Canterbury Energy Inventory 2025

CANTERBURY
Mayoral Forum

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Executive Summary

This energy inventory report (energy inventory) responds to direction from the Canterbury Mayoral Forum to develop an evidence base and a current state assessment of the energy landscape in the Canterbury region.

This energy inventory provides a regional overview of Canterbury's energy profile, including information on energy use and demand, energy resources, assets and networks. It also identifies opportunities and challenges. It is the first step, and will help inform potential future work, to shape the energy future for Canterbury.

Energy is an essential driver for economic growth, social development and environmental sustainability. In New Zealand, and across the globe, the energy transition is happening, with pace, with a significant shift towards renewable energy and away from fossil fuels.

Canterbury is a large region with an abundance of sun, water and wind, positioning it well for the energy transition. Canterbury also drives much of the South Island's economic activity. There are wide-reaching opportunities and challenges for the Canterbury region related to the energy transition. Some of the potential benefits are in making progress on decarbonisation and climate change goals, improved energy resilience, supporting existing industry and future industry growth, job creation, encouraging energy workforce capability and improving environmental health. Some of the challenges for Canterbury are likely to be in managing investment, access to capital, managing peak capacity issues in a changing climate, and supporting community and consumer understanding.

Some of the key insights that came through from stakeholder engagement were:

- **Energy and economic development are inextricably linked** – to support existing industry and attract new industry, energy is critical and there needs to be confidence in the region's direction and security of supply.
- **A regional approach and plan for energy is urgently needed** – to realise the economic, social and environmental benefits for the region. There is strong support for this to be developed collaboratively with stakeholders.
- **Coordination is essential** – the next phase of work to shape the energy future for Canterbury should coordinate across local, regional, and national plans and with existing structures. It also needs to consider the impacts for nearby regions, for the South Island and for wider New Zealand.

There is significant support from stakeholders in Canterbury for a joined-up, regional approach to energy and making sure that it aligns with, and coordinates with the relevant goals and priorities of regional and local government, central government, industry and communities.

Glossary and definitions

The report uses the following definitions and abbreviations.

Table 1: Glossary of terms

Terms	Description
Distributed energy generation	Distributed energy generation refers to energy generation occurring at, or near the point of use, using decentralised systems and often renewable energy sources - for example solar panels.
EDB	Electricity Distribution Businesses, also known as 'lines companies'.
Energy	Energy can exist in many different forms. Primary energy sources such as crude oil, natural gas, coal, sunlight, wind, geothermal heat is converted into secondary energy, i.e. electricity from a power plant, gasoline from refined crude oil, heat from burning natural gas.
Electricity	Electricity is secondary energy and is the flow of electrical power or charge. Electricity is one of the most widely used forms of energy. The units used for electrical energy are typically Wh (Watt hours) or kWh, MWh or GWh for larger quantities.
GXP	A Grid Exit Point (GXP) is a connection point on the electricity grid at which electricity predominantly flows out of the grid.
GIP	A Grid Injection Point (GIP) is where electricity predominantly flows into the grid, typically at power stations.
Gentailer	In the context of the New Zealand electricity market, a "gentailer" (short for "generator-retailer") is a company that both generates and sells electricity.
HVDC	The High Voltage Direct Current (HVDC) Inter-Island link is a 610km long, 1200MW high-voltage direct current transmission system that connects the electricity networks of the North and South Islands of New Zealand.
MW	A megawatt (MW) is a unit of power equal to one million watts, especially as a measure of the output of a power station.
Net vs Gross Emissions	Gross emissions are our total greenhouse gas emissions from human activity. Net emissions include any removal of carbon dioxide from the atmosphere through land-use and forestry.
PJ	A petajoule (PJ) is a unit of energy equal to one million billion joules.
Renewable energy	Energy from a source that is not depleted when used, such as wind and solar. In contrast to fossil fuels such as oil or coal that also generate greenhouse gas emissions as they are burnt and depleted.
Node	Nodes represent specific locations on the national electricity grid where electricity flows in or out (known as GIP or GXP).

Chapter One
Introduction

Energy is central to the way we live, it supports our wellbeing, and is vital for a strong, productive economy. The world's reliance on energy continues to grow.

The global energy transition from fossil fuels to sustainable low-carbon renewable energy sources is well underway. New Zealand, like many other countries, is at a major transition point in shifting to low or carbon-neutral energy.

Shaping the energy future for Canterbury | Waitaha is of integral importance across the priorities in the 'Plan for Canterbury 2023-2025' from the Canterbury Mayoral Forum, those priorities are:

- Sustainable environmental management of our habitats
- Shared prosperity for all our communities
- Climate change mitigation and adaptation.

The 'Plan for Canterbury' recognises that energy security will be critical to support opportunities for the region. It also notes that renewable energy will become an increasingly important part of responding to climate change risks, and that Canterbury has an opportunity to be at the forefront of an energy transition to attract and retain talent, investment, and technologies.

Economic growth and development relies on an energy future that is secure, sustainable and affordable

The Canterbury Mayoral Forum made a commitment to supporting the region to foster partnerships, to investigate barriers, harness opportunities to improve our energy security and systems in ways that maximise benefits for our community, economy and environment.

This Energy Inventory responds, in part, to the commitment above. It is intended to form an evidence-base and provide a current state assessment of the energy system for the Canterbury region. It is the first step in what could be a much larger piece of work.

The shifting energy landscape

The transition away from fossil fuels and towards renewable energy has benefits for decarbonisation and climate change, improved environmental health, job creation, industry growth, economic development, reduced operational costs for businesses, and meeting public and consumer expectations.

There are also challenges and constraints that must be considered in the transition, such as the potential environmental impacts on ecosystems, the use of highly-productive land, rapidly changing technology, storage availability, electrical grid/network stability, economic viability for industry to make change, and more.

Globally

The energy system is transitioning from traditional fossil-based energy sources that emit high levels of carbon dioxide (CO2) to low or zero-emitting sources. This transition is crucial for mitigating climate change through achieving net-zero emissions.

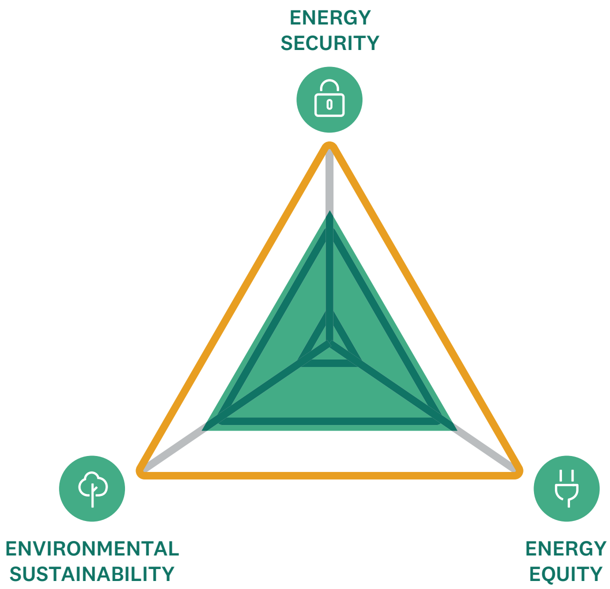
Globally, the energy sector is responsible for around three-quarters of greenhouse gas emissions. Replacing non-renewable energy sources, primarily fossil fuels such as coal, gas and oil, with energy from renewable sources, such as wind or solar, would dramatically reduce carbon emissions.[1]

There are numerous policy changes and initiatives happening internationally, as countries shift away from fossil fuels and towards renewable energy. Countries that are positioned as global leaders in the energy transition, such as Sweden, Denmark, Scotland and others could provide New Zealand, and Canterbury, with valuable insights into what works and what doesn't.

Some key things to be aware of in the global energy transition are the 'Energy Trilemma' and the Paris Agreement.

The Energy Trilemma – is a framework developed by the World Energy Council that shows the need to balance energy security, equity and sustainability (see figure 1). The trilemma is commonly referred to and underpins conversations about the energy transition. The World Energy Council measures and tracks performance using this framework and in 2023, New Zealand was ranked ninth of more than 120 countries.

The Paris Agreement[2] – is an international treaty on climate change and is one of the key influencers in energy transition. New Zealand ratified the Paris Agreement on October 4, 2016. As of June 2024, 107 countries, responsible for approximately 82 per cent of global greenhouse gas emissions, had adopted net-zero pledges, either in law, in a policy document such as a national climate action plan or long-term strategy, or through an announcement by a high-level government official.



Energy Security – the capacity to meet current and future demand reliably, withstand and bounce back swiftly from system shocks with minimal disruption to supplies

Energy Equity – the ability to provide universal access to affordable, fairly priced and abundant energy for domestic and commercial use

Energy Sustainability – the transition of a country's energy system towards mitigating and avoiding potential environmental harm and climate change impacts

Figure 1: Energy Trilemma from World Energy Council

[1] Net Zero Coalition | United Nations
[2] The Paris Agreement | UNFCCC

Nationally

New Zealand is well-positioned for the energy transition, given its natural resources. However, there are still significant challenges in the transition journey as New Zealand is heavily reliant on fossil fuels, with around 60-70 per cent of overall energy use supplied by fossil fuels. Energy use is responsible for 37 per cent of New Zealand's gross emissions, and transitioning towards renewable, clean energy will be essential in cutting these emissions to meet New Zealand's international climate commitments and reduce the impacts of climate change. [3 4]

As a direct result, New Zealand's electricity demand is projected to increase by up to 82 per cent by 2050, driven by factors such as population growth and the electrification of transport and industry.[5] Meeting this demand will require a huge increase in investment in generation and networks.[6]

Electricity is the principal energy form that enables direct consumption, battery charging or conversion into other energy forms such as hydrogen.

The energy system in New Zealand has a complex consenting and regulatory framework and there are a range of ownership structures across the energy sector. A successful transition of the New Zealand energy system requires central and local government, the energy sector, industry, and private/public stakeholders to work together.

At the time of writing, there is a significant amount of regulatory and policy change that relates to the future of energy at the national level – this inventory considers those changes, and further information on the central government-led direction for New Zealand's energy future can be found in appendix 1.

Regionally

Canterbury is New Zealand's largest region by land area (44,508km^2), covering approximately 30 per cent of the total land area of the South Island and spanning the territory of ten local authorities (see figure 2). Ngāi Tahu is the iwi of Waitaha/Canterbury. There are ten papatipu rūnanga in Canterbury who are mana whenua within their takiwā.

Canterbury is the most populous region in the South Island and is the second most populous region in New Zealand. Eighty-two per cent of Canterbury's resident population live in Greater Christchurch (encompassing Christchurch City, Waimakariri and Selwyn Districts).

