 3. National energy consumption by sector and year.

Industrial electricity consumption fell to 12.5 gigawatt hours (GWh), the lowest level since 1992, largely due to the demand response agreement with New Zealand Aluminium Smelters being called on. While industrial demand declined, residential and agricultural electricity consumption increased, keeping national total electricity use relatively stable.

International transport fuel consumption continued to grow as travel activity continued to increase following the coronavirus (COVID-19) pandemic. Aviation fuel consumption, covering both international and domestic transport, reached 11.0 million barrels which is 90 per cent of pre-pandemic levels. Consumption of other fuels remained stable overall, with increases in residential and agricultural use offsetting declines in the commercial sector.

Energy intensity gives an indication of the relationship between energy use and economic growth by telling us the amount of energy required to produce each dollar of gross domestic product (GDP). Energy intensity across most sectors was relatively unchanged from 2023 levels, with national average energy intensity improving slightly, declining from 1.90 megajoules per dollar (MJ/$) in 2023 to 1.87 MJ/$ 2024 (Figure 4). The chemicals and metals subsector saw the largest change, with its energy intensity falling from 11.3 to 9.5 MJ/$. Although the subsector's GDP dropped from 2023 to 2024, its energy intensity fell due to a large decline in energy use.

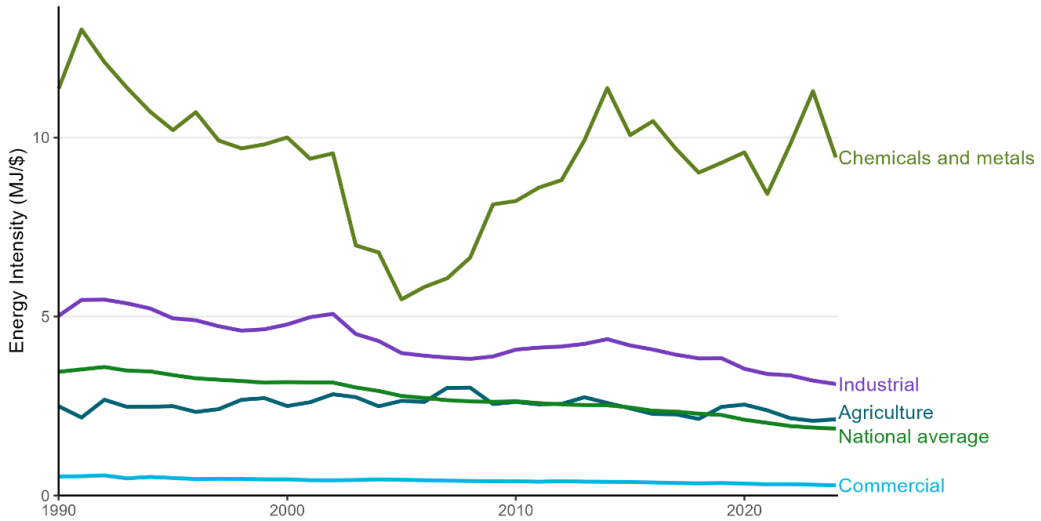


Figure 4. Energy intensity for selected sectors and subsectors in New Zealand, by year.

National average energy intensity has been improving since 2011, driven by the commercial sector with its large contribution to national GDP and its relatively low energy intensity.

B

Electricity

Low hydro inflows and lower gas supply saw an increase in coal use for electricity generation in 2024. At the same time, increases in wind, solar, and geothermal generation capacity helped offset the drop in hydro generation, with 85.5 per cent of electricity generated in 2024 coming from renewable sources.

Industrial demand for electricity decreased from 2023 levels, as New Zealand Aluminium Smelters' demand response agreement was called on, freeing up electricity for use in other sectors. The residential and agricultural sectors saw increased demand, with national electricity consumption staying steady on 2023 levels.

BACKGROUND

Most of New Zealand's electricity generation comes from renewable sources:

- **Hydroelectric** generation has been a part of New Zealand's energy system for over 100 years and continues to provide a large share of our electricity needs. At over 5,000 MW, hydro accounts for around half of national generation capacity, with most of it found in the South Island.
- **Geothermal** generation in New Zealand began over 55 years ago with the opening of the Wairakei Power Station in November 1958. Most of New Zealand's installed capacity is in the Taupō Volcanic Zone. Geothermal plants run as baseload, meaning that they are unable to quickly increase or decrease their generation output.
- **Wind** generation has grown quickly as a source of electricity in New Zealand with the first wind farm commissioned in 1997. The largest wind farms are in the North Island.
- **Solar** is a relatively new source of electricity generation in New Zealand. As well as households and businesses having their own solar panels for on-site generation ('distributed solar'), there are also large-scale (or 'utility-scale') solar farms feeding into New Zealand's national grid.

In most years, over 80 per cent of electricity is generated from renewable sources. The remainder of electricity generation comes from the combustion of non-renewable sources such as **coal, oil, and natural gas**. These fuels account for around a fifth of New Zealand's annual electricity generation.

Around a third of New Zealand's electricity is used by households and around a third is from industrial sectors. Most of our industrial electricity demand comes from the basic metals, food processing, and wood, pulp and paper processing sectors. The aluminium smelter at Tiwai Point is the largest single user of electricity in the country. The commercial sector consumes around a quarter of New Zealand's electricity demand. The remaining demand comes from the agriculture, forestry, and fishing sectors and transport.

LOW INFLOWS SEE INCREASED GENERATION FROM NON-RENEWABLE SOURCES

In 2024, 43,879 gigawatt hours (GWh) of electricity was generated in New Zealand, up 0.9 per cent from 2023. Low hydro inflows saw electricity generation from hydroelectric plants fall. This drop in generation was covered by a combination of new capacity from other renewable sources, and increased generation from non-renewable sources (natural gas, coal, and oil).

Overall, 85.5 per cent of electricity in 2024 came from renewable sources, down from 88.1 per cent in 2023 (Figure 5).

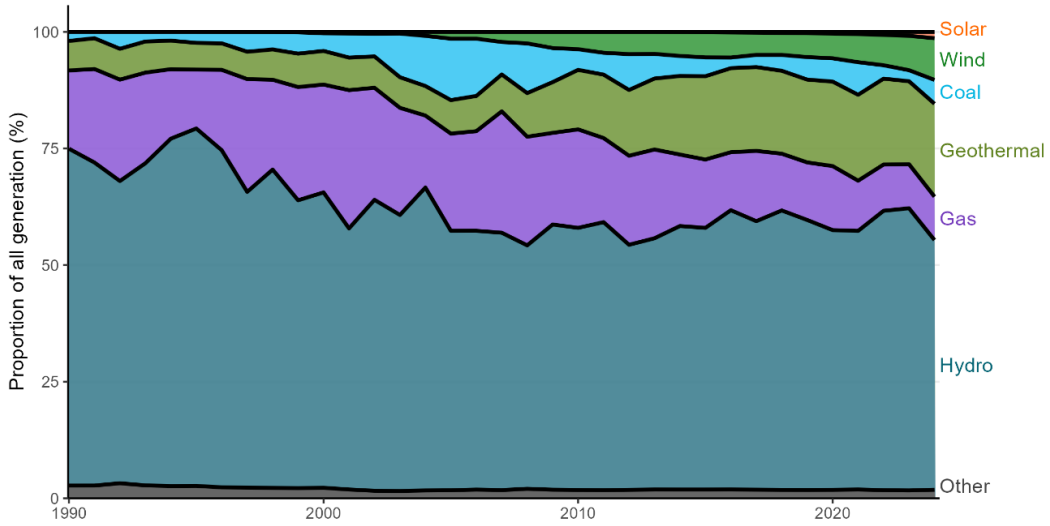


Figure 5. The proportion of total electricity generation from each fuel type, by year.

Annual hydro generation falls to lowest level since 2013

Hydro is a major of source of New Zealand's electricity generation, with just under 60 per cent of annual generation coming from hydroelectric plants in the past decade.

Dry conditions in May, June, and July 2024 resulted in low hydro lake levels, leading to lower hydro generation. Hydro accounted for 23,490 GWh in 2024, a 11 per cent decrease from 2023 and the lowest level since 2013.

The first two quarters of 2024 saw similar levels of hydro generation to that observed in recent years (Figure 6). However, the dry conditions, notably in June and July 2024, saw hydro generation in the September 2024 quarter being 17 per cent lower than the September 2023 quarter. The September 2024 quarter saw the lowest hydro generation for a September quarter since 2001.

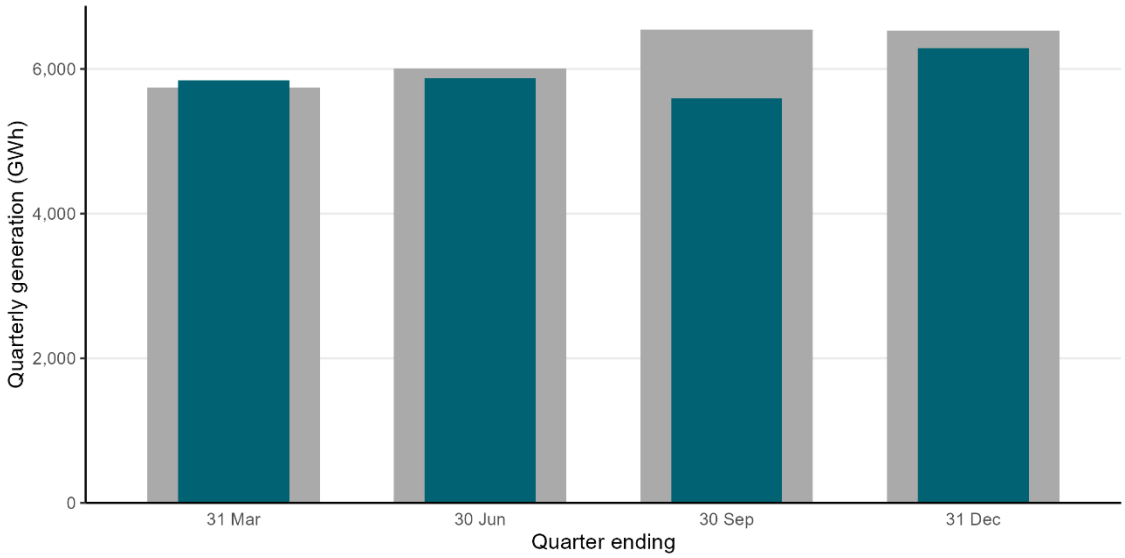


Figure 6. Quarterly hydro generation in 2024 (teal bars), compared to 2020-2024 average hydro generation for that quarter (grey bars).

Record generation from geothermal, solar, and wind

While hydro generation fell in 2024, generation from other renewable sources reached new records as newly commissioned plants lead to increased capacity (Figure 7). This helped keep the share of electricity generated from renewable sources relatively high at 85.5 per cent in 2024.

Generation from solar increased 62 per cent to its highest level on record at 601 GWh. Driving this was a significant increase in capacity due to the commissioning of several utility-scale solar farms, including Kohirā (November 2023), Naumai (May 2024), Ruawai (December 2024), and Rangitaiki (March 2024). Collectively, these plants have added 87 megawatts (MW)[2] to New Zealand's generation capacity.

New capacity additions in addition to windy conditions in parts of the year also saw generation from wind reach a new record, up 22 per cent on 2023 levels at 3,919 GWh in 2024. Contributing to this was the new 176 MW[2] Harapaki wind farm, which started commissioning in late 2023 and became fully operational in July 2024.

Geothermal generation hit a record 8,741 GWh in 2024, an increase of 13 per cent on 2023 levels. Contributing to this increase was the opening of two geothermal power plants, with Tauhara coming online in May 2024 and Te Huka 3 coming online in October 2024. Together, these plants added 225 MW[2] of geothermal capacity.