Canterbury drives much of the South Island's economic activity. For the year ended March 2024, Canterbury generated 12.4 per cent of the national GDP.[7]

Canterbury is a region with an abundance of sun, water and wind, meaning it is well placed for a successful clean energy transition to a low-emissions future.[8]

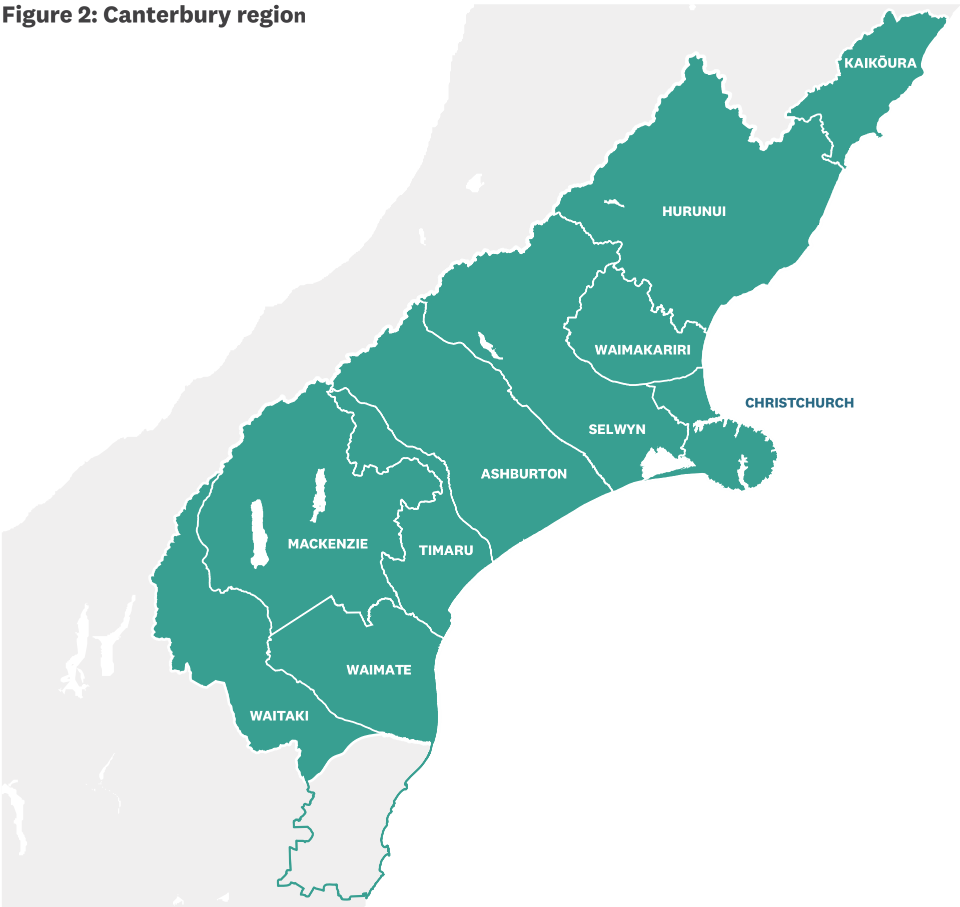
Canterbury makes a significant contribution to renewable electricity generation and plays a vital role in meeting increasing energy demand, mainly through the eight hydro stations on the Waitaki River system that produce a significant proportion of the nation's electricity. When planning the future for energy in Canterbury, we need to consider the close alignment and linkages with other regional workstreams - particularly those focused on economic development, spatial planning, and climate change.

More information about Canterbury's energy supply and demand can be found in chapter 2.

The Canterbury region we most commonly refer to is shown in block colour in figure 2 - the broader outline is used to show the full extent of the Waitaki district, which spans two regions (Canterbury and Otago).[9]

3 New Zealand Second Emissions Reduction Plan | MfE
4 Advancing New Zealand's Energy Transition | ENA
5 Electricity Demand and Generation Scenarios: Results summary, July 2024 | MBIE
6 New Zealand Energy Strategy | MBIE
7 Sourced from Infometrics Regional Economic Profile
8 Canterbury Climate Partnership Plan | Canterbury Mayoral Forum
9 The Canterbury region is geographically defined in different ways for specific purposes, which can sometimes result in an inconsistent picture. Where data presented in this report relates to boundaries that differ to those shown in figure 2, this is noted.

Figure 2: Canterbury region



Scope and constraints

This inventory compiles a range of information from existing sources – more in-depth and technical information is often available and wherever possible links and references are provided. This inventory has been informed by a range of material, but is far from exhaustive.

The following shows what is in, and out of scope:

In scope	Out of scope
• The energy system and how it currently operates.	• Price and costs for energy supply and energy transition.
• Information on what is planned or already underway relating to the energy transition.	• Proposed solutions or direction on how energy matters should be managed in the Canterbury region.
• Identification of information gaps, issues, opportunities, and challenges.	

There are constraints and caveats noted throughout, relating to the availability of information (some of which is commercially sensitive), the variance of timescales, and geographical differences within the Canterbury region.

Engagement

A collaborative approach has been taken in the development of this inventory. We thank all contributors for sharing their time and expertise.

A range of targeted engagement sessions were held, as well as a facilitated workshop with key stakeholders from the electricity and energy sector, industry, local councils, academia, central government, Ngāi Tahu Holdings and others. Wherever possible attribution has been provided.

We particularly acknowledge and thank Lincoln University for providing regular input and support in the development of this report and to the Electric Power Engineering Centre (EPECentre) University of Canterbury for providing technical review and support.

Chapter Two
Energy sector overview

The energy sector

In New Zealand we have a mixed energy supply - around 60 per cent is supplied by fossil fuels, and about 40 per cent from renewable sources (see figure 3). Once energy losses and distribution are considered, fossil fuels make up about 70 per cent of our total final consumption. This includes petrol and diesel for vehicles, coal and gas for industrial boilers, and household gas and LPG.

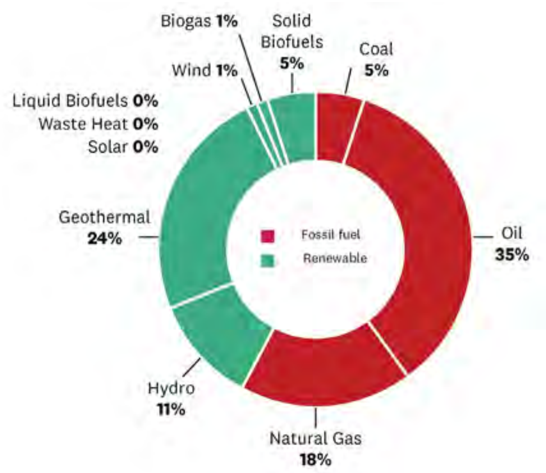


Figure 3: Primary energy supply in New Zealand 2023

The sections that follow explain the electricity system and other forms of energy used in New Zealand. This information provides a snapshot of the electricity generation, distribution and retail sectors, and other energy sectors, at the time of writing.

Electricity system

The New Zealand electricity system is a complex network, with a regulatory framework that is covered by acts and regulations specific to the sector.[10] Electricity is generated from a variety of sources before being transmitted across the national grid and distributed to where it is needed (see figure 4). There are four main components of the electricity system: generation, transmission, distribution and retail. A summary is provided in figure 5.

Electricity is an 'instantaneous' form of energy. Generation and load need to be connected and matched perfectly for energy to flow. Unless electric power is used as it is created (or stored in a battery), it is lost. Balancing supply and demand is a complex task, managed by Transpower.

In this context, it is important to consider not just the amount of power that can be generated, but when it can be generated. This is particularly important when it comes to renewable energy, which is often intermittent and weather-dependent – for example, solar energy cannot be generated at night, and wind power generation declines during periods of low wind speed.

This report presents generation examples in terms of the maximum power output but does not report the balance between when power is needed and when the maximum generation output occurs. For this reason, caution must be used when summing generation against load.

[10] Electricity industry regulatory framework | MBIE

Figure 4: The New Zealand electricity system

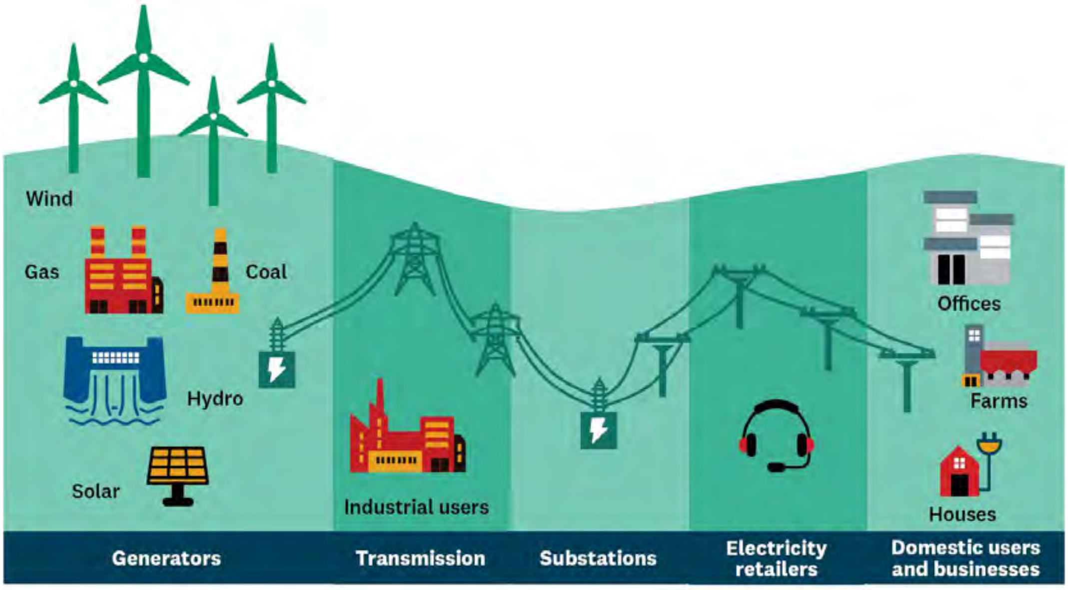


Figure 5: Summary of the electricity system

Generation

Meridian, Genesis and Manawa Energy produce most of the electricity generated in Canterbury/Waitaha.

Most large-scale generation plants supply electricity to the national grid. Some smaller-scale generation is 'embedded' and feeds local distribution networks.

Distributed energy resources are expected to play an increasingly important role in future.

All significant-scale electricity generation in Canterbury and the South Island is renewables-based, most of which comes from hydro-electric schemes.

Transmission

The national grid is owned and operated by Transpower. They are also the national 'system operator', responsible for maintaining the balance between supply and demand.

The national grid transmits high-voltage electricity from generators to regional distribution (lines) companies, and to some large industrial consumers directly.

Transpower is responsible for new nation grid investments and all transmission developments.

Distribution

Five distribution companies operate in Canterbury/Waitaha, maintaining the local lines from the national grid to regional network consumers.

Legislation sets out the application and approval processes for connecting a new generator to a local network.

Retail

The four main retailers in New Zealand are also major generators, sometime referred to as 'gentailers'. Retailers purchase electricity from the wholesale market and sell it to consumers, together with the costs associated with transmission and distribution.

New Zealand has a highly vertically integrated electricity market.

Electricity generation in Canterbury

There are approximately 80 generation companies across New Zealand, operating more than 200 plants that supply electricity to the national grid and local distribution networks. The four major generators in New Zealand – Genesis Energy, Mercury, Meridian Energy, and Contact – are known as 'gentailers', these companies are both generators and retailers. Some smaller-scale generation feeds directly into local distribution networks – this is often referred to as distributed energy generation, and can include rooftop solar installations, small solar arrays, micro-hydro schemes, and wind turbines.

The main generating companies presently operating in Canterbury are Meridian, Genesis, and Manawa Energy.

All significant-scale electricity generation in Canterbury (and the South Island) is renewables-based. Most of the electricity generated in Canterbury comes from hydro generation, with some from solar.

Hydro electricity generation in Canterbury

Canterbury is a significant contributor to New Zealand's hydroelectricity generation and distribution infrastructure. Canterbury's operational hydro schemes (see figure 6) range in scale, with the largest being the Waitaki Hydro Electric Power Scheme. This consists of eight power stations from Lake Tekapo to Lake Waitaki, operated by Genesis and Meridian. Benmore, is the largest hydro station in Canterbury and the second largest in New Zealand behind Manapōuri.

The Coleridge Power Station (Manawa Energy), located in the Rakaia River catchment, was New Zealand's first major hydroelectric generation scheme, becoming operational in 1914. The scheme was built to supply power to Christchurch.

Details of the major operational Hydro-power schemes in Canterbury are set out in Table 2.

Figure 6: Hydroelectricity generation in Canterbury[11]

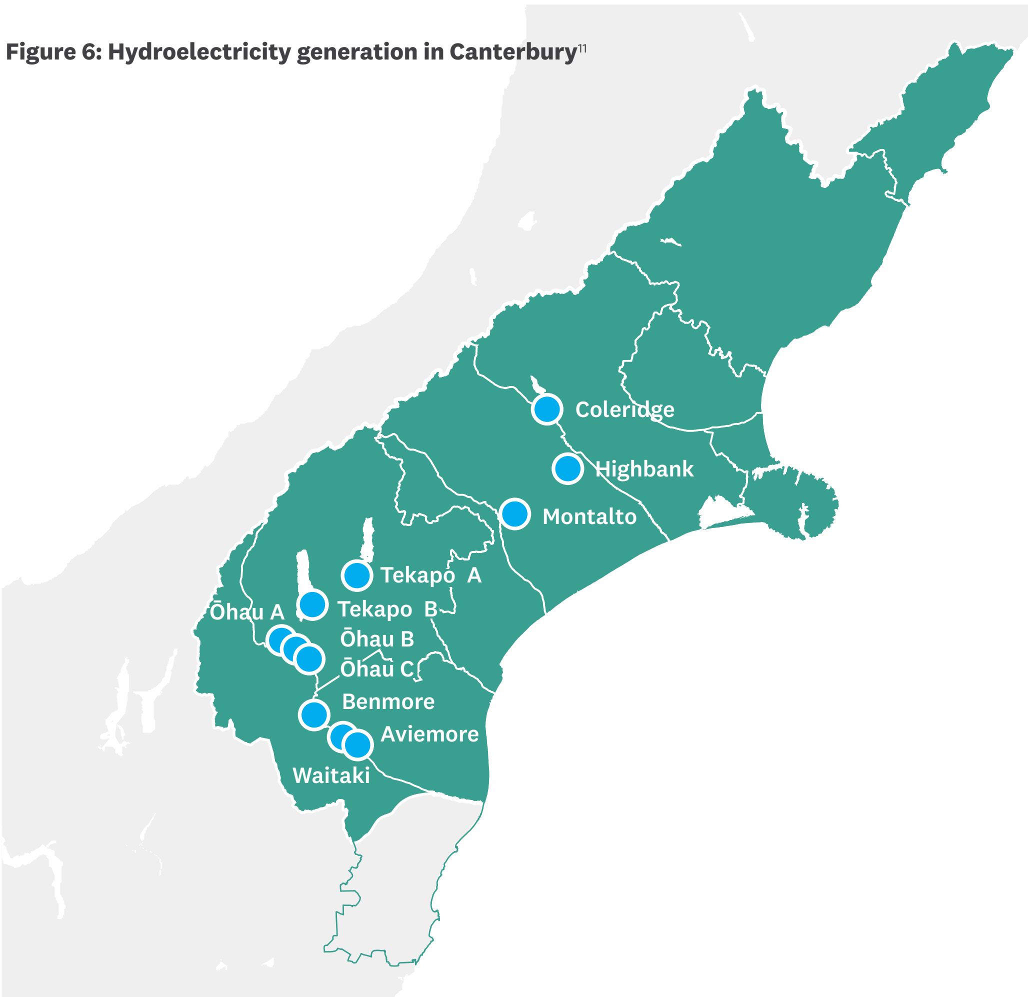


Table 2: Major operational Hydro-power stations in Canterbury[11]

Operator	Name	District	Generation capacity	Annual output	Hydro scheme
Genesis	Tekapo A	Mackenzie	30MW	160GWh	Waitaki hydro scheme
Genesis	Tekapo B	Mackenzie	160MW	800GWh	
Meridian	Ōhau A	Waitaki	264MW	1,150GWh	
Meridian	Ōhau B	Waitaki	212MW	970GWh	
Meridian	Ōhau C	Waitaki	212MW	970GWh	
Meridian	Benmore	Waitaki	540MW	2,215GWh	
Meridian	Aviemore	Waitaki	220MW	942GWh	
Meridian	Waitaki	Waitaki	90MW	500GWh	
Manawa Energy	Coleridge	Selwyn	40MW	270GWh	Coleridge Power Station
Manawa Energy	Highbank	Ashburton	25MW	115GWh	Highbank Power Scheme
Manawa Energy	Monalto	Ashburton	2MW	12GWh	

There is also smaller-scale hydro generation associated with irrigation schemes in Canterbury. One example is the Cleardale mini-hydro scheme located on the north flank of Mount Hutt near the Rakaia River. This generates around 6GWh annually, enough to power 500 homes. The station diverts up to 450 litres/second from Little River, transporting it 2.3km via a pipeline to power a Pelton wheel turbine.[12] Irrigation is provided to 91 hectares of land.

Landfill gas to electricity in Canterbury

The Kate Valley Landfill receives and manages waste from Hurunui, Waimakariri, Christchurch, Selwyn, and Ashburton Councils through a public private partnership with Waste Management, called Transwaste Canterbury. Through its resource consent conditions Kate Valley is required to collect and destroy methane generated by the decomposition of organic matter within the landfill.

Approximately 95 per cent of landfill gas is collected according to a recent greenhouse gas emissions audit by Toitū Envirocare. The landfill gas is collected and transported to the Gareth James Energy Park where approximately 3,800 m³/hour of gas is destroyed either by flaring or combustion in an electricity generator.

At the Gareth James Energy Park there are four 1MW Jenbacher landfill gas-to-electricity generators. The four generators are capable of producing enough electricity to power 4,000 homes. The Gareth James Energy Park supplies electricity via high-voltage power lines into the national electricity grid at Waipara.

A gas-powered evaporation plant also converts leachate collected at the base of the landfill into water vapour, while a stormwater system ensures clean water flows into nearby wetlands.

The site meets the highest international standards and complies with New Zealand landfill regulations.

Further information can be found at the Transwaste Canterbury website – **Transwaste - Trusted managing our community's waste**

[11] Sourced from Transpower
[12] Renewable Energy | Mainpower

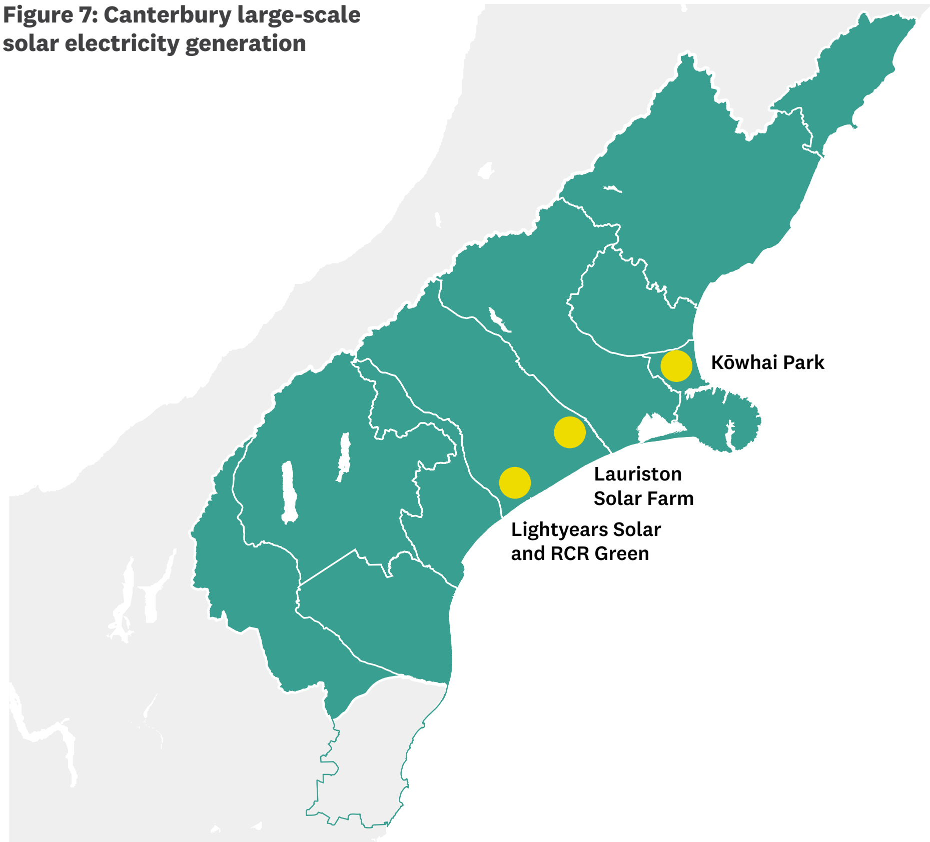
Solar electricity generation in Canterbury

There are currently three large operational, or soon-to-be operational, solar arrays in Canterbury (see figure 7):

- The Kōwhai Park solar farm, under construction at Christchurch Airport, is being developed as a joint venture between Contact Energy and Lightsource BP. When complete, it will cover 300 hectares and the expected 150MW (or 170MWp) array will generate 290GWh of electricity per year. Construction began in August 2024, and the solar farm is expected to be generating energy by 2026.[13]
- The Lauriston Solar Farm is a joint venture partnership between Genesis Energy and FRV Services Australia, located in Lauriston, near Ashburton. The solar farm is located on a 93-hectare site and has a nominal capacity of 47MW (63MWdc). It is expected to generate approximately 100GWh of electricity per year. The solar farm became operational in 2025 and was, at that time, the largest operational solar farm in New Zealand.[14]
- The construction of two solar farms on an eight-hectare rural property near Ashburton was completed in December 2024. The two community-scale farms comprise a 1.2MW site owned by Lightyears Solar and a 6MW site owned by RCR Green Development. The design of the solar farms allows for the continuation of agriculture on the site, with sheep able to graze beneath the panels. The estimated annual output is in the range of 15GWh per year.

Other large-scale solar farm projects are at various stages in the planning process and have the potential to diversify Canterbury's energy mix. These are identified in Chapter Three.