[2] Based on public announcements

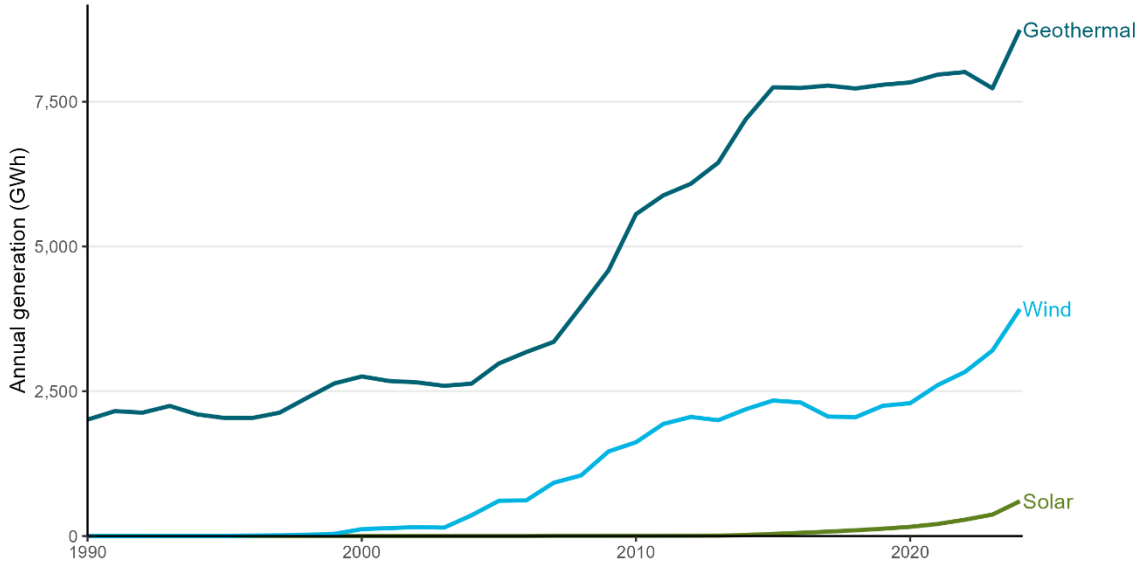


Figure 7. Electricity generation from geothermal, wind, and solar sources, by year.

Increased coal use pushes up electricity emissions

In periods of reduced generation from hydro and other renewable sources, non-renewable generation (namely coal and natural gas) are used to ensure that electricity demand can be met (Figure 8).

Reduced supply in 2024 meant that less natural gas was available for electricity generation. This saw electricity generated from gas relatively unchanged from 2023 levels, down 0.6 per cent. As a result, electricity generation from other non-renewables sources increased in 2024 to meet demand – notably during the winter months.

Electricity generation from coal increased 118 per cent on 2023 levels, to 2,243 GWh. This saw coal accounting for 5 per cent of electricity generated in 2024, up from 2 per cent in the previous year.

Generation from plants that are fuelled by oil products, such as diesel, also increased to meet demand as a range of generation sources were drawn on. Electricity generation from oil increased by 443 per cent to 25 GWh. The majority (20 GWh) of this was generated in the September 2024 quarter, which saw the highest quarterly generation from oil since the June 2008 quarter. This increase in coal and diesel saw greenhouse gas emissions from electricity generation increase in 2024.

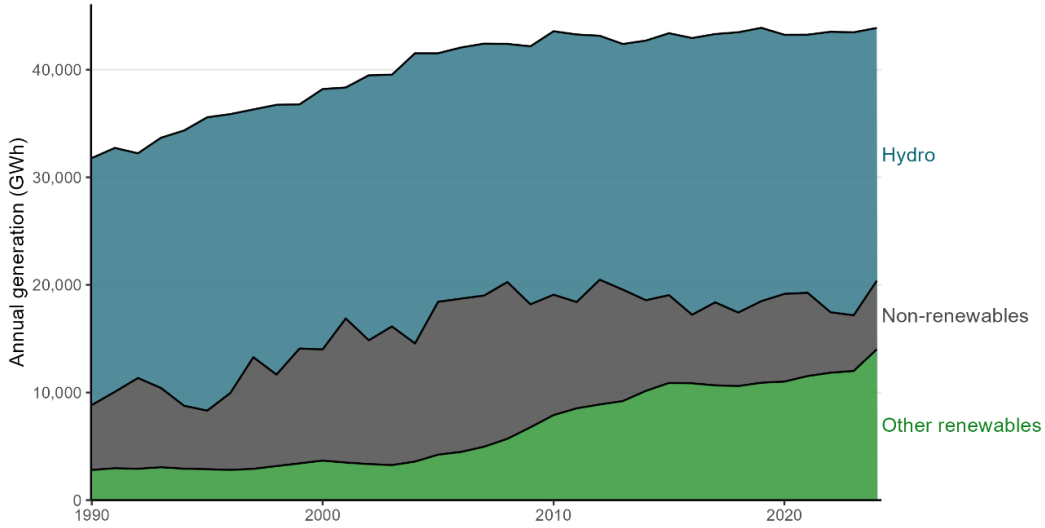


Figure 8. Generation from hydro, other renewable sources (wind, geothermal, solar, biogas, and wood), and non-renewable sources, by year.

Reduced availability of generation resources led to high wholesale electricity prices between July and early August

Wholesale electricity prices rose significantly between July and early August 2024. Contributing to this was reduced availability of generation resources and increased prices for gas-fired generation due to lower gas supply.

Falling hydro storage in mid-2024 was reflected in prices for hydro generation, which increased to reflect less available supply. When hydro generation is low, generation is often needed from thermal fuels, such as natural gas and diesel, which tend to have higher prices. To fill the gap in supply, thermal fuels increased their output, but at a higher price due to limited gas supply.

Additionally, low wind generation in early August 2024, further contributed to reduced generation and upwards pressure on wholesale electricity prices.

NATIONAL ELECTRICITY CONSUMPTION REMAINS STEADY

Electricity consumption in New Zealand in 2024 was 40,002 GWh, a 0.3 per cent increase on 2023 consumption. Consumption in the industrial and commercial sectors decreased, down 3.3 per cent and 1.0 per cent respectively. Electricity consumption by the residential sector exceeded industrial demand for the second year in a row, up 1.9 per cent on 2023 levels (Figure 9).

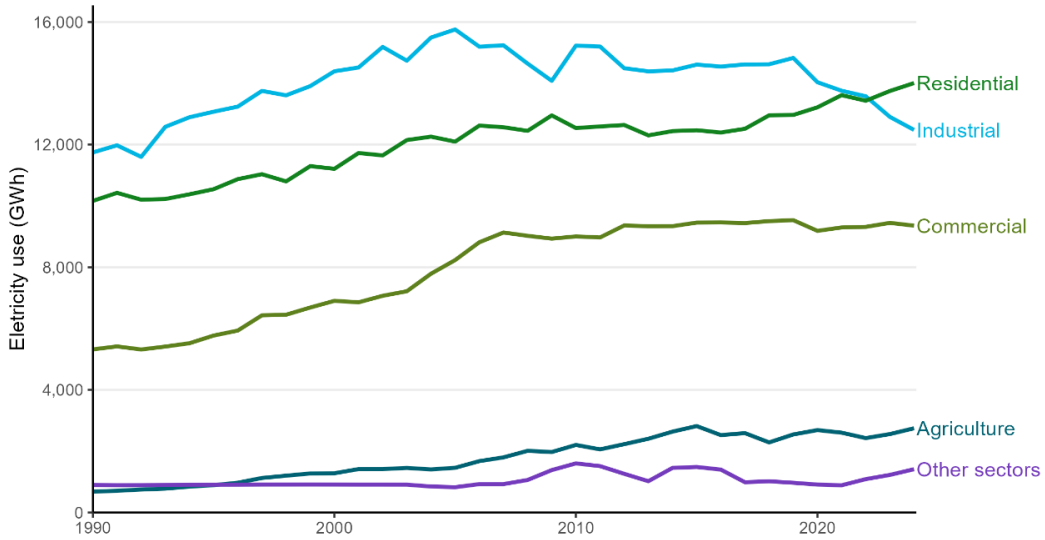


Figure 9. Electricity consumption by sector, by year. “Other sectors” includes transport, unallocated onsite generation, and unallocated demand.

Electricity use in some industrial subsectors increased due to changes in activity and fuel switching

Electricity use in the wood, pulp, and paper subsector increased 9.1 per cent (90 GWh) from 2023 levels. Contributing to this increase was the re-opening of Pan Pac’s Whirinaki site in early 2024 which had closed in early 2023 due to damage from Cyclone Gabrielle. Despite this increase, demand by this subsector is 27 per cent lower than 2022 levels.

Electricity used by the wood, pulp, and paper subsector has been trending down since 2016, with the closure of several processing facilities over recent years contributing to this. In August 2024, Winstone Pulp International announced a pause in operations at their Karioi pulp mill and Tangiwai sawmill, before announcing their official closure in September 2024. Oji Fibre Solutions confirmed the closure of their Penrose paper recycling mill in September 2024, with the closure taking place in December 2024.

Electricity consumption by the food processing sector has been steadily increasing since 2012 (Figure 10). Contributing to this growth has been electrification in the dairy processing sector, with processors switching from fossil fuels to electricity. In 2024, Mataura Valley Milk completed the installation of a new electric boiler leading to it becoming the first dairy factory in New Zealand to be all-electric.

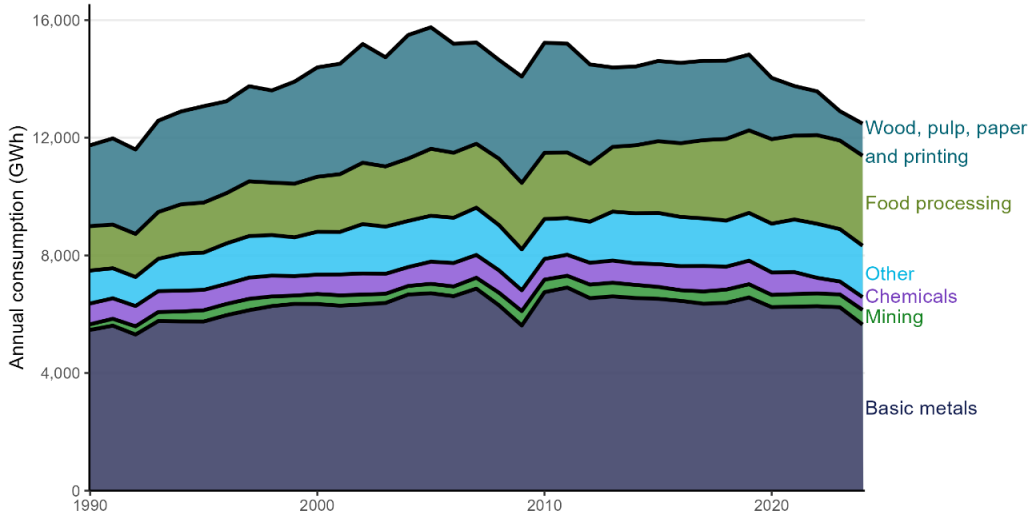


Figure 10. Industrial electricity consumption by subsector, by year.

Total industrial demand fell due to demand-side response

Despite the increased electricity use in food processing and wood, paper, and pulp subsectors, total industrial sector demand fell due to a 9.4 per cent reduction in electricity use in the basic metals subsector.

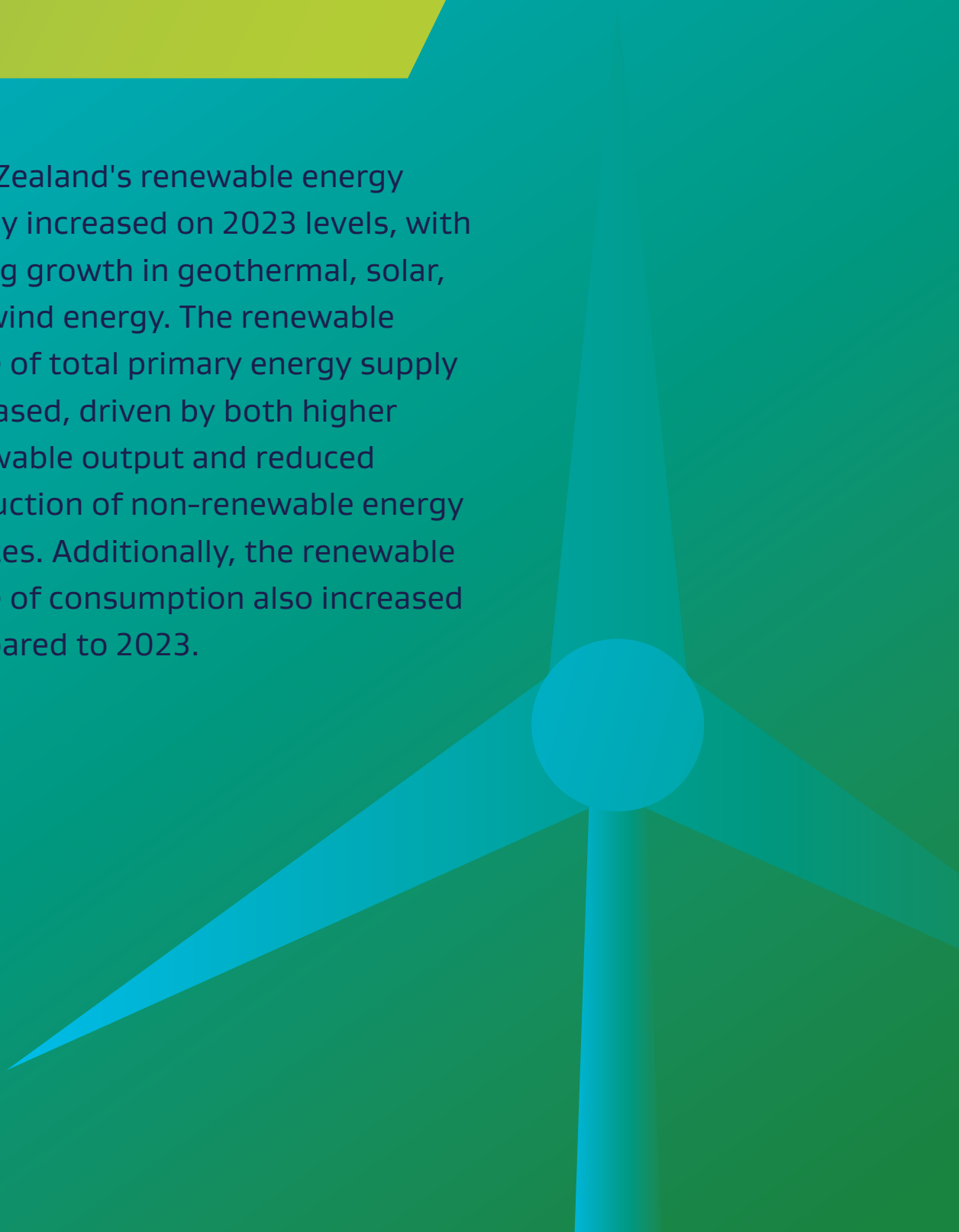
Electricity use in the basic metals subsector in 2024 was at its lowest level since 2009. The combination of low hydro inflows and decreased gas supply during the winter of 2024 saw Meridian Energy call on its demand response agreement with New Zealand Aluminium Smelters (NZAS). NZAS is the single largest user of electricity in the country, accounting for around 12 per cent of the national annual electricity consumption on average over the past decade. This agreement allows Meridian Energy the option to ask NZAS to reduce its electricity consumption at their Tiwai Point aluminium smelter, freeing up electricity to meet demand elsewhere in the country.

Over July and August 2024, Meridian Energy made a series of demand response calls to NZAS, requiring them to reduce electricity usage by a total of 185 MW from early August. A further 20 MW was then negotiated over and above the existing demand response agreement. These demand response calls saw annual electricity use by NZAS fall to its lowest level since 2009, when a transformer fault at that time resulted in the closure of one of the potlines.

C

Renewables

New Zealand's renewable energy supply increased on 2023 levels, with strong growth in geothermal, solar, and wind energy. The renewable share of total primary energy supply increased, driven by both higher renewable output and reduced production of non-renewable energy sources. Additionally, the renewable share of consumption also increased compared to 2023.



BACKGROUND

New Zealand uses renewable energy sources for electricity generation and direct use.

Electricity generation

New Zealand's renewable resources are primarily used to generate electricity in New Zealand:

- **Hydro** is used to generate electricity, with hydroelectric plants distributed across both islands. The largest plants, in terms of capacity, are found in the South Island.
- **Wind** is also used to generate electricity, with the largest wind farms found in the North Island.
- New Zealand's **geothermal** resources are almost exclusively concentrated in the central North Island, within the Taupō Volcanic Zone. There is also a geothermal field in Northland at Ngāwhā. Electricity generation plants in these locations run as baseload, meaning that they are unable to quickly adjust their generation output.
- **Solar** is a newer of source of renewable electricity generation in New Zealand. Historically, this has been in the form of 'distributed' installations such as on-site generation or use by households and businesses. Recent years have seen large 'utility-scale' solar farms coming online with some of these connected to the national electricity grid.

Direct use

Renewable energy can also be used for a range of other applications:

- **Geothermal** is used directly in industrial processes (such as drying milk powder or timber), heating greenhouses, and for residential and commercial heating. Kawerau, where geothermal steam is a significant source of energy for pulp and paper mills located there, is one of the largest locations in the world for direct use of geothermal heat.

- **Solid biofuels** refer to woody biomass, black liquor, charcoal, and firewood.
    - Many pulp and paper mills and wood processors use by-products, such as **wood residuals** and black liquor, onsite to generate heat for their processes.
    - **Black liquor** is a by-product of the wood pulping process, containing lignin, wood fibres, and chemicals. It is combusted in boilers in pulp mills and is considered to be a solid biofuel.
    - Households use smaller amounts of **charcoal** and **firewood**.

- **Liquid biofuels** are renewable, low emission fuels that can be used in place of existing fossil fuel oil products.
    - **Biodiesel** and **bioethanol** can be blended with petrol or diesel and are compatible with existing internal combustion engines and help reduce transport emissions.
    - **Sustainable Aviation Fuel (SAF)** is a jet fuel made from renewable feedstocks such as vegetable oils and animal fats and is chemically similar to fossil jet fuel.

- **Biogas** is produced from organic waste sources like wastewater, sewage, and landfills. It consists mainly of methane and carbon dioxide and is used to generate heat and electricity.
    - **Sludge gas** is derived from the anaerobic fermentation of biomass and solid wastes from sewage.
    - **Landfill gas** is derived from the anaerobic fermentation of biomass and other organic solid wastes in landfills.

RENEWABLE ENERGY PRODUCTION INCREASED IN 2024

The total supply of renewable energy increased to 379 PJ in 2024, a 16.1 PJ rise from 2023. Supply of most renewables increased except for hydro and liquid biofuels. Among these, geothermal, solar, and wind continue to reach record high levels. In contrast hydro fell to its lowest level since 2013.

New Zealand's renewable share of total primary energy supply (TPES) increased to 45.4 per cent in 2024, up from 42.9 per cent in 2023. This has been driven by a combination of increases in renewable energy production and decreases in non-renewable energy production. Renewable energy production increased 4.42 per cent from 363 PJ in 2023 to 379 PJ in 2024, while non-renewable energy production decreased 5.6 per cent from 483 PJ to 456 PJ.

USE OF RENEWABLE ENERGY INCREASES

Direct use of renewable energy increased by 4.07 per cent from 32.5 PJ in 2023 to 33.8 PJ in 2024. This was largely driven by a 6.17 per cent increase in industrial sector direct use of renewable energy from 21.4 PJ in 2023 to 22.7 PJ in 2024.

Solid biofuel production has recovered slightly from a 30-year low following Cyclone Gabrielle. Pan Pac's Whirinaki site near Napier paused operations in February 2023 as the cyclone lead to flooding. The site was shut down in February 2023 due to damage caused by this flooding. Operations were resumed in a phased approach, with major facilities like the chip mill, sawmill, and pulp mill gradually resuming operations after August 2023.

Wood residuals are a type of solid biofuel used in New Zealand that are by-products of sawmilling and pulp production and are typically used on-site. Use of wood residuals has been trending down in recent years, with the closures of mills contributing to this.

RENEWABLE ELECTRICITY GENERATION CAPACITY CONTINUES TO GROW

Collectively, electricity generation capacity from renewables increased 7 per cent from 2023 to 8,728 MW in 2024. This was a 17 per cent increase from 5 years ago (Figure 11).

Geothermal electricity capacity increased in 2024, up 21 per cent from 2023. Driving the increase was the opening of two new geothermal power stations. Contact Energy's Tauhara power station came online in May 2024, ahead of full commissioning activity to support the electricity system in meeting demand during a cold period. In October 2024, commissioning activity started at Contact Energy's Te Huka 3 geothermal power station, during which generation from this plant was supplied to the grid for the first time.

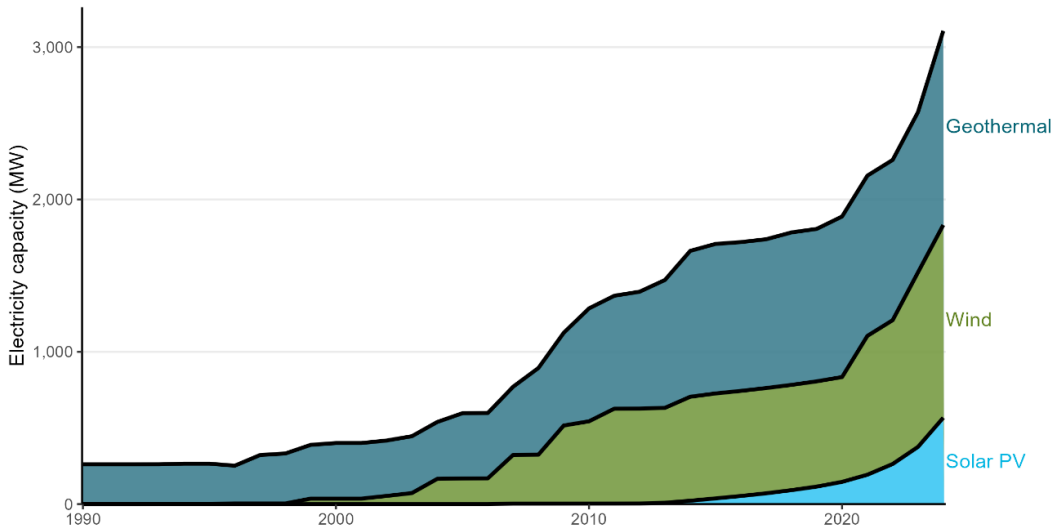


Figure 11. Electricity generation capacity for solar photovolatic, wind, and geothermal generation, by year.

Solar photovoltaic (PV) capacity increased 51 per cent from 2023 to 2024. Contributing to this was the opening of solar farms such as Lodestone Energy's Rangitaiki Solar Farm in March 2024, Newpower Energy's Naumai solar farm in May 2024 and Northpower's Ruawai solar farm (December 2024). In addition to new utility-scale solar farms, distributed solar capacity also increased. Based on installed distributed generation trends published by the Electricity Authority, total installed capacity of residential solar (covering connections with and without batteries) increased 29 per cent over the 2024 calendar year, increasing from 251 MW to 323 MW.

Wind generation capacity has nearly doubled over the past 5 years from 688 MW of installed capacity in 2020 to 1265 MW of installed capacity in 2024. Contributing to this has been four new wind farms coming online over the past five years, Harapaki**Error! Bookmark not defined.**, Kaiwera Downs, Turitea, and Waipipi. The upward trend continued in 2024 with wind capacity increasing 10 per cent from 2023 to 2024.

Table 1. New plant capacity from November 2023 – December 2024

Plant Name	Type	Capacity[3]
Naumai	Solar	4.8 MW
Te Huka Unit 3	Geothermal	51.4 MW
Tauhara	Geothermal	174 MW
Rangitaiki	Solar	32 MWp[4]
Kohirā	Solar	33 MWp[4]
Harapaki	Wind	176 MW

[3] Based on public announcements

[4] MWp (megawatt peak) refers to the maximum rated capacity that can be produced under ideal test conditions.

D

Coal

Slips and a partial tunnel collapse disrupted both exports and production of coal in 2024. At the same time, coal imports increased as Genesis rebuilt its stockpile at the Huntly Power Station.

While coal use for electricity generation increased in 2024, use in other applications continued to decline, primarily driven by lower industrial coal consumption.