Figure 7: Canterbury large-scale solar electricity generation



[13] Kowhai Park | Christchurch Airport
[14] Lauriston Solar Farm | Genesis Energy

Installed distributed rooftop solar in Canterbury

There are various examples of smaller-scale solar in Canterbury, from community initiatives to household distribution. Some community initiatives include:

- Community resilience hubs, including solar panels and batteries at Community Centres and Marae, including Te Hapu o Ngāti Wheke - Rāpaki Marae a community resilience hub near Lyttelton
- Castle Hill Village - a civil defence hub in a remote location, easily cut off by weather and earthquakes. Solar energy offers a resilience solution to this community
- Ōtautahi Community Housing Trust, a large community housing provider with goals of creating energy equity and resilience in its housing complexes in Christchurch
- Social housing with solar energy, such as the Kāinga Ora development on Riccarton Road in Christchurch

The Electricity Authority's online installed distributed generation trends dashboard shows Canterbury is a national leader in installed generation of solar, with 125MW in the region (see figure 8).

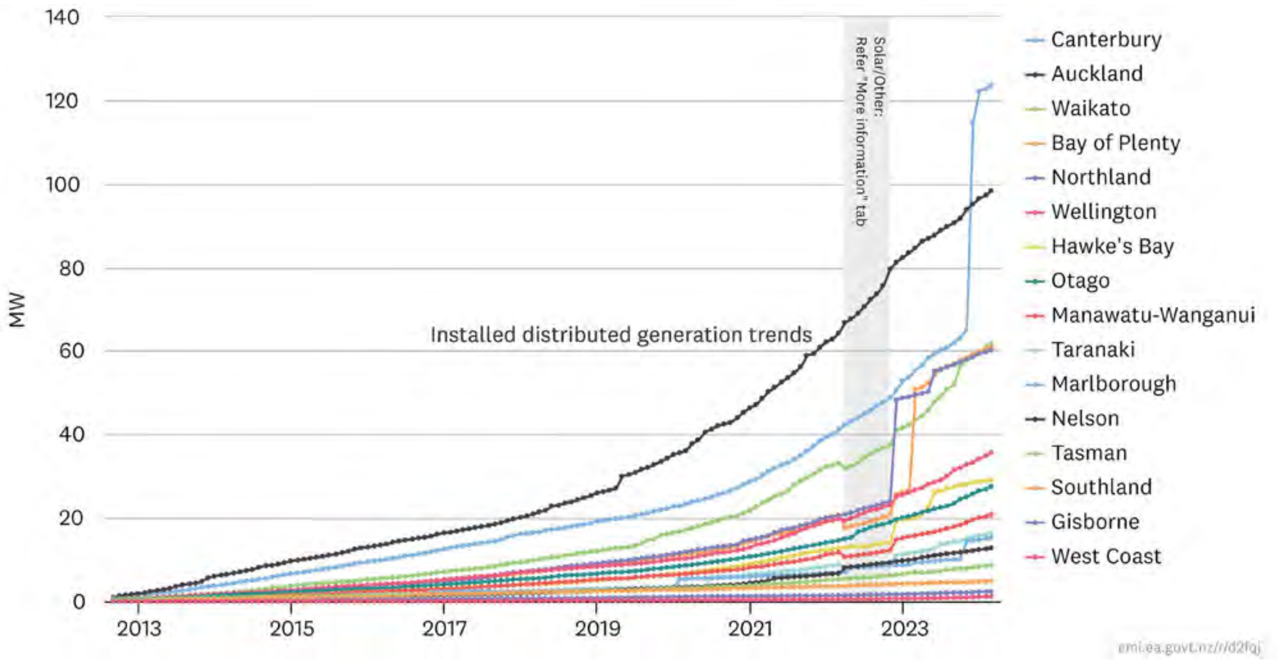


Figure 8: New Zealand installed distributed generation by region[15]

[15] Electricity Authority Dashboard | EMI accessed April 2025

Electricity transmission in Canterbury

Transpower owns, maintains, operates and develops New Zealand's high-voltage electricity transmission network (the National Grid). The National Grid transmits high-voltage electricity from generators to regional distribution (lines) companies, and to some large industrial users directly connected to the grid. The connection from transmission to local distribution or large industrial user occurs at a Transpower GXP.

South Canterbury hosts the bulk of the South Island's hydro generation and the southern end of the High Voltage Direct Current (HVDC) inter-island link. Several major 220 kilovolt (kV) lines serve the South Canterbury sub-region, connecting it to Christchurch and the upper South Island. The sub-region contributes a major portion of the generation of the South Island, feeding the 220 kV transmission network from the Tekapo, Ōhau, and Waitaki Valley generation stations.

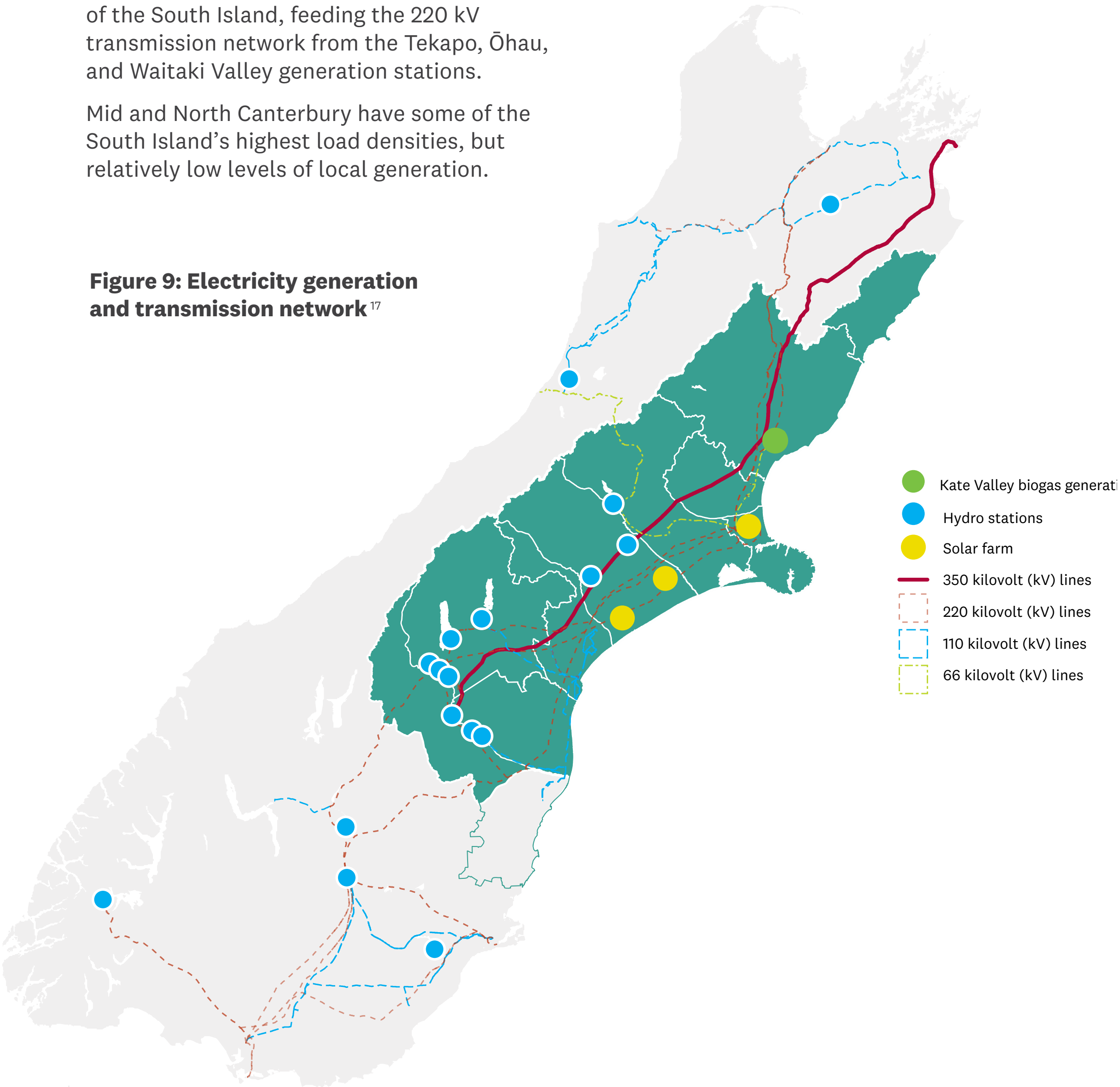
Mid and North Canterbury have some of the South Island's highest load densities, but relatively low levels of local generation.

As a result, most of Canterbury's electricity demand is supplied by generation located in the South Canterbury region. This transmission is essential for electricity flow into Canterbury and onwards to the Nelson-Marlborough and West Coast regions.

The existing transmission network for the region and wider South Island is shown in Figure 9.

Transpower is investigating the investment and upgrades needed to ensure long-term security of supply in Canterbury, including through the Upper South Island upgrade project.[16] Transpower's work programme of upgrades and investment in new works is identified in a rolling 15-year view through its Transmission Planning Reports.

Figure 9: Electricity generation and transmission network[17]



[16] Upper South Island upgrade project | Transpower
[17] Transpower Asset Maps

Electricity distribution

Twenty-nine electricity distribution businesses (EDBs), also known as lines companies (all members of the Electricity Network Association) distribute electricity throughout New Zealand. EDBs connect to the National Grid at GXPs and distribute electricity to consumers through their local networks.