BACKGROUND

New Zealand has extensive coal resources, mainly in the Waikato and Taranaki regions of the North Island, the West Coast, Otago, and Southland regions of the South Island.

New Zealand's coal market can be divided into three distinct geological areas:

- In the **North Island**, coal production is centred in the Waikato region where large coalfields produce sub-bituminous coal. This coal is suitable for heating and electricity generation, but it is generally not high enough quality to be used in metallurgical applications (that is, the production of iron and steel). One of the main users of this coal is the steel mill in Glenbrook, south-east of Auckland. Unlike other steel mills, the Glenbrook mill can use thermal-grade coal in the production of iron and steel due to the unique processes employed at the facility.
- Most coal extracted on the **West Coast** of the South Island is generally classified as bituminous, which has higher energy content than the sub-bituminous coal mined in the North Island. Most of this bituminous coal is exported for use in the production of iron and steel. Sub-bituminous coal from the West Coast is used locally or within the northern half of the South Island.
- The **rest of the South Island** tends to produce either sub-bituminous coal or the even lower-energy lignite. Lignite has a lower energy content and is generally sold to dairy and meat processing plants in the South Island and to households and companies for heating.

Coal is used in New Zealand for **energy use**: the coal is burned to provide heat whether that heat is used to dry milk powder, power a steam engine, run a boiler, or heat a house.

There are also two other major uses of coal in New Zealand:

- At the Huntly Power Station, the energy in the combusted coal is used to drive turbines which generate electricity.
- At the Glenbrook steel mill, coal is used as a reducing agent converting magnetite in ironsand to metallic iron. While it may provide energy, its primary purpose is as a reagent in a chemical reaction meaning that it is not classified as energy use.

COAL PRODUCTION AND EXPORTS FALL DUE TO CLOSURES OF TRANSPORT ROUTES

Coal production and exports fell in 2024, with the closure of a major transport route contributing to this. In June 2024, the Tawhai Tunnel on the route between the Stockton mine to Lyttleton Port was closed following a partial collapse. This led to the closure of the rail line linking the mine and the port, a main route for moving export-bound coal. The closure of the tunnel for the rest of 2024 saw road-based freight being used to bypass the tunnel, although this was at a lower volume. October 2024 saw further disruptions to supply routes, with a slip in the Buller Gorge causing the rail line to fully close for several weeks.

The rail line closures also meant coal could not be sent down from the mines via the aerial transport system to the rail loading facilities[6]. As a result, production was limited whenever the rail line was not operational, which impacted production volumes for the year as well.

Coal production in 2024 fell 3.64 per cent from 65.78 PJ in 2023 to 63.38 PJ in 2024. Exports also fell by 9.78 per cent, from 36.74 PJ to 33.15 PJ, reflecting the reduced capacity to transport coal to ports and international markets (Figure 12).

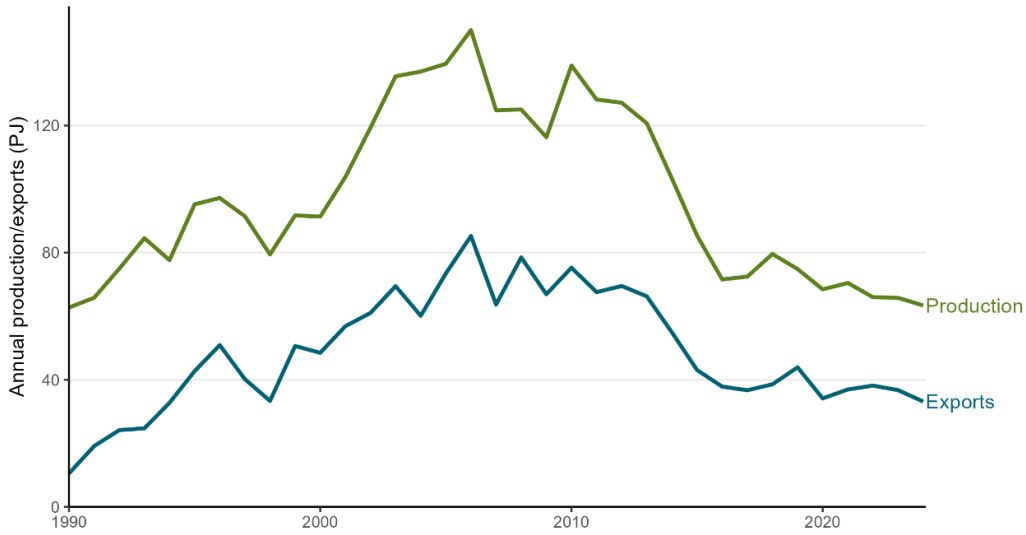


Figure 12. Total coal production and exports, by year.

[6] https://bathurst.co.nz/assets/reports/Bathurst-AnnualReport-2024-Final-FA-DIGITAL.pdf

GAS SUPPLY UNCERTAINTY LEADS TO COAL STOCKPILE INCREASE

Genesis' Huntly Power Station, New Zealand's only coal-fired power plant, sources most of its coal from mines in Indonesia. Uncertainty around domestic gas supply saw Genesis announce in May 2024 that it would resume imports of coal to increase its stockpile[7]. As a result, coal imports increased by 311 per cent up from 5.39 PJ in 2023 to 22.15 PJ in 2024 (Figure 13)**.** The majority of this was sub-bituminous coal, the type used at Huntly. Imports of bituminous coal, which is typically used in industrial manufacturing, also increased, nearly doubling from 1.14 PJ in 2023 to 2.22 PJ in 2024.

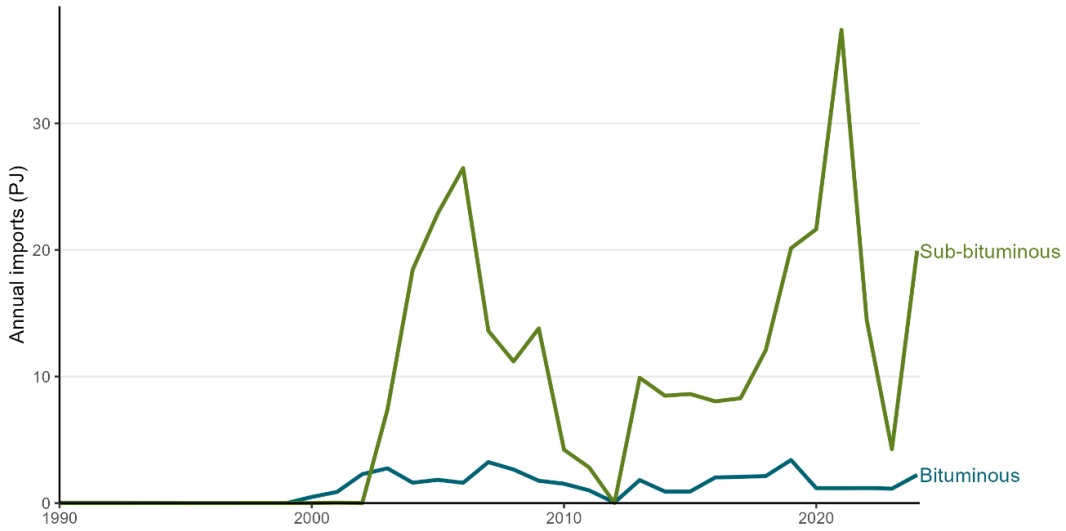


Figure 13. Coal imports by year and energy type. New Zealand does not import lignite.

COAL USE FOR ELECTRICITY INCREASES, BUT OTHER USE CONTINUES DOWNWARD TREND

Electricity generation from coal saw a large increase in 2024, driven by a combination of unfavourable hydro conditions and lower gas supply. Coal use in electricity generation rose by 225 per cent, from 5.68 PJ in 2023 to 18.47 PJ in 2024, more than tripling year-on-year.

Coal used in the rest of the economy continued its long-term decline, falling from 18.64 PJ in 2023 to 17.22 PJ in 2024. This was primarily driven by reductions in industrial use.

Industrial coal consumption dropped from 16.41 PJ to 15.32 PJ (Figure 14). Contributing to this is a reduction in coal use for food manufacturing. Notably, Fonterra has been transitioning away from coal in its manufacturing processes, with coal boilers at several of its facilities being replaced by electrode boilers or switching to using wood pellets. Their last coal boiler in the North Island was turned off in November 2024.

Coal used in steel production, another major use of coal in New Zealand, experienced a slight decrease from 9.68 PJ to 9.45 PJ. The agriculture, forestry, and fishing sector also saw a modest decline in coal use, from 1.61 PJ to 1.40 PJ, while residential consumption remained relatively stable.

[7] https://www.genesisenergy.co.nz/about/news/genesis-increases-coal-stockpile-for-winter-amid-gas-shortage

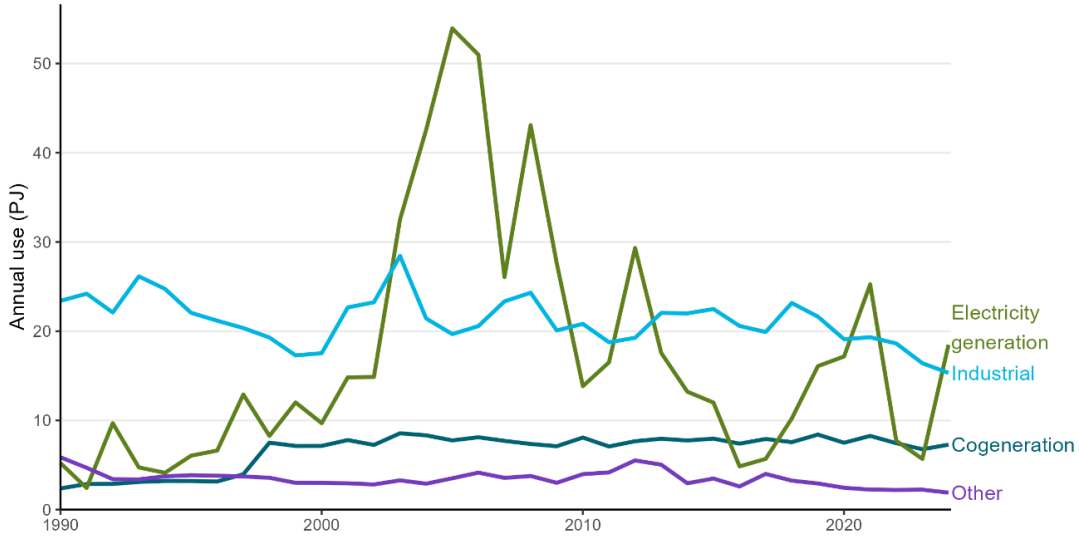
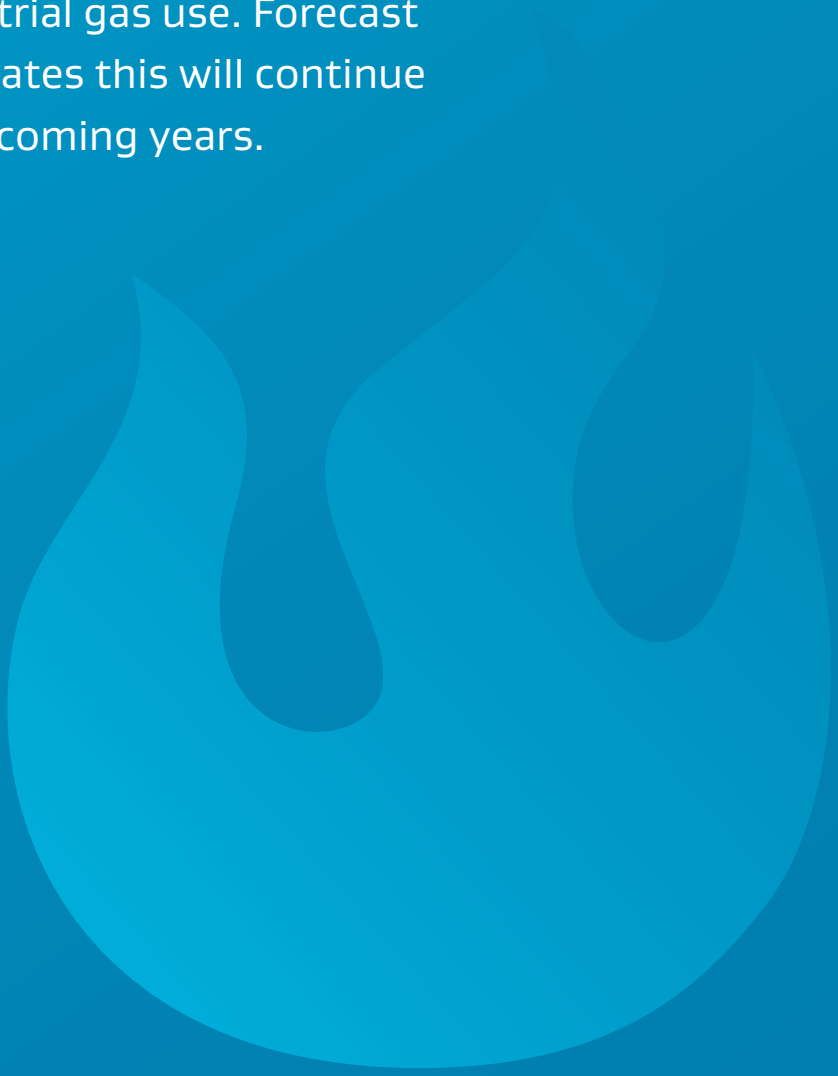


Figure 14. Coal use by sector and year.