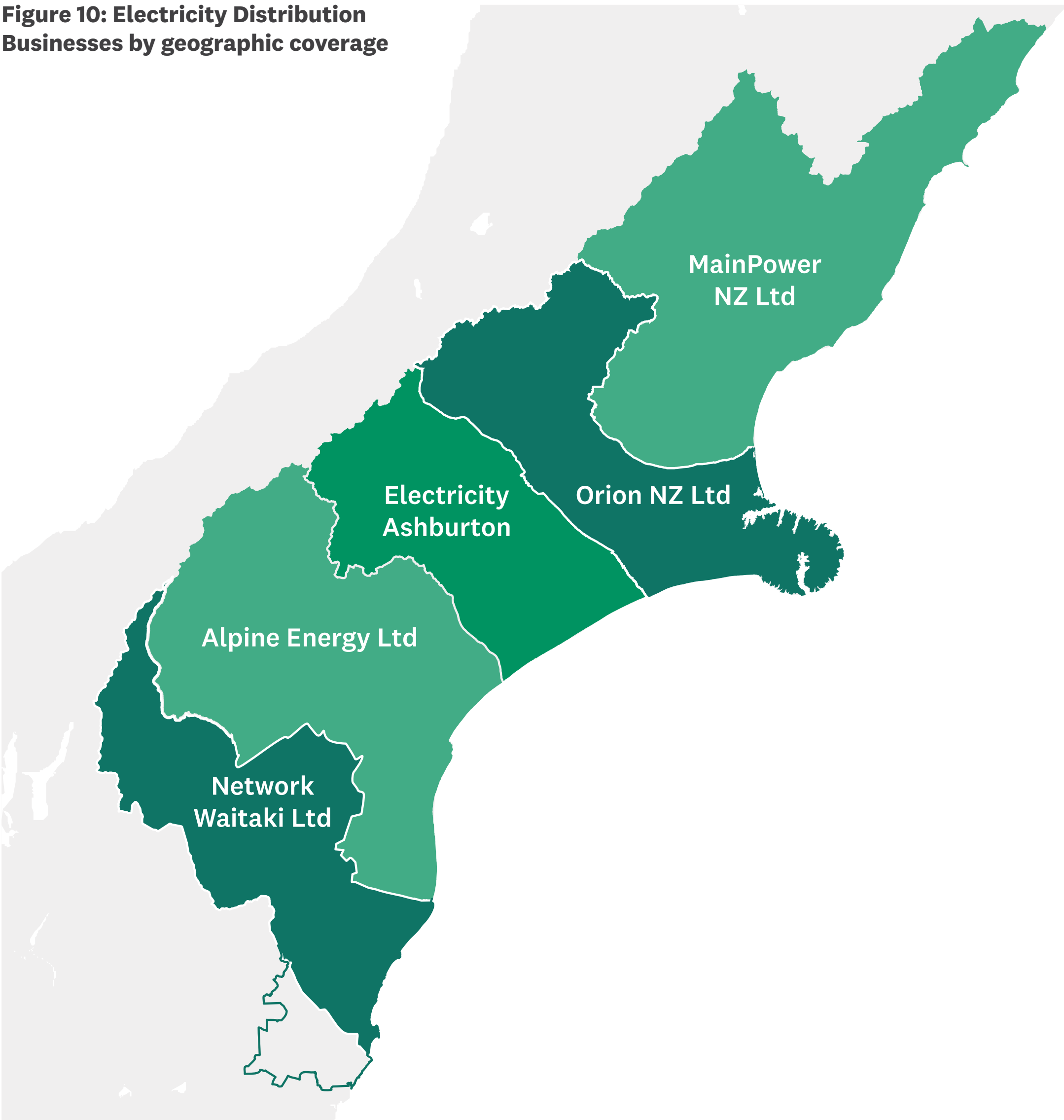
There are five EDBs operating in Canterbury, providing and maintaining the local lines that carry electricity from the national transmission grid to consumers in their regional network. Table 3 below provides detail on the EDBs operating in Canterbury and figure 10 shows their geographic coverage.

Table 3: Electricity Distribution Businesses in Canterbury region

Distribution company	Customer supply	Network
Orion	One of the largest electricity distributors in New Zealand with over 228,000 customers in Ōtautahi / Christchurch and Selwyn District, over an area of over 8,000km2. Delivers approximately 3,520GWh annually.	Network of approximately 14,300km of lines and cables, and 52 zone substations. Supplies significant customers, including Christchurch City Council, Christchurch Hospital, Christchurch International Airport and the Lyttelton Port Company.
MainPower	41,000 customers in Hurunui, Waimakariri and Kaikōura districts, over an area of approximately 11,000km2 Delivers approximately 600GWh annually.	Network of approximately 5,100km of lines and cables, and 16 zone substations. Provides supply to several significant industrial and commercial customers (e.g. Daiken, Hellers).
Alpine Energy	34,000 customers in the Timaru, Mackenzie and Waimate districts, over an area of approximately 10,000km2 Delivers approximately 840GWh annually.	Network of approximately 4,300km of lines and cables, and 28 zone substations. Supplies high-use customers including Fonterra (multiple sites), Oceania Dairy, Opuha Dam, Holcim, and Waihao Downs irrigation.
Electricity Ashburton	A cooperative company in the Ashburton District with over 13,000 shareholders and more than 21,000 connections. The network spans an area of approximately 5,000km2 and delivers about 600GWh of energy annually with a peak demand of more than 180MW.	Network of approximately 3,150km of lines and cables, and 20 zone substations. It supplies several significant industries, including ANZCO meat processing, Talleys food processing, Mt Hutt ski field, various irrigation schemes, and large embedded electricity generators, including Manawa Energy's Highbank ~28MW hydro station and Genesis Energy's ~47MW Lauriston solar farm. Irrigation consumes a significant proportion of total energy delivered.
Network Waitaki[18]	13,800 customers over an area of approximately 8,000km2. Delivers around 300GWh annually.	Network of around 1,940 km of lines and cables, and 19 zone substations. Supplies regionally significant irrigation schemes, meat processing and wool spinning plants.

[18] The figures in this table relate to the whole of the Network Waitaki area, which extends beyond the boundary of the Canterbury region.

Figure 10: Electricity Distribution Businesses by geographic coverage



Retail

New Zealand's retail electricity market is currently made up of 39 retailers, of which four are large gentailers that both sell and buy electricity. The largest retailers - Genesis, Contact, Meridian, and Mercury supply more than 80 per cent of residential customers.[19]

There were 24 electricity retailers operating in the Canterbury region at the time of writing. The largest retailers each have between 15 per cent and 30 per cent of the retail market share: Meridian (30%), Contact (24%) Genesis (17%), and Mercury (15%).[20] The remaining retailers have a combined total of less than 14 per cent of the market share.

Other energy types

Renewable heat sources

Renewable energy is often associated with electricity production - specifically wind, solar, or hydro generation. However, renewable energy is also used for direct heat applications such as commercial space heating and cooling, heating of swimming pools and thermal heated pools, and residential space and water heating systems.

[19] Industry retail | Electricity Authority

[20] Market Share Breakdown by Regional Council | Electricity Authority

Geothermal energy

While there is no significant-scale geothermal energy generation in Canterbury, there are many examples of smaller-scale direct-use applications.

The Hanmer Hot Pools are heated naturally by geothermal energy, where rainwater is warmed by heat radiating from the Earth's core before being drawn to the surface; essentially, the water is heated by the earth itself without any additional heating systems needed.

Ground source heat pumps (GSHPs) have been installed as a sustainable heating solution, particularly in Christchurch, where they became a prominent feature in post-quake rebuild projects, with many large buildings incorporating them for both heating and cooling due to readily available groundwater at a stable temperature. The University of Canterbury, Lincoln University and Christchurch Airport are notable examples of buildings that utilise GSHPs for heating applications.

The post-earthquake re-build of Christchurch's central city has enabled large commercial-scale buildings, including the Christchurch Arts Centre, Town Hall, Bus Exchange, Justice Precinct, Christchurch Airport Terminal and the Pita Te Hori Centre, to utilise more efficient building energy systems using aquifer based geothermal heat pump technology. Christchurch is located on a series of confined aquifers, ranging in depths from 5m to greater than 200m. These aquifers contain water that is consistently between 12-13°C providing a stable and constant source of heat energy. The systems extract heat from this source and also use it as a sink for cooling.

Biomass

Biomass is organic material — such as wood and wood waste, crops or animal manure – that can be used as an energy source. Most commonly, the conversion of biomass into energy is achieved through the combustion of biomass directly in a biomass boiler, but it can also be achieved by converting biomass into biofuel or biogas.

Biomass makes up around 6 per cent of total primary energy use in New Zealand. Around three-quarters of this is used in the industrial sector (mainly wood product manufacturing and pulp and paper manufacturing) and for process heat and some electricity co-generation. Around 15 per cent is used for heating in residential households.[21]

Using biomass as a direct-use energy source is expected to increase in New Zealand as it is an affordable, low-emission renewable fuel source. EECA's Regional Energy Transition Accelerator (RETA) reports highlight regional opportunities for switching to biomass.

Biomass to methanol is an energy pathway being considered by shipping lines. Maersk is a Danish shipping and logistics company that recently launched the Laura Maersk, the first of 15 dual-fuel hulls ordered, capable of running on fossil-based bunkers and methanol.[22] Many shipping lines consider New Zealand's access to predominantly renewable electricity and nearby biomass sources as a favourable source of energy on one of their trade lanes, servicing one of the more remote countries.

Solar hot water

Low and medium-temperature solar thermal systems (typically below 250oC) produce heat rather than electricity. Solar collector panels installed on roofs transfer heat from the sun to water stored in hot water cylinders.

Natural gas and LPG

Natural gas produced in New Zealand is sourced from the Taranaki region, from onshore and offshore fields. After processing, it is piped throughout the North Island to homes and businesses. The gas transmission network is owned solely by First Gas Limited. The South Island does not have a piped connection, but bottled Liquified Petroleum Gas (LPG) is widely used. Around 1.8 per cent of the country's total energy consumption comes from LPG, the bulk of which is produced domestically. In total, there are around 600,000[23] users of natural gas and LPG in New Zealand.

[21] Renewable energy biomass - EECA.
[22] Methanol Vessel | Maersk
[23] Gas Supply and Demand Study 2024 | Gas Industry Co.

Oil

New Zealand is a producer of crude oil, from the same fields producing natural gas concentrated around Taranaki. However, historically, the crude oil produced in New Zealand has been almost entirely exported. New Zealand's sole oil refinery, Marsden Point, closed in 2022 and now all domestic petroleum needs are served by imports of refined products such as petrol, diesel, and jet fuel. Marsden Point is now a fuel import terminal, known as Channel Infrastructure. Most oil is imported from refineries located in Singapore, South Korea and Japan. Channel Infrastructure focuses on supplying the Auckland and Northland fuel markets, handling between 3 and 3.5 billion litres of transport fuels annually, which is about 40 per cent of New Zealand's fuel demand.[24] In the South Island, there is a liquid bulk terminal owned by Lyttelton Port Company and operated by several oil companies. It provides facilities for the discharge of liquid bulk products including LPG, petroleum, aviation gas, bitumen and methanol, as well as bunkering for a variety of vessels. Timaru Port is also a liquid bulk fuel depot.

Mobil, Z Energy and BP are the three main petrol retailers. There are a number of smaller independent retailers including Gull, Allied, NPD, Challenge and Waitomo.

Biofuels

Biofuels are fuels produced from biological matter or 'biomass'. This can include agricultural and forestry crops and residues, organic by-products, and waste.

Liquid biofuels are a renewable, low-emissions fuel that can be blended with petrol and diesel to help reduce net greenhouse gas emissions from transport. They are less dependent on new vehicle technology (for example, electric vehicles or hydrogen fuel cell vehicles) as most biofuels can directly replace conventional fuels in existing internal combustion engines. Some higher-concentration blends (like ethanol E85 or pure biodiesel) may require minor engine modifications.

The use of biofuels in New Zealand is very low and domestic production is limited. In 2020, EECA commissioned a study on the role liquid biofuels could play in decarbonising New Zealand's transport sector.[25] Based on the insights provided by the study, ECCA's view is that advanced biofuels will have a role in the long term, while conventional biofuels could be an interim solution.

Hydrogen

Hydrogen is a versatile energy carrier, not an energy source, meaning it can store, transport and deliver energy produced from a variety of resources, such as natural gas, nuclear power, biogas and renewable power like solar and wind. The economic feasibility of hydrogen is constrained by its relatively high production costs, the limited efficiency of electrolysers, and the scalability challenges of fuel cell technologies. Due to hydrogen's low volumetric energy density, storage and transportation technologies require further development and cost reductions to achieve viability at scale.

A 2024 low-emission hydrogen plan was released by the Government, which sets out steps to unlock private sector investment and support New Zealand's transition to a low-emissions economy.