E

Gas

Natural gas production decreased in 2024 because of faster-than-expected natural field decline, most notably impacting industrial gas use. Forecast production indicates this will continue throughout the coming years.



BACKGROUND

New Zealand's natural gas fields are concentrated around and off the coast of the Taranaki region (Figure 15). New Zealand has no facilities to import or export natural gas, which means that all natural gas produced in the country is used domestically, and that any decline in gas supply is met by a decline in demand. Most of the gas produced by these fields is injected into a transmission network that delivers gas to major centres in the North Island[8]. New Zealand's only large-scale natural gas storage facility is at Ahuroa.

In New Zealand, natural gas is used for several applications, including:

- as a feedstock for chemical processes (that is, being used for its chemical properties, rather than being burned for energy)
- for electricity generation
- for high-temperature industrial process heat
- for operating boilers and heaters in hospitals, schools, and other large facilities
- for residential cooking and heating.

The largest user of natural gas in New Zealand is Methanex, which uses natural gas as both a feedstock to produce methanol and a source of energy. While some large users have direct connections to natural gas fields, most users draw natural gas from the transmission network.

[8] The South Island has no natural gas transmission network

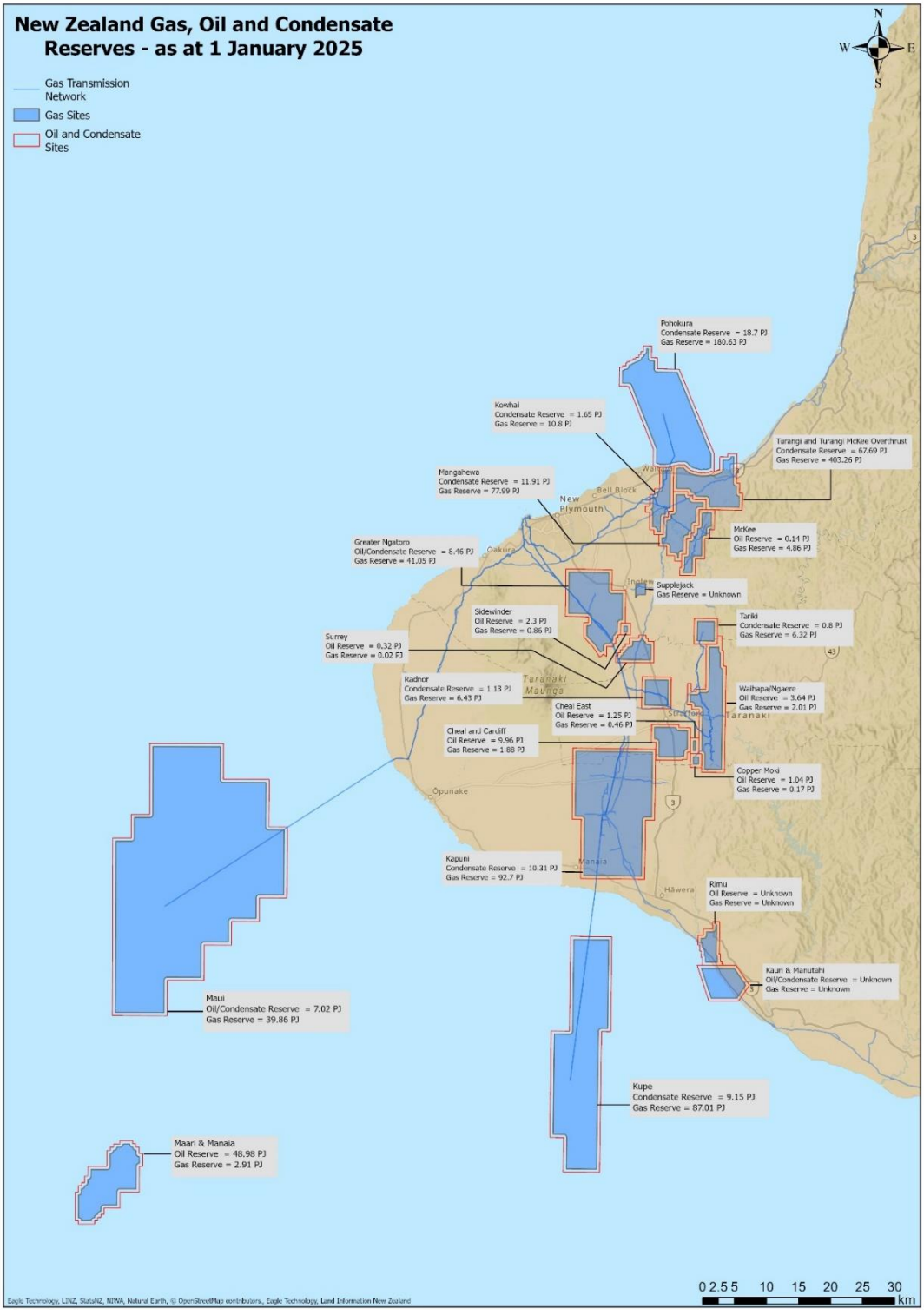


Figure 15. New Zealand's active oil and gas fields, and their remaining reserves as at 1 January 2025.

GAS PRODUCTION DROPS BELOW EXPECTED LEVELS

Gas supply[9] for 2024 was 115.70 PJ, a decrease of 20.9 per cent (29.04 PJ) on 2023 levels, mainly due to natural field decline. The most significant drops were observed for the Maui and Pohokura fields.

Gas field operators provide an expectation of future production through MBIE's Petroleum Reserves[10], which considers natural field decline, expected levels of extraction, and field development projects. Gas production per field in 2024, compared against expected production as 1 January 2024, is shown in Figure 16. This shows that contributing to the drop in production was several fields not meeting their production expectations. This includes Kupe's KS-9 well, which started production in January 2023 and was predicted to increase the field's annual output by approximately 10 PJ. Additional reductions in production were the result of lower-than-expected deliverability from Maui and Pohokura fields, combined with several unplanned outages in 2024 (at the Kupe, Kapuni, Maui, and Pohokura fields).

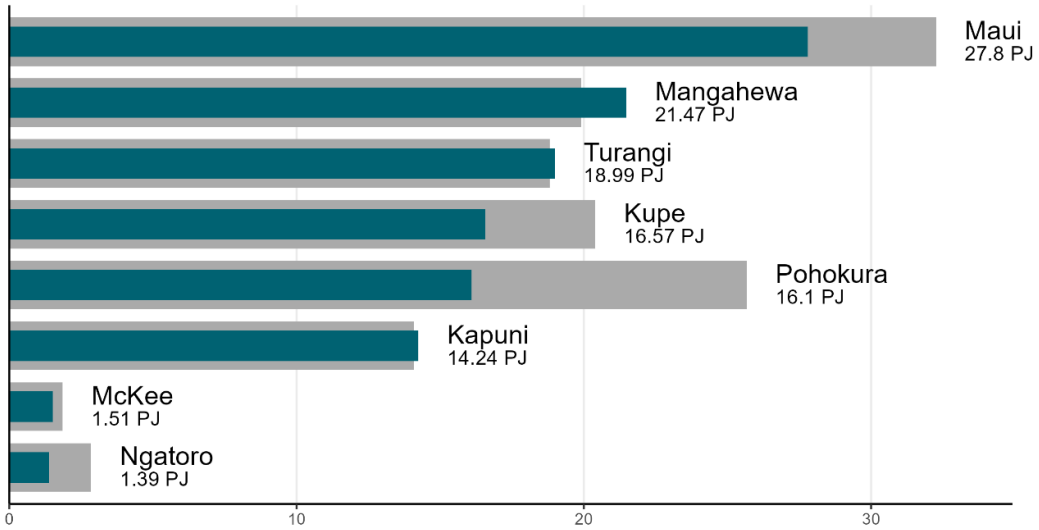


Figure 16. Natural gas net production (teal bars) versus predicted production from Petroleum Reserves as at 1 January 2024 (grey bars). Figures show actual production for 2024. Fields whose annual production was <1 PJ are not shown.

GAS USERS RESPOND TO LOWER SUPPLY

Total gas use in the economy (including use as a feedstock, energy use of gas, and gas use in electricity generation) was 117.73 PJ in 2024, a decrease of 22 per cent on 2023 use (Figure 17). This decrease was driven mainly by a decrease in use at Methanex, which reduced its operations in response to low gas deliverability in early 2024 before idling its Motunui plant completely between August and October. This in turn freed up natural gas for use in electricity generation during the third quarter of 2024, when hydro inflows were particularly low.

[9] Gas supply is equal to gross production minus gas reinjected, LPG extracted, gas flaring, and own use. It is a useful measure of the amount of produced which is available to the market.

[10] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/petroleum-reserves-data

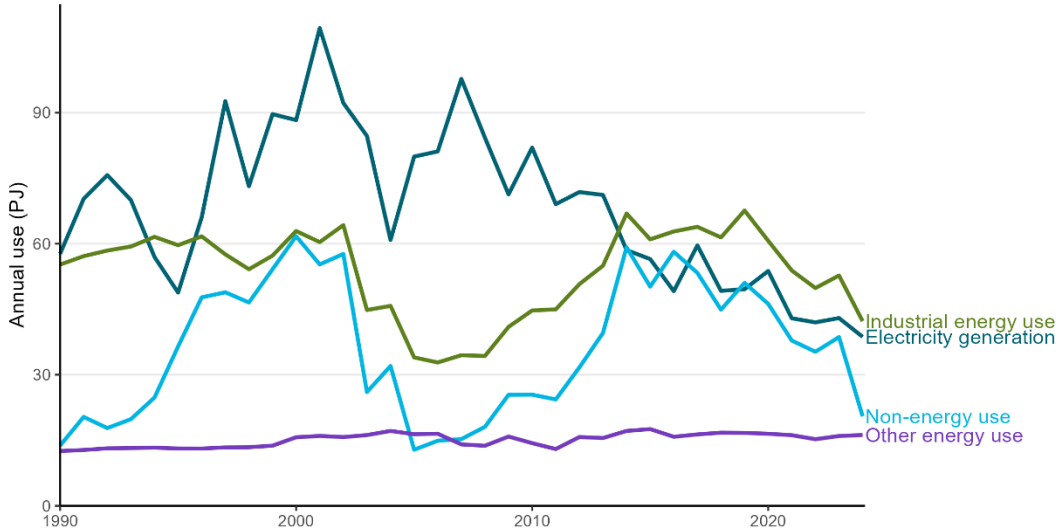


Figure 17. Natural gas use by sector over time. This plot does not show other transformation of gas, which was only prevalent until 1997.

RESERVES DATA SHOWS OUR GAS SUPPLY IS FALLING FASTER THAN PREVIOUSLY EXPECTED

Natural gas reserves provide an indication of the amount of gas that can be extracted from existing gas fields[11]. New Zealand's natural gas reserves as at 1 January 2025 were estimated to be 948 PJ, a drop of 27 per cent on 1 January 2024 figures. While some of this drop was due to natural gas extracted for use over the course of 2024, around 66 per cent of the drop is due to gas field operators revising their estimates of field reserves. This may occur, for example, when gas field operators perform more detailed surveys on reservoirs, or when development projects provide operators with a better idea of how much gas they are able to extract from a given reservoir.

Production profile data also indicates that production will continue to decrease year-on-year (Figure 18), with annual production likely dropping below 100 PJ in the next two years. This contrasts with previous production profiles, which had predicted an increase in production around 2025 as development projects were expected to mature (Figure 19). Since around 2020, this expected increase has been revised downward multiple times as new developments have failed to meet production expectations.

[11] All petroleum permit holders are required to submit data on remaining reserves as well as expected future production profiles (a forecast of annual production based on existing development plans and field data) to MBIE on an annual basis, and this data is published as MBIE's Petroleum Reserves data. Find MBIE's Petroleum Reserves data here: https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/petroleum-reserves-data

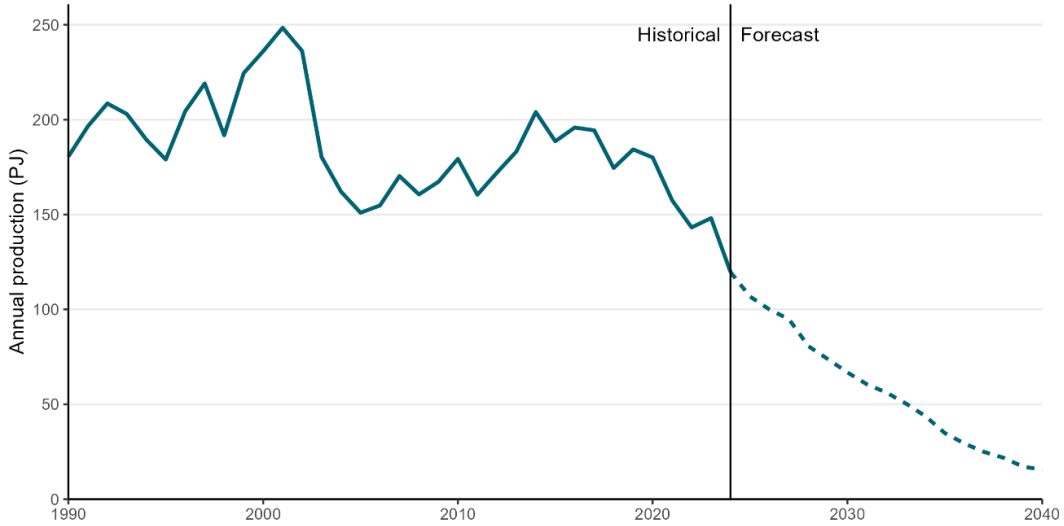


Figure 18. Gas net production (solid line) and forecast production (dashed line) based on production profile data.

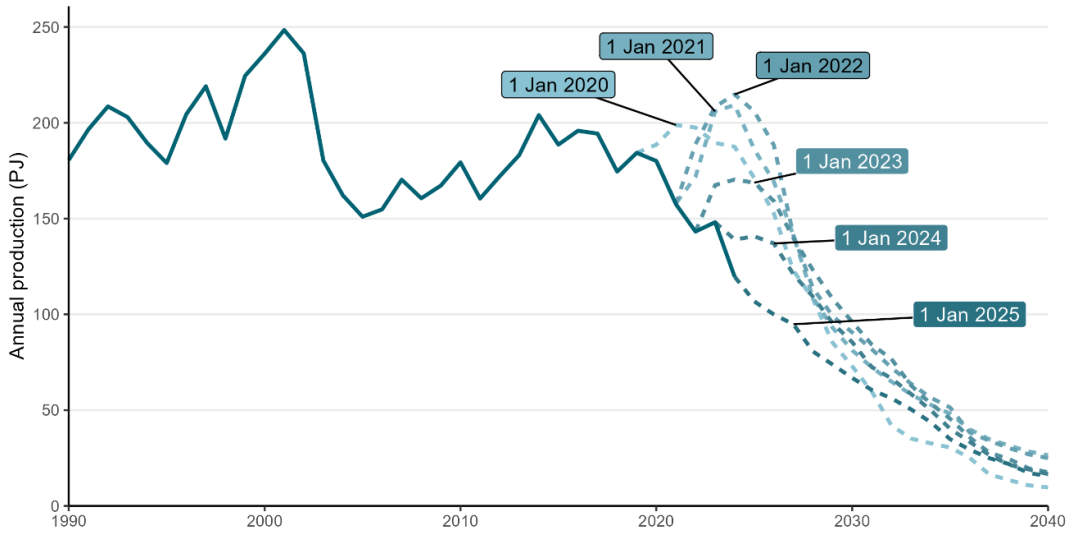


Figure 19. Gas production profiles as reported from 1 January 2020 through 1 January 2025.

F

Oil

Domestic consumption of oil products remains steady, with declines in commercial sector use counteracting an increase in residential and agricultural use. International transport fuel use continues to increase as travel recovers from the impacts of the coronavirus (COVID-19) pandemic.

BACKGROUND

Oil can refer to a wide range of different products, including

- crude oil extracted from oil fields.
- refined fuels like petrol, diesel, and jet fuel, which are produced through refining crude oil.

New Zealand's crude oil fields are concentrated both within, and just off the shore of, the Taranaki region (Figure 15). Crude oil extracted in New Zealand is bound entirely for the export market.

Even when New Zealand had the capacity to refine crude oil, almost all New Zealand crude was exported as it wasn't suitable for the capabilities of the refinery. Until 2021, the country's sole refinery operated at Marsden Point, north of Auckland. This refinery produced several types of refined fuels (mainly petrol, diesel, and jet fuel) from imported crude oil, usually sourced from the Middle East. On 31 March 2022 the refinery shut down for economic reasons and the facility switched to a fuel import terminal only.

Since the closure of the Marsden Point refinery, New Zealand's imports of crude oil have dropped to zero, with imports of refined products rising to cover the shortfall. Five companies currently import fuel for sale in New Zealand: Z Energy, BP, Mobil, Gull, and Tasman Fuels. These companies sell fuel both directly to consumers and to independent fuel resellers.

CRUDE OIL PRODUCTION CONTINUES TO DECLINE

Crude oil production for 2024 totalled 694.83 kt, a decrease of 14 per cent (117 kt) on 2023 figures. Most fields saw decreases in year-on-year production due to ongoing natural decline, with the exceptions (Kapuni and Ngatoro) unable to make up for losses across other fields (Table 2).

Table 2. Crude oil production for all major oil fields in New Zealand. Fields whose annual production in 2024 was less than 10 kt are not shown.

Field	2024 production (kt)	2023 production (kt)	% change
Maari	221.25	221.8	▼<1%
Maui	122.01	165.03	▼26%
Kapuni	71.08	61.17	▲16%
Turangi	66.88	75.74	▼12%
Mangahewa	58.04	85.17	▼32%
Pohokura	53.07	88.09	▼40%
Cheal	40.77	54.13	▼25%
Kupe	39.13	40.73	▼4%
Ngatoro	13.44	8.19	▲64%

The Maari field was the largest contributor to New Zealand's crude oil production in 2024, comprising 32 per cent of all crude oil production (Figure 20). The Maari field started production in 2009, and has been the largest contributor to crude oil production since 2015.

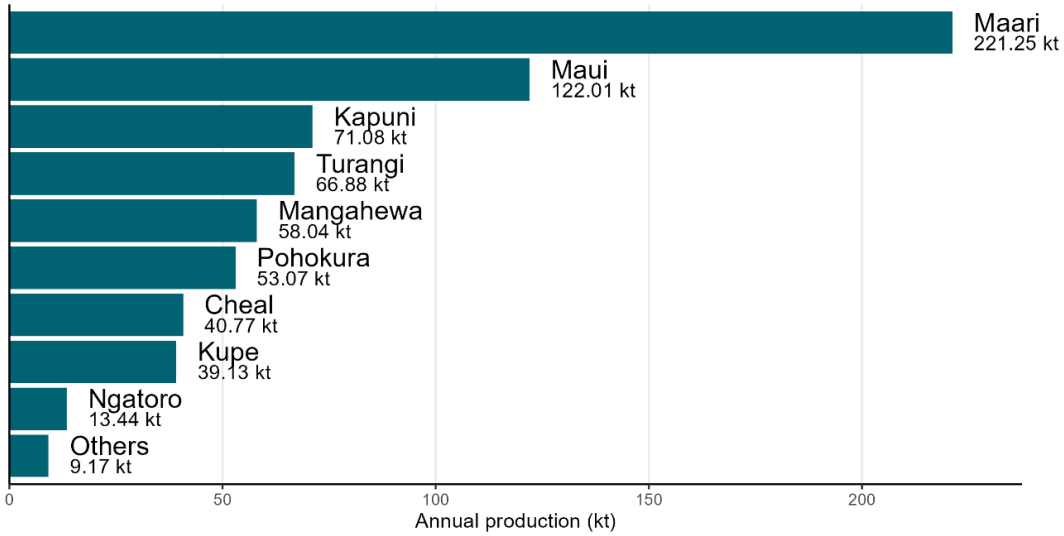


Figure 20. Crude oil production by field for 2024.

INTERNATIONAL TRANSPORT FUEL USE RISES AS INTERNATIONAL TRAVEL CONTINUES TO RECOVER FROM COVID-19

Fuel use for international transport totalled 1,289 kt in 2024, an increase of 15 per cent (166 kt) on 2023 figures. This includes fuel for international aviation (including jet fuel) and international shipping (including diesel and fuel oil). Jet fuel use increased by 16 per cent (153 kt) on 2023 figures, while fuel oil increased by 9 per cent (10 kt).

International transport was significantly disrupted in 2020 due to border closures implemented in response to the coronavirus (COVID-19) pandemic. Fuel use for both international aviation and international shipping has been recovering in the years since. Jet fuel use for international aviation in 2024 was still only 92 per cent of pre-pandemic levels (based on average use for 2017-2019) while international flight numbers[12] were at 90 per cent of pre-pandemic levels (Figure 21).

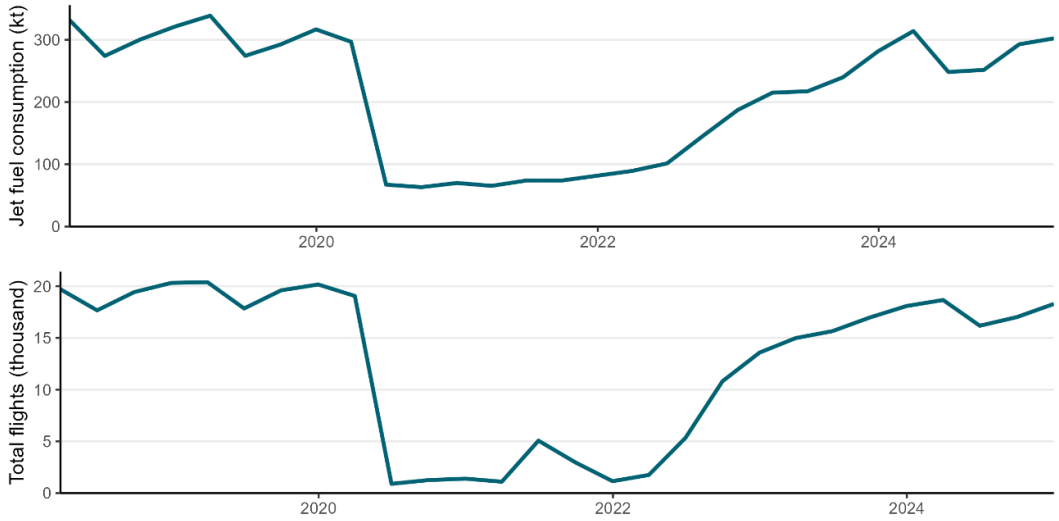


Figure 21. Jet fuel use for international transport (top) compared to international flight numbers (bottom). Flight data provided by Cirium.