Current hydrogen projects in Canterbury include:[26]

- Global Bus Ventures (Rolleston) – hydrogen bus, truck and marine vessel manufacture and hydrogen system integration
- University of Canterbury – multiple hydrogen research projects
- Fabrum – liquid hydrogen systems, hydrogen refuelling stations, cryogenic technology, small-scale hydrogen liquefication, lightweight composite tank manufacture
- Christchurch International Airport – Kōwhai Park renewable energy precinct
- Hydrogen Aviation Consortium – zero emissions aviation.

There are currently no hydrogen vehicle refuelling stations in Canterbury. The South Island's first operational hydrogen refuelling station is expected to open in Invercargill in mid-2025.

[24] Oil statistics | Ministry of Business, Innovation & Employment
[25] EECA insights liquid biofuels
[26] New Zealand Hydrogen Council, January 2025

Chapter Three
Energy supply and demand in Canterbury

This chapter outlines information on supply and demand for the Canterbury region as well as some consenting information on renewable energy that would influence future supply in the region. It is important to note the scope and constraints section in chapter one when reviewing the available information.

Canterbury energy use by sector

The following estimates are based on regional data from 2006-2007, overlaid with current national energy demand totals. This means that this is a best estimate capture of current energy use by sector, labelled as 2022-2023.

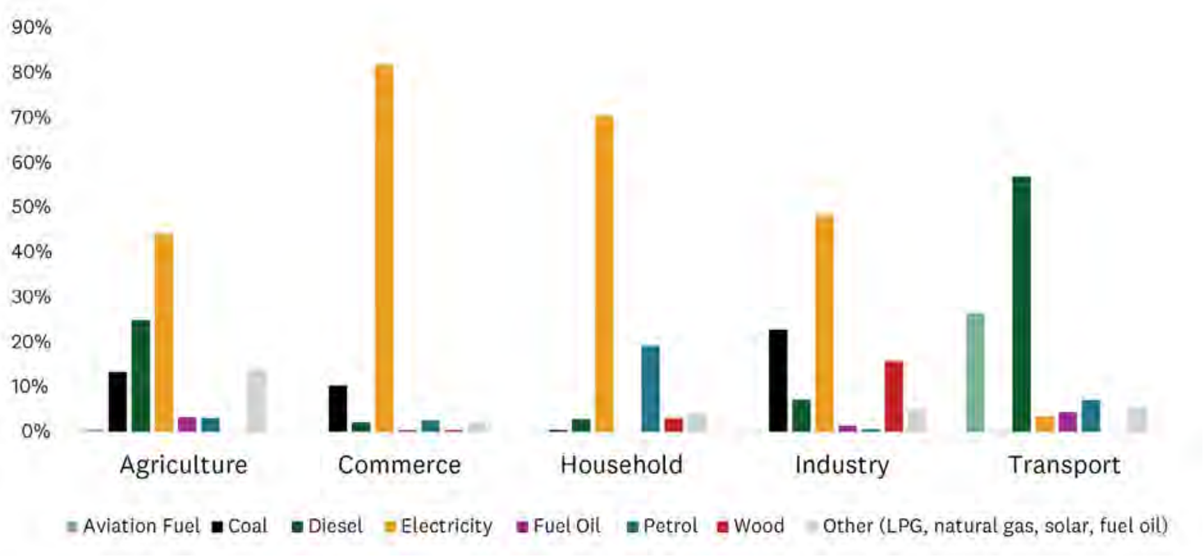
The split of overall energy use indicates that industry is the largest user of energy in Canterbury, followed by household energy use and then commerce, transport and agriculture (see figure 11).

Figure 11: Estimated energy use by sector in Canterbury

It is important to note that residential transport energy demand is allocated to household consumption. To disaggregate household transport demand, analysis of Ministry of Transport and Metro Christchurch data would be needed to capture transport and energy demand across all modes of passenger transport.

A further breakdown by fuel type used for each sector in the Canterbury region is provided in figure 12.

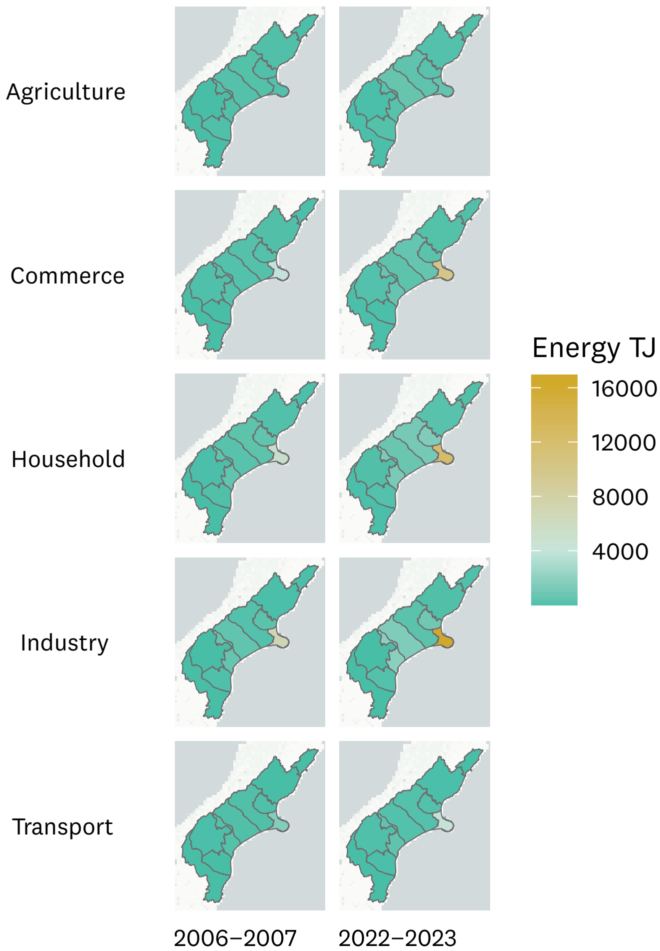
Figure 12: Estimated fuel type breakdown by sectors in Canterbury



A heatmap shows the breakdown of the total energy use by district and across sector from the year 2006-2007 to 2022-2023 (see figure 13). Most significant is the increased energy use for the Christchurch district across commerce, household and industry. It is worth noting that highly populated districts – Christchurch, Ashburton and Timaru - have a significant share of energy use taken up by industry.

Additional graphs showing further detail on energy use by sector and fuel type for the Canterbury region as a whole, as well as Christchurch City and Ashburton across 2006-2007 and 2022-2023 can be found in appendix 2.

Figure 13: Comparison heatmap of total energy use in Canterbury



Electricity supply and demand

The Canterbury region (excluding South Canterbury) has significantly more electricity demand than it generates, whereas in South Canterbury the reverse applies, with significantly more generation than demand.

Electricity supply and demand information is provided in table 4. Note that Transpower uses different regional boundaries for Canterbury than those referred to throughout this inventory.[27]

Table 4: Canterbury regional supply and demand in MW

Region splits *Data as of 2023	**Generation capacity** (excludes any embedded solar (PV) generation)	**Demand**	**Peak demand forecasts for the next 15 years**
Canterbury region – Mid and North Canterbury	820MW	820MW	2% per annum growth
South Canterbury region - generation far exceeds local demand	231MW	231MW	2.8% per annum growth
Total Canterbury region	1,051MW	1,051MW	2-2.8% per annum growth

Electricity demand is forecast to increase in Canterbury, which has implications for consistent supply. The increased demand for electricity is driven by a range of factors, including, but not limited to:

- A growing population
- Increasing urban development
- Increasing industrial activity
- Changes in climate
- Decarbonisation and electrification of homes, transport, and industry

Transpower's Transmission Planning Reports forecast all load nationally for NZ and are updated annually. This will provide future load forecasting for Canterbury, broken down into constituent parts.

Nodes are points where electricity is either generated and fed into the grid or where retailers and major users bid to buy electricity. Figure 14 displays the geographic distribution of these nodes, their annual demand values, and network connectivity to the main transmission lines.

Seasonal supply and demand

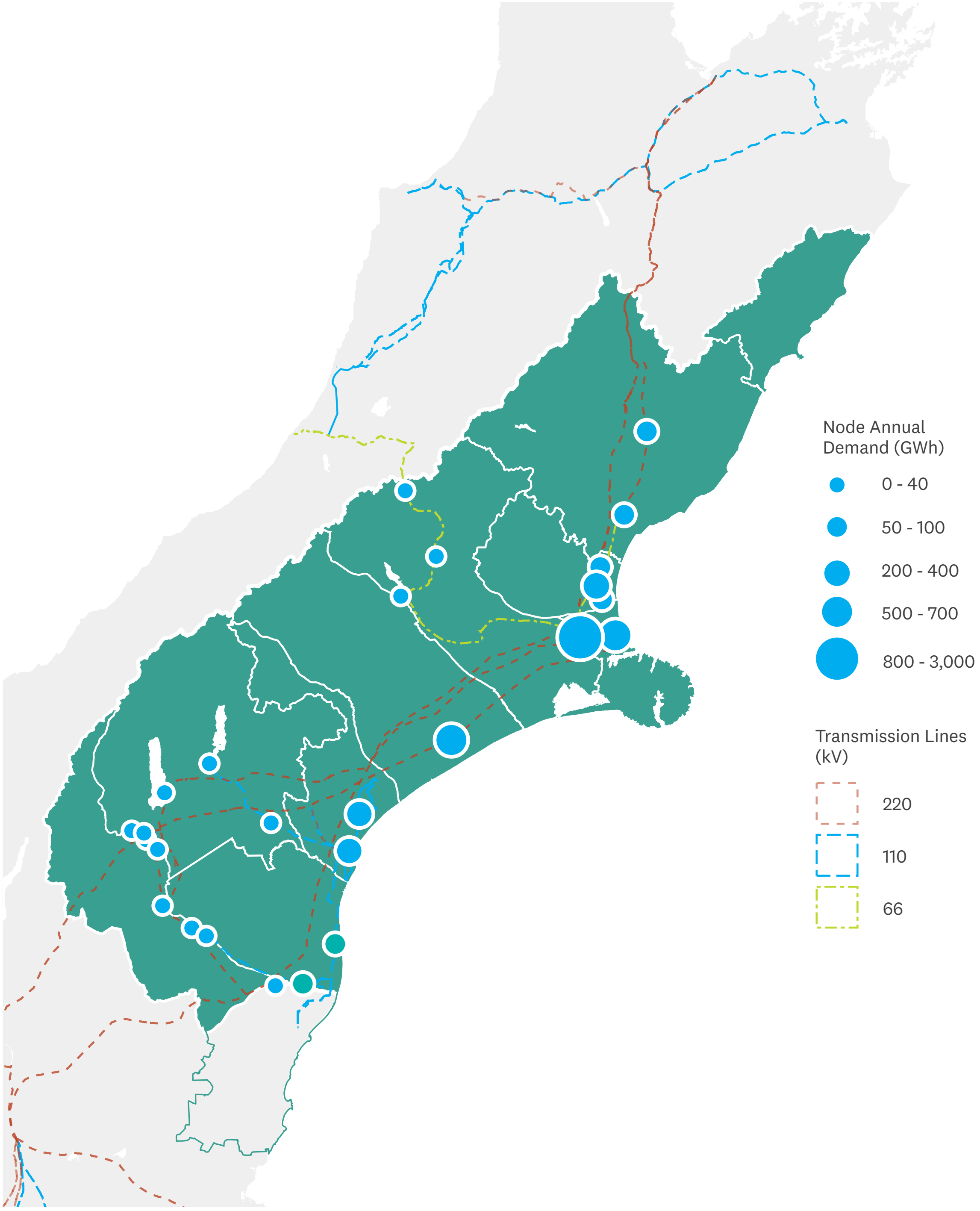
Energy demand in Canterbury fluctuates with the seasons - in winter more energy is used for heating, and in summer for cooling. Some of this can be attributed to poorly insulated housing stock that is energy inefficient and likely to be damp and cold in winter, and overheat in summer. Summer months also see an increased energy demand for irrigation.