DOMESTIC OIL CONSUMPTION STAYS STEADY

Total domestic consumption for petrol, diesel, and jet fuel has stayed relatively level when compared to 2023 usage. Oil use in the agriculture, forestry and fishing sector decreased by 17.0 per cent (69.8 kt) on 2023, driven by a combined drop in petrol and diesel use. Industrial and commercial use of oil also fell, by 18.6 per cent (82.8 kt) and 34 per cent (78.9 kt) respectively (Figure 22). This decrease was counteracted by increased in residential use (up 9.5 per cent, or 41.3 kt) and domestic transport (up 4.0 per cent, or 175.0 kt).

[12] Based on flight data provided by Cirium.

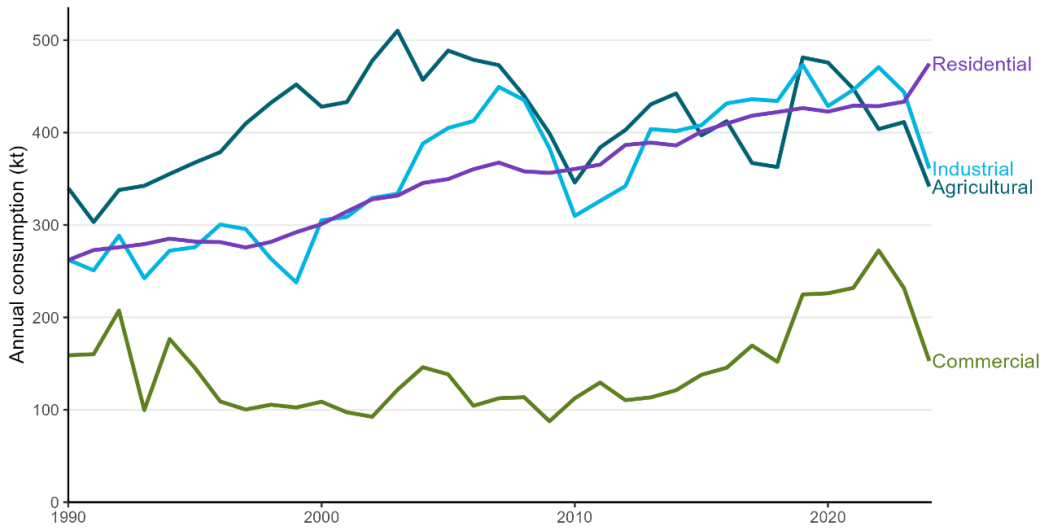


Figure 22. Domestic (non-transport) oil consumption by sector over time.

Domestic transport accounts for almost three quarters of all domestic consumption of oil products in New Zealand. As a result, small changes in domestic transport fuel use can have marked effects on overall oil product consumption. Petrol use for domestic transport is usually linked to private vehicle use (for example, commuting and private transport), while diesel use is driven by commercial activity (such as freight transport by trucks and vans).

In 2024, petrol use for transport decreased by 0.6 per cent (10.6 kt) on 2023 levels, while diesel increased by 8.1 per cent (183.5 kt) (Figure 23). Petrol use remains below pre-pandemic levels, which may indicate behaviour changes resulting from the pandemic such as working from home. In contrast, diesel use for domestic transport is now 17.5 per cent higher than it was in 2019 levels, reflecting the continuing economic recovery from the pandemic.

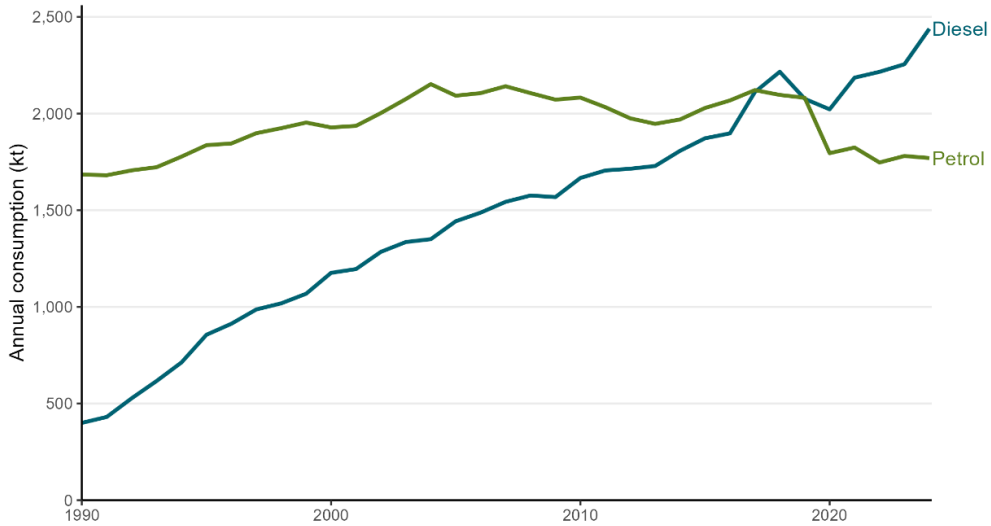


Figure 23. Petrol and diesel use for domestic transport over time.

FUEL PRICES DROP, DRIVEN BY INTERNATIONAL FACTORS AND REMOVAL OF REGIONAL FUEL TAX

Petrol prices for the final quarter of 2024 were 274.00 cents per litre (c/L) for premium petrol and 254.70 c/L for regular petrol, a decrease of 11 per cent (when adjusted for inflation) on the same quarter of the previous year. Diesel prices also dropped, with retail diesel dropping 19 per cent to 183.70 c/L and commercial diesel dropping 15 per cent to 146.09 c/L[13] (Figure 24).

Fuel prices experienced significant spikes in 2022 and 2023 due to the Russian invasion of Ukraine and the Israel-Hamas conflict respectively. These conflicts drove up international oil prices as they threatened international supply of crude oil, resulting in higher domestic fuel prices. In contrast, slowing global oil demand growth, coupled with increasing global oil supply, led to lower prices during 2024[14].

Figure 24. Petrol and diesel prices over time, adjusted for inflation. All values are in December 2024 prices.

In July 2024, the Government removed the legislative framework for regional fuel taxes, which in turn led to the repeal of Auckland's regional fuel tax. The Auckland scheme started operation on 1 July 2018 and imposed a tax of 10 c/L (11.5 c/L including GST) on all petrol and diesel distributed in the Auckland region. With the removal of the Auckland Regional Fuel Tax, fuel prices in the Auckland region dropped by between 8 and 11 c/L, indicating that the removal of the tax was carried through to consumers[15].

[13] Commercial diesel prices are exclusive of the goods and services tax (GST)

[14] IEA Oil Market Report, 12 December 2024. https://iea.blob.core.windows.net/assets/209af090-8713-42b6-ac5b-650c6e68bccc/-12DEC2024_OilMarketReport.pdf

[15] https://comcom.govt.nz/__data/assets/pdf_file/0024/361356/Removal-of-Auckland-Regional-Fuel-Tax.pdf

G

Balance tables

BACKGROUND

Domestic energy supply is derived from either indigenous production or imported from overseas sources. In turn, energy types can be transformed into different forms of energy at the cost of losses and inefficiencies, which vary by the transformation process used. Supply, demand, losses, and inefficiencies are reflected in balanced energy supply and demand tables.

Both the energy supply and demand sections of the energy balance tables are calculated from surveys that span different sources. An imbalance exists between demand calculated from reported supply data, and demand observed from reported consumption data.

Energy supply

Total primary energy supply (TPES) is the amount of energy available for use in New Zealand. Much of it is converted into other forms of energy before it is used.

By convention, fuel used for international transport is excluded from TPES. International transport includes international sea and air transport but excludes coastal shipping, national air transport, and all land transport.

Indigenous natural gas production does not include natural gas that is flared, reinjected, or extracted as LPG.

The primary energy figures presented are actual data, except for some that go into electricity generation as detailed under energy transformation.

Energy transformation

Energy transformation includes:

- generation of electricity, including cogeneration
- oil production, including refinery operations and the manufacture of synthetic fuel from natural gas[16]
- other transformation, primarily in the production of steel.

In the Energy Transformation section of the balance tables, ‘energy in’ is shown as negative values and ’energy out’ as positive values in the appropriate columns.

Transformation of energy from one form to another always results in conversion losses, particularly in thermal electricity generation, as much energy is lost as heat. Transformation losses in electricity generation are calculated using the net electricity generated, with the actual input being used where available. Input to electricity generation from biogas, hydro, wind, and waste heat are fully estimated. Quarterly figures for electricity generation are made up of actual data from major generators and the Electricity Authority. Estimates are made where actual data are unavailable at the time of publishing.

Liquid biofuel production (bioethanol and biodiesel) appears as renewable energy supply in the energy balance tables. As bioethanol and biodiesel are generally blended with motor petrol and

[16] Methanex stopped the production of methanol to petrol in April 1999, while Refining New Zealand stopped the production of refined oil products from crude oil in April 2022.

diesel before consumption, liquid biofuel also appears in Energy Transformation under Fuel Production.

Consumer energy demand

Consumer energy is the amount of energy consumed by final users. It excludes energy used or lost in the process of transforming energy into other forms and in bringing the energy to the final consumers.

Consumer energy statistics can either be calculated from supply-side data or observed from usage data.

- *Consumer energy (calculated)* forms the top half of the energy balance tables. It is calculated as TPES less energy transformation less non-energy use.
- *Consumer energy (observed)* forms the bottom half of the energy balance tables. It represents reported demand in the agricultural, industrial, commercial, transport, and residential sectors. Apart from domestic use of energy for on-road, rail, sea, and air transport in the transport sector, these sectors follow the Australia New Zealand Standard Industrial Classification 2006 definitions. Estimates of on-site cogeneration demand are included in electricity end-use.

Where the energy end-use is not available or confidential, the 'unallocated' category is used.

Statistical differences

Statistical differences show the difference between 'consumer energy (calculated)' and 'consumer energy (observed)'. This difference is shown at the bottom of the energy balance tables.