There is a range of mitigations that can manage seasonal demand, including improved energy efficiency in homes through more insulation, double glazing, consumer education on how and when to use energy, energy-efficient appliances, and more. There is also a need for careful management of the electricity system to provide for the expected peaks in energy demand. These changes would reduce pressure on the energy network, lower the reliance on coal or gas to fill peak times, and result in more affordable electricity overall.

Further information is available in appendix 2.

[27] Transmission Planning Report 2023 | Transpower

Figure 14: Annual electricity consumption in nodes within Canterbury



Transport supply and demand

Canterbury is well-connected internationally and nationally, with movement of people and goods through the South Island's:

- international airport in Christchurch;
- two sea Ports (Lyttelton and Timaru);
- inland Ports at Woolston and Rolleston;
- main trunk and spur rail lines; and
- nationally-significant roading networks.

The likely transition to a low-emission transport system in Canterbury will have significant impacts on the demand for energy in the region – specifically the probable switch from petrol and diesel vehicles to electric and hydrogen vehicles, and methanol or ammonia for shipping. There are also anticipated changes for aviation (including electrification and liquid hydrogen technologies), rail (electrification, liquid or gaseous hydrogen), and off-road transport. Increased demand for alternative forms of energy will require supporting infrastructure and investment.

Canterbury has 286 public electric vehicle charging points (as of October 2024, EECA), the most of any region in the South Island.[28]

E-commerce

New Zealanders spent over $6.09 billion online in 2024 – a 5 per cent increase from 2023.[29] E-commerce growth, accelerated by the global pandemic since 2019, is reshaping urban freight dynamics and driving higher demand for last-mile delivery services. This trend has implications for urban logistics, traffic congestion, and transport energy use. Planning for efficient freight movement, including the integration of co-operative concepts, low-emission delivery vehicles, consolidated distribution hubs, and rail-based freight, will be fundamental to ensure reliable goods distribution within the region.

Heavy freight

In the heavy freight sector, recent New Zealand estimates suggest that, on average, heavy truck transportation produces 4.9 times and 3.8 times more emissions per tonne-kilometre than coastal shipping and rail transport, respectively.[30] These estimates depend partly on total freight volumes and type (such as bulk vs. containerised commodities). Nevertheless, they highlight the potential for a mode shift to more energy-efficient transport (like rail and coastal shipping) to mitigate energy demand and reduce fossil fuel reliance in heavy freight.

A substantial shift to coastal shipping and rail would require targeted upgrades to network capacity, port infrastructure, and intermodal connectivity. The benefits of such investments should be evaluated through direct emissions reductions and by accounting for broader resilience gains—reducing oil dependency would shield New Zealand's geographically isolated economy from environmental risks like carbon pricing shocks and geopolitical disruptions to global fuel supply chains. In line with these benefits, the Canterbury Regional Land Transport Plan 2024-2034[31] prioritises improving intermodal connections to enable seamless freight movement, enhance economic efficiency, and strengthen network resilience. This includes investments in alternative routes to mitigate disruptions.

The remaining priorities of the Canterbury Regional Land Transport Plan focus on:

- Maintaining a well-functioning transport network,
- Reducing exposure risks to extreme events to enhance resilience against natural disasters and climate change,
- Implementing safer transport systems, and
- Developing integrated public and active transport networks.

[28] Public EV Charger Dashboard | EECA
[29] Record transaction levels drive 2024's online growth | NZ Post Business IQ
[30] Transport dashboard | University of Canterbury
[31] Canterbury transport plans | Environment Canterbury

These priorities align with the Canterbury Regional Public Transport Plan, which responds to Greater Christchurch's rapidly growing urban population—projected to almost double to one million residents within 60 years. To address these pressures, the Public Transport Plan outlines strategies to:

- Improve public transport journey times to better compete with private car travel,
- Integrate land use, public transport, and active modes, and
- Introduce a mass rapid transit (MRT) system servicing key corridors, including connections to growing areas like Rolleston and Rangiora.

Further information is available in appendix 2.

Industry supply and demand

Canterbury drives much of the South Island's economic activity. For the year ending in March 2024, Canterbury generated 12.4 per cent of the national GDP. Economic growth in the Canterbury region averaged 2.9 per cent per annum over the 10 years to 2024 compared with an average of 3.0 per cent per annum in New Zealand. Renewable energy supply in Canterbury is expected to increase to support decarbonisation and industry growth.[32]

Industry compositions vary between Canterbury's sub-regions. Employment in Christchurch City is heavily concentrated in healthcare, retail, manufacturing, construction, professional services and education - compared to agriculture and food processing in the rest of Canterbury. Accommodation and food services employment is also higher in the rest of Canterbury (excluding Christchurch) than the Canterbury average, primarily because of tourism activity in Kaikōura, Hurunui, and Mackenzie.

Agriculture plays a significant role in Canterbury's economy; it is the largest agricultural region in New Zealand with 2.6 million hectares of land used for farming, one fifth of the total area farmed in New Zealand (as of 2022).[33]

In the Canterbury region, the agriculture, forestry and fishing sectors contributed $3,895.4m to GDP in the year ending March 2024 – a 8.1 per cent increase on the previous year.

This growth rate exceeded New Zealand's national increase of an 6.9 per cent for the same sector during this period.[34]

The work by EECA through the Regional Energy Transition Accelerator reports provide useful information on industry supply and demand for energy use in the region (see table 5). Two reports – one for North Canterbury and one for Mid-South Canterbury include information about medium and large energy users, with a view to reducing the carbon footprint of industrial processes.

[32] Orion Future Energy Scenarios Report 2024
[33] Food, Fibre and Agritech in Christchurch and Canterbury | ChristchurchNZ
[34] Sourced from Infometrics Regional Economic Profile

Both reports explore the pathways for decarbonisation of process heat emissions. The reports provide analysis on the impacts on fuel demand across three categories – demand reduction, heat pumps and fuel switching.

Both biomass and electricity are considered in fuel switching and considerable analysis is available on the resourcing and costs of making these fuel switches in the reports.

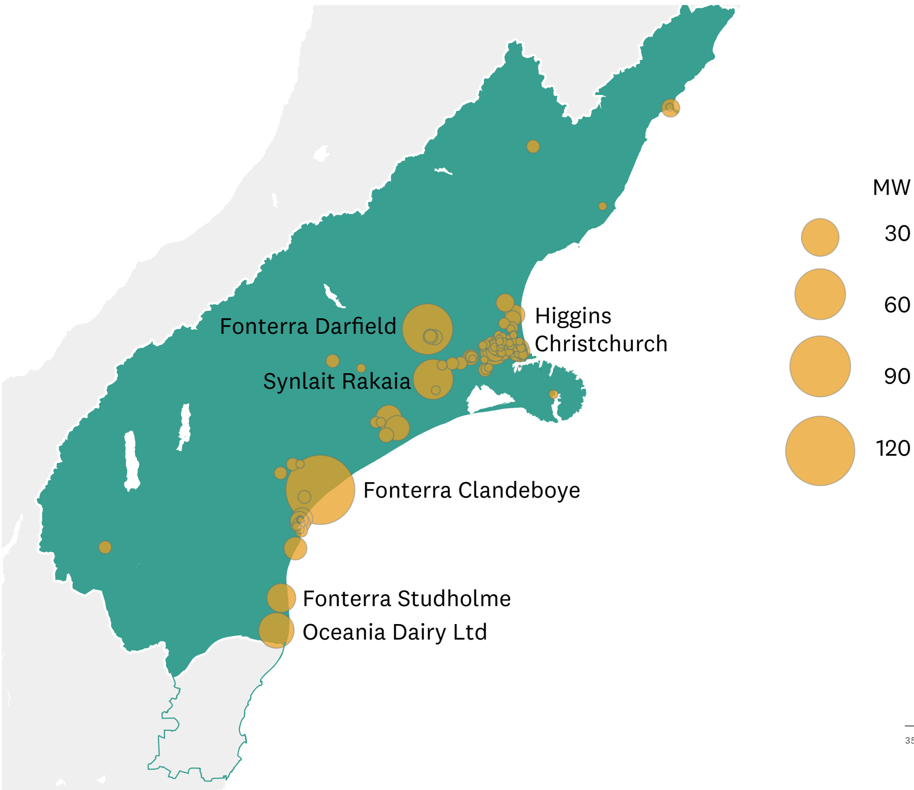
Table 5: Canterbury RETA sites - fossil fuel process heat demand and emissions.

RETA reports	Number of sites (only includes sites with >500kW or where EECA has info about the decarbonisation pathway)	Demand (amount of process heat energy consumed)	Greenhouse gas emissions
Mid-South Canterbury	33	5,731TJ – primarily in the form of coal	542kt per annum of greenhouse gas emissions
North Canterbury	80	4,267TJ - primarily in the form of coal	372kt per annum of greenhouse gas emissions

The online RETA Map is an interactive tool that shows a visual representation of demand and supply energy sites, with a regional focus.[35] Utilising RETA data from EECA, existing electricity demand and the anticipated shifts on demand for both electricity and biomass that will be needed to support the decarbonisation of medium to large process heat industries in the Canterbury region is shown across figures 15, 16 and 17.

Figure 15 illustrates the projected power demand from industrial electrification scenarios across Canterbury, with dairy manufacturing plant boilers representing the largest energy users. Figure 16 complements this analysis by mapping the resulting power loads on existing GXP nodes in the region. Notably, additional grid connections may be required – particularly for Fonterra's Clandeboye facility.