		Coal					Oil								Natural Gas
		Bituminous	Sub-bitum.	Bituminous & Sub-bitum.	Lignite	Total	Crudes/ Feedstocks/ NGL	LPG	Petrol	Diesel	Fuel Oil	Av. Fuel/ Kero	Others	Total	Total
SUPPLY	Indigenous Production	36.50	22.46	58.96	4.42	**63.38**	32.19	6.91	-	-	-	-	-	**39.11**	**119.64**
	+ Imports	2.22	19.93	22.15	-	**22.15**	0.05	1.67	100.69	146.99	7.03	67.91	12.44	**336.78**	**-**
	- Exports	32.89	0.26	33.15	-	**33.15**	30.97	-	-	-	-	-	-	**30.97**	**-**
	- Stock Change	3.06	(2.99)	0.07	0.06	**0.13**	(1.05)	(0.05)	0.28	0.70	0.65	(0.39)	0.62	**0.76**	**1.74**
	- International Transport	-	-	-	-	**-**	-	-	0.00	3.07	4.91	51.30	0.17	**59.45**	**-**
	TOTAL PRIMARY ENERGY	**2.77**	**45.12**	**47.90**	**4.36**	**52.26**	**2.33**	**8.63**	**100.41**	**143.21**	**1.47**	**16.99**	**11.65**	**284.71**	**117.89**
	ENERGY TRANSFORMATION	**(0.33)**	**(35.54)**	**(35.87)**	**-**	**(35.87)**	**0.49**	**-**	**0.08**	**(0.09)**	**0.44**	**(0.14)**	**0.03**	**0.81**	**(43.19)**
	Electricity Generation	-	(18.47)	(18.47)	-	**(18.47)**	-	-	-	(0.31)	-	-	-	**(0.31)**	**(29.63)**
	Cogeneration	-	(7.28)	(7.28)	-	**(7.28)**	-	-	-	-	-	-	-	**-**	**(9.04)**
	Fuel Production	-	-	-	-	**-**	0.49	-	0.14	0.24	(0.17)	0.04	(0.12)	**0.63**	**-**
	Other Transformation	-	(9.45)	(9.45)	-	**(9.45)**	-	-	-	-	-	-	-	**-**	**-**
	Losses and Own Use	(0.33)	(0.35)	(0.67)	-	**(0.67)**	-	-	(0.06)	(0.03)	0.60	(0.17)	0.15	**0.49**	**(4.52)**
	Non-energy Use	**-**	**-**	-	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**(11.81)**	**(11.81)**	**(20.49)**
CONSUMER ENERGY (calculated)		**2.45**	**9.58**	**12.03**	**4.36**	**16.39**	**2.82**	**8.63**	**100.49**	**143.12**	**1.91**	**16.86**	**(0.12)**	**273.71**	**54.21**
DEMAND	**Agriculture, Forestry and Fishing**	**0.03**	**1.36**	**1.39**	**0.01**	**1.40**		**0.12**	**2.41**	**15.66**	**-**	**-**		**18.19**	**1.17**
	Agriculture	0.03	1.36	1.39	0.01	1.40		0.12	2.27	11.93	-	-		14.31	1.17
	Forestry and Logging	-	-	-	-	-		-	0.03	2.17	-	-		2.20	0.00
	Fishing	-	-	-	-	-		-	0.11	1.57	-	-		1.68	-
	Industrial	**2.81**	**8.25**	**11.06**	**4.26**	**15.32**		**3.85**	**0.26**	**16.72**	**0.75**	**-**		**21.59**	**42.27**
	Mining	-	-	-	-	-		**-**	0.01	5.79	-	-		5.79	0.11
	Food Processing	0.44	7.55	7.99	3.97	11.96		-	-	-	-	-		-	20.67
	Textiles	0.01	0.00	0.01	-	0.01		-	-	-	-	-		-	0.30
	Wood, Pulp, Paper and Printing	0.03	0.10	0.13	-	0.13		-	-	-	-	-		-	2.43
	Chemicals	-	0.01	0.01	-	0.01		-	-	-	-	-		-	13.52
	Non-metallic Minerals	2.22	0.59	2.82	0.05	2.86		-	-	-	-	-		-	1.96
	Basic Metals	-	-	-	0.25	0.25		-	-	-	-	-		-	2.43
	Mechanical/Electrical Equipment	-	-	-	-	-		-	-	-	-	-		-	0.28
	Building and Construction	-	-	-	-	-		-	0.12	6.95	-	-		7.08	0.45
	Unallocated	0.10	-	0.10	-	0.10		3.85	0.13	3.98	0.75	-		8.71	0.10
	Commercial	**0.10**	**0.19**	**0.29**	**0.06**	**0.35**		**1.83**	**0.34**	**7.48**	**-**	**-**		**9.65**	**7.76**
	Transport	**-**	**-**	**-**	**-**	**-**		**0.14**	**83.32**	**103.51**	**0.76**	**13.27**		**201.01**	**-**
	Residential	**0.01**	**0.13**	**0.14**	**0.01**	**0.15**		**3.90**	**14.37**	**2.60**	**-**	**-**		**20.87**	**7.28**
CONSUMER ENERGY (observed)		**2.94**	**9.93**	**12.87**	**4.35**	**17.22**		**9.85**	**100.70**	**145.98**	**1.51**	**13.27**	**-**	**271.31**	**58.48**
Statistical Differences		**(0.50)**	**(0.35)**	**(0.84)**	**0.02**	**(0.83)**	**2.82**	**(1.22)**	**(0.21)**	**(2.86)**	**0.40**	**3.59**	**(0.12)**	**2.40**	**(4.28)**

		Renewables								Electricity	Waste Heat	TOTAL
		Hydro	Geothermal	Solar	Wind	Liquid Biofuels	Biogas	Solid Biofuels	Total	Total	Total	
SUPPLY	Indigenous Production	85.41	226.05	2.53	14.25	0.06	4.18	46.59	**379.08**		**0.68**	**601.89**
	+ Imports	-	-	-	-	-	-	0.12	**0.12**		-	359.06
	- Exports	-	-	-	-	-	-	-	**-**		-	64.12
	- Stock Change	-	-	-	-	-	-	-	**-**		-	2.63
	- International Transport	-	-	-	-	-	-	-	**-**		-	59.45
	TOTAL PRIMARY ENERGY	**85.41**	**226.05**	**2.53**	**14.25**	**0.06**	**4.18**	**46.72**	**379.21**		**0.68**	**834.75**
	ENERGY TRANSFORMATION	**(85.41)**	**(218.68)**	**(2.16)**	**(14.25)**	**(0.06)**	**(3.87)**	**(20.82)**	**(345.26)**	**145.19**	**(0.68)**	**(279.00)**
	Electricity Generation	(85.41)	(218.12)	(2.16)	(14.25)	-	(3.06)	-	**(323.00)**	**154.16**	-	(217.25)
	Cogeneration	-	(0.56)	-	-	-	(0.82)	(20.82)	**(22.20)**	**6.31**	**(0.68)**	(32.89)
	Fuel Production	-	-	-	-	(0.06)	-	-	**(0.06)**	**-**	-	0.57
	Other Transformation	-	-	-	-	-	-	-	**-**	**-**	-	(9.45)
	Losses and Own Use	-	-	-	-	-	-	-	**-**	**(15.28)**	-	(19.97)
	Non-energy Use	**-**	**-**	**-**	**-**	**-**	**-**	**-**		**-**	**-**	**(32.30)**
CONSUMER ENERGY (calculated)			**7.38**	**0.36**	**-**	**-**	**0.31**	**25.90**	**33.95**	**145.19**	**-**	**523.45**
DEMAND	**Agriculture, Forestry and Fishing**		**0.45**	**-**			**-**	**-**	**0.45**	**9.97**		**31.18**
	Agriculture		0.45	-			-	-	0.45	9.60		26.94
	Forestry and Logging		-	-			-	-	-	0.21		2.41
	Fishing		-	-			-	-	-	0.15		1.83
	Industrial		**4.34**	**-**			**0.05**	**18.33**	**22.73**	**48.92**		**150.82**
	Mining		-	-			-	-	-	1.73		7.64
	Food Processing		-	-			-	-	-	11.21		43.85
	Textiles		-	-			-	-	-	0.45		0.77
	Wood, Pulp, Paper and Printing		-	-			-	18.33	18.33	3.85		24.74
	Chemicals		-	-			-	-	-	1.54		15.06
	Non-metallic Minerals		-	-			-	-	-	0.93		5.76
	Basic Metals		-	-			-	-	-	20.32		23.00
	Mechanical/Electrical Equipment		-	-			-	-	-	0.55		0.83
	Building and Construction		-	-			-	-	-	1.45		8.98
	Unallocated		4.34	-			0.05	-	4.39	6.89		20.20
	Commercial		**2.38**	**-**			**0.26**	**-**	**2.64**	**33.19**		**53.58**
	Transport		**-**	**-**			**-**	**-**	**-**	**1.20**		**202.21**
	Residential		**0.21**	**0.36**			**-**	**7.44**	**8.01**	**50.65**		**86.97**
CONSUMER ENERGY (observed)		**-**	**7.38**	**0.36**	**-**	**-**	**0.31**	**25.77**	**33.83**	**143.92**	**-**	**524.76**
Statistical Differences		**-**	**0.00**	**-**	**-**	**-**	**(0.00)**	**0.12**	**0.12**	**1.27**	**-**	**(1.31)**

Glossary

Baseload generation: Power plants that do not change their electricity generation output quickly. These plants are less flexible with meeting electricity demand.

Calorific value: The amount of energy that can be generated by burning a fuel. Usually expressed in megajoules per kilogram (MJ/kg). A calorific value may either be a gross calorific value (GCV) or a net calorific value (NCV) — see the relevant entries in this glossary.

Capacity factor: A measure of how often an electricity generation plant runs in a period of time. It is calculated as the amount of electricity generated by a plant divided by the maximum amount that could have been generated if it operated continuously at full power in that period of time.

Coal ranks: Used to refer to different types of coal. In New Zealand, we have three main types of coal:

- **Bituminous coal** is the highest rank of coal in New Zealand. Bituminous coal is generally exported for steelmaking.
- **Sub-bituminous coal** is mainly used in heating and electricity generation. In New Zealand, steel can be made using sub-bituminous coal due to the unique processes used at the Glenbrook mill.
- **Lignite**, also known as brown coal, is the lowest grade coal with the least concentration of carbon.

Cogeneration: When electricity plants generate electricity and heat at the same time. Otherwise known as combined heat and power, or CHP.

Conversion efficiency: The amount of energy produced in a transformation process divided by the amount of energy that went into the process.

Conversion losses: The energy lost in transforming one type of energy to another. This is calculated as the difference between the amount of energy that has gone into a transformation process and the amount of energy that has been produced.

Direct use: The use of energy without it first going through a transformation process (such as electricity generation). For example, the use of geothermal energy to heat greenhouses.

Energy consumption: the amount of energy consumed by final users, excluding any energy transformation (eg into electricity) and energy used in its transmission or distribution. Sometimes also referred to as “end use”.

Energy use: The use of fuel to provide energy (for example, burning coal to heat a boiler, or using electricity to power a motor). Sometimes also referred to as "energy end use".

Feedstock: Any raw material used as an input for an industrial process. In New Zealand, natural gas is used as a feedstock to produce both urea and methanol. Use of a fuel as a feedstock is considered to be non-energy use.

Generation capacity: The maximum amount of electricity that can be produced by an electricity generation plant running at full power at a specific point in time.

Grid Exit Point (GXP): A point where electricity leaves the national grid operated by Transpower and enters the local distribution network.

Gross Calorific Value (GCV): The total amount of energy released when combusting a fuel. This value will be higher than a fuel's net calorific value.

Hydro inflows: The volume of water flowing into a hydroelectric reservoir or system from upstream sources such as rivers, rainfall, snowmelt, or other tributaries.

Net calorific value (NCV): The amount of energy that can be recovered when combusting a fuel. Some energy from combustion will always be lost due to heating water vapour and other factors, and the net calorific value takes this into account. This value will be lower than a fuel's gross calorific value.

Non-energy use: The use of energy for purposes other than combustion. This includes, for example, the use of bitumen in the construction of roads and the use of natural gas in ammonia production.

Process heat: The energy used for warming spaces and industrial processes (such as drying milk powder). This is often in the form of steam, hot water, or hot gases.

Reserves (1P, 2P and 3P): The amount of crude oil, LPG, or natural gas that is believed to be available and commercially producible in an oil or natural gas field. These are reported at different levels of confidence or certainty.

- 1P reserves are Proven reserves (both developed and undeveloped). These reserves have a 90 per cent certainty of being produced.
- 2P reserves are the sum of Proven reserves and Probable reserves. These reserves have a 50 per cent certainty of being produced.
- 3P reserves are the sum of Proven reserves, Probable reserves, and Possible reserves. These reserves have a 10 per cent certainty of being produced.

Resources, Contingent (2C): 2C Contingent resources are resources estimated at a particular time to be potentially recoverable but are not yet commercially recoverable. This could be a result of technological barriers or economic factors. It is possible for remaining reserves to be reclassified as Contingent resources (or vice versa) because of changing economic conditions.

Self-sufficiency: A measure of a country's ability to meet its own energy supply requirements and is calculated as domestic production divided by total primary energy supply. A value of 100 per cent indicates that a country produces all the energy it needs, whereas values above or below 100 per cent indicates it is a net exporter or importer of energy, respectively.

Total final energy consumption (TFEC): Energy consumed by end-users such as factories and households.

Total primary energy supply (TPES): The total amount of energy available for use in New Zealand, accounting for domestic production and trade.

Transformation: Any process by which one energy type is transformed into another energy type. For example, the production of electricity by burning coal is a transformation process, as is the conversion of crude oil into petroleum. If an energy type is transformed into a non-energy form, this is instead non-energy use.

Utility-scale solar: Large solar photovoltaic (PV) projects that directly supply an electricity grid or network.

Waste heat: Heat that is generated from a by-product chemical reaction and used to generate electricity.

CONVERSION EQUIVALENTS

To convert values from one unit to the other:

1. Find the unit your value is in on the column of the table.
2. Find the unit you wish to convert to in the top row of the table.
3. Multiply your value by the listed amount.

	TJ	PJ	GWh	TWh
Terajoule		0.001	0.2778	0.0002778
Petajoule	1000		277.778	0.2778
Gigawatt hour	3.6	0.0036		0.001
Terawatt hour	3600	3.6	1000	

Te Kāwanatanga o Aotearoa
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