Figure 15: Expected peak electricity demand for industrial sites in Canterbury



[35] RETA map | EECA

Figure 16: Expected additional electricity load from industry decarbonisation scenarios

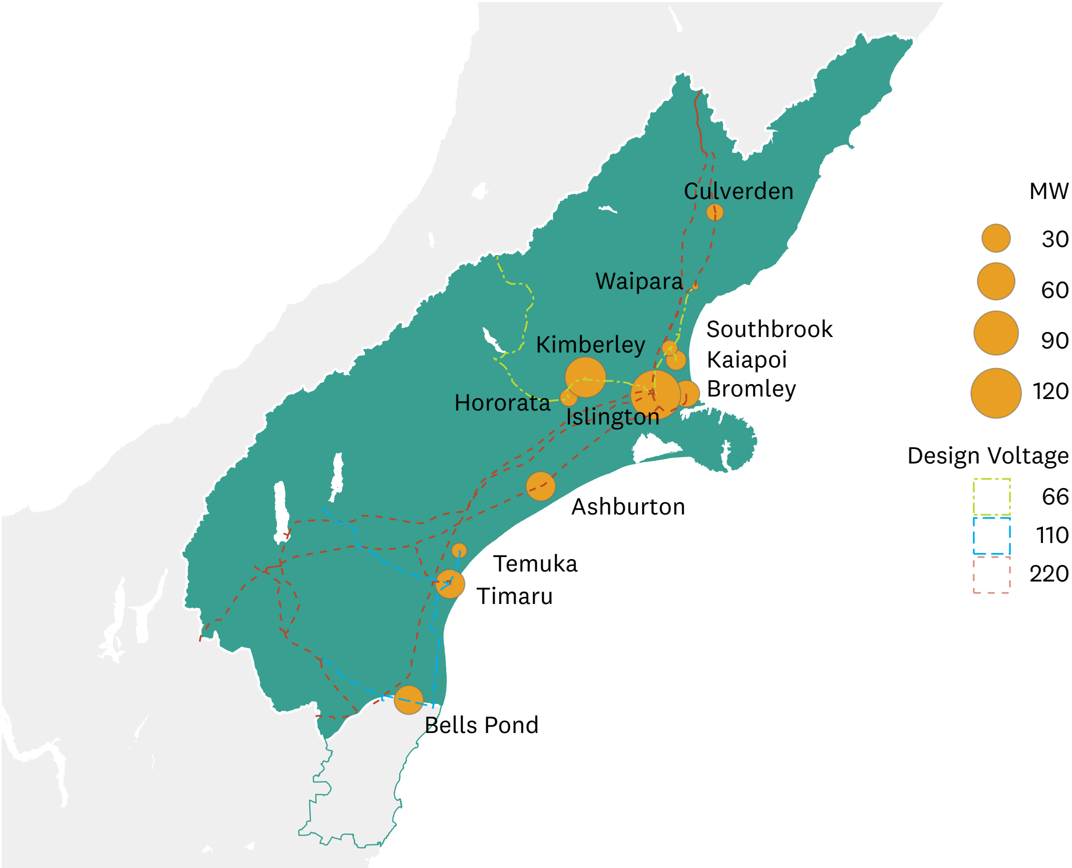
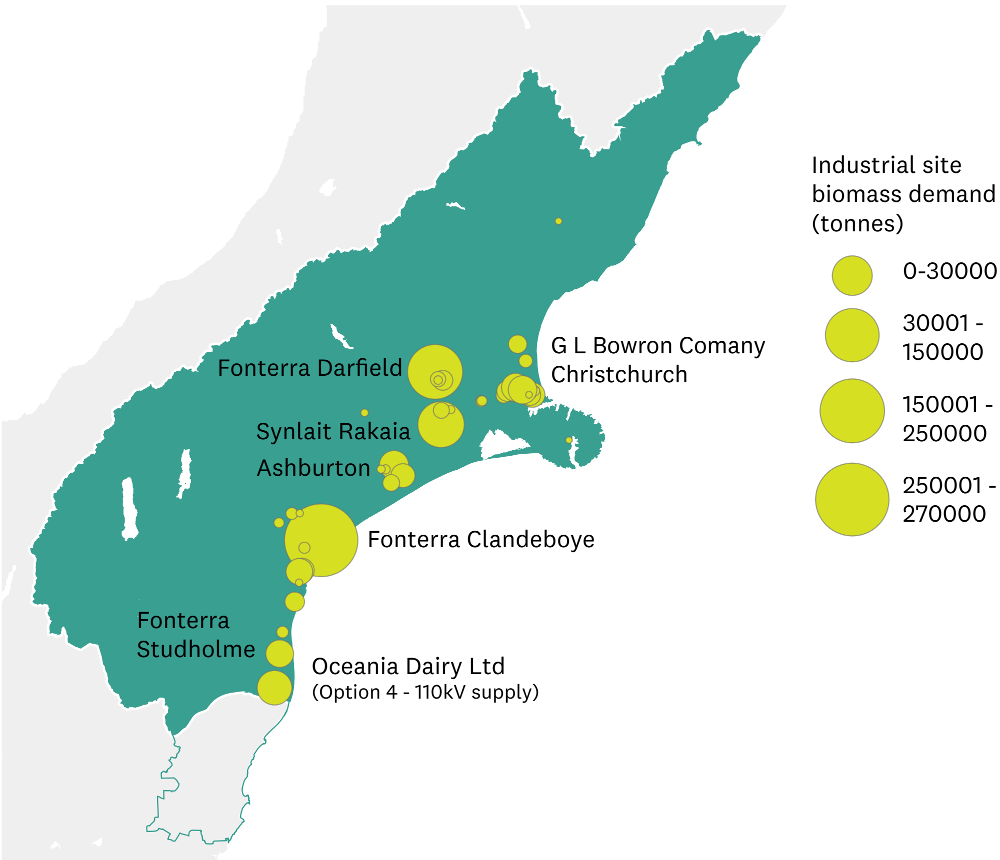


Figure 17: Expected biomass demand in industry decarbonisation scenarios



Major energy users in Canterbury

The Major Electricity Users' Group (MEUG) is a New Zealand trade association working to improve New Zealand's electricity sector. It advocates for an affordable and reliable electricity supply to support a productive economy. There are two MEUG members in the Canterbury region - Fonterra and Daiken New Zealand Limited.

Fonterra – powering up while bringing emissions down

Fonterra has a wide range of work underway in an effort to shift manufacturing operations to renewable energy sources and have made a commitment to stop using coal by 2037.

Fonterra announced its largest decarbonisation project to date for their Clandeboye site in South Canterbury, achieved through converting two coal boilers to wood pellet use. The $64 million investment will cut the cooperative's overall manufacturing emissions by nine per cent, with reductions totalling 155,000 tonnes of CO_2 each year, the equivalent of removing more than 64,000 cars from New Zealand roads each year.

The conversion of the two boilers is scheduled to be completed and operational by September 2025. Plans to transition the site's remaining boilers to use a renewable energy source will continue as part of the Co-operative's wider decarbonisation plans.

This conversion is co-funded as part of a partnership between Fonterra and EECA.

Further information on this and other decarbonisation projects by Fonterra can be found on their website.

For further information and data about energy supply and demand:

Transpower – provide a wide range of information, data and analysis on energy market indicators, including generation, demand, and HVDC transfer. They also operate EMS – Energy Market Services and em6 which is NZ's electricity data hub that provides live electricity market data across the country

EECA – provides access to the Energy End Use Database EEDU that provides the latest data on energy use in NZ homes and businesses.

Regional Energy Transition Reporting (RETA) – developed by EECA

- RETA reports – provide accessible information on energy use in North Canterbury and Mid-South Canterbury
- RETA Map – an interactive tool that shows a visual representation of demand and supply side energy sites, with a regional focus.

MBIE – provides energy statistics and modelling. A wide range of data is made available, although most of it is provided at national, rather than at regional level

Electricity Authority – provide data and insights on the electricity market through data dashboards and quarterly reviews.

Potential Canterbury supply

The future supply of Canterbury's electricity generation will be influenced by the potential of new renewable energy. There are numerous solar proposals in Canterbury – noting that while some are under construction and others are well into the planning stages, some have been consented, but without any immediate plans for construction.

Table 6 provides a sample of some larger-scale renewable energy projects in the pipeline in Canterbury. It is acknowledged that this doesn't give a comprehensive picture of the pace of change and challenges for communities, providers and regulators. More comprehensive and up-to-date information on the progress to connect new generation and batteries to the grid can be found on the Transpower website.[36]

Table 6: Sample of large-scale, future renewable generation

Solar under construction	Description	Location	Generation Capacity
Kōwhai Park Solar Farm	A partnership between Christchurch Airport, Contact Energy and Lightsource bp. Part of Christchurch Airport's commitment to decarbonising and creating a clean energy hub and will begin generating electricity by 2026.	Christchurch Airport	150MW or
Consented solar	**Description**	**Location**	**Generation Capacity**
Brookside Solar	Ethical Power and KeaX are partnered to build a solar array of 74,400 panels connecting at the Brookside sub-station.	111 hectares in Buckley's Road, Leeston, Selwyn District	67MW or 110GWh annually
Lodestone Dunsandel	Combined agriculture and solar array that will connect to Orion zone sub-station collocated at Transpower's newest grid entry/exit point (GXP) sub-station	100 hectares between Norwood and Charing Cross, Selwyn District	80MW
Lodestone Mount Somers	Sheep farm with solar power generation. Will connect to the Mount Somers sub-station.	35 hectares Tramway Road, Mount Somers, Ashburton District	51MW
Lodestone Clandeboye	Agrivoltaic design combining productive farming with solar power generation.	Near Temuka, Timaru District	24MW
Lincoln University	Energy farm mixing high-value crops and photovoltaic panels.	Lincoln University, Selwyn District	1.5MWp

[36] Connection data | Transpower

Consented wind	Description	Location	Generation Capacity
Mt Cass Wind farm	22 turbine wind farm at Mt Cass, near Waipara.	Hurunui District	95MW - power 40,000 homes per year
Fast track project	**Description**	**Location**	**Generation Capacity**
Balmoral Station Solar Array	Construct and operate a solar array comprised of approximately 135,000 solar panels	Mackenzie District 113-hectare site in Tekapo	88MW
The Point Solar Farm	Construct and operate a solar farm that could generate enough electricity to power 100,000 homes	Mackenzie District 670- hectare site near Lake Benmore	420MWp
Haldon Station Limited (Lodestone Energy)	Construct and operate a solar farm – this is a two-stage development total planned capacity is 220MW. Stage one construction is intended to start in 2025 – 2026	Mackenzie District 320-hectare site adjacent to Lake Benmore	220MWp
Black Point Solar Farm	Construct and operate a solar farm comprised of approximately 380,000 solar panels, enough to power approximately 38,000 homes	Waitaki District 240-hectare site near Oamaru	270GWh annually


Photo: Genesis Energy.

Of note, **Lincoln University** is developing an Energy Farm project, looking at how to optimise productive land that can cultivate high-value crops such as blueberries while generating grid-scale solar power at 1.5MWp from approximately 2,800 photovoltaic panels. It has an ongoing research group focused on agrivoltaics, which will provide insights into this business model locally, nationally and internationally.

Fast track solar projects

Four solar projects in the Canterbury region were included in Schedule 2 of the Fast-track Approvals Act 2024, which means they can apply directly for consideration by an Expert Panel under the Act. Each of these projects would connect to and supply electricity to the national grid. If the four projects are approved and constructed, there will be an additional 38 per cent of regional generation capacity between them – more than 690MW, where existing capacity across Canterbury's major generators is currently 1800MW.

Smaller scale renewable consented projects

Information about consented renewable energy projects in Canterbury has been provided by district councils. Smaller consented Canterbury wind projects include a proposed 7.1m wind turbine at Cashmere High School and two wind turbines of between 9m and 12m at Orton Bradley Park. There are too many projects to list, so this report gives a sample of the projects in the pipeline for Canterbury.

Examples of large-scale projects in the consenting process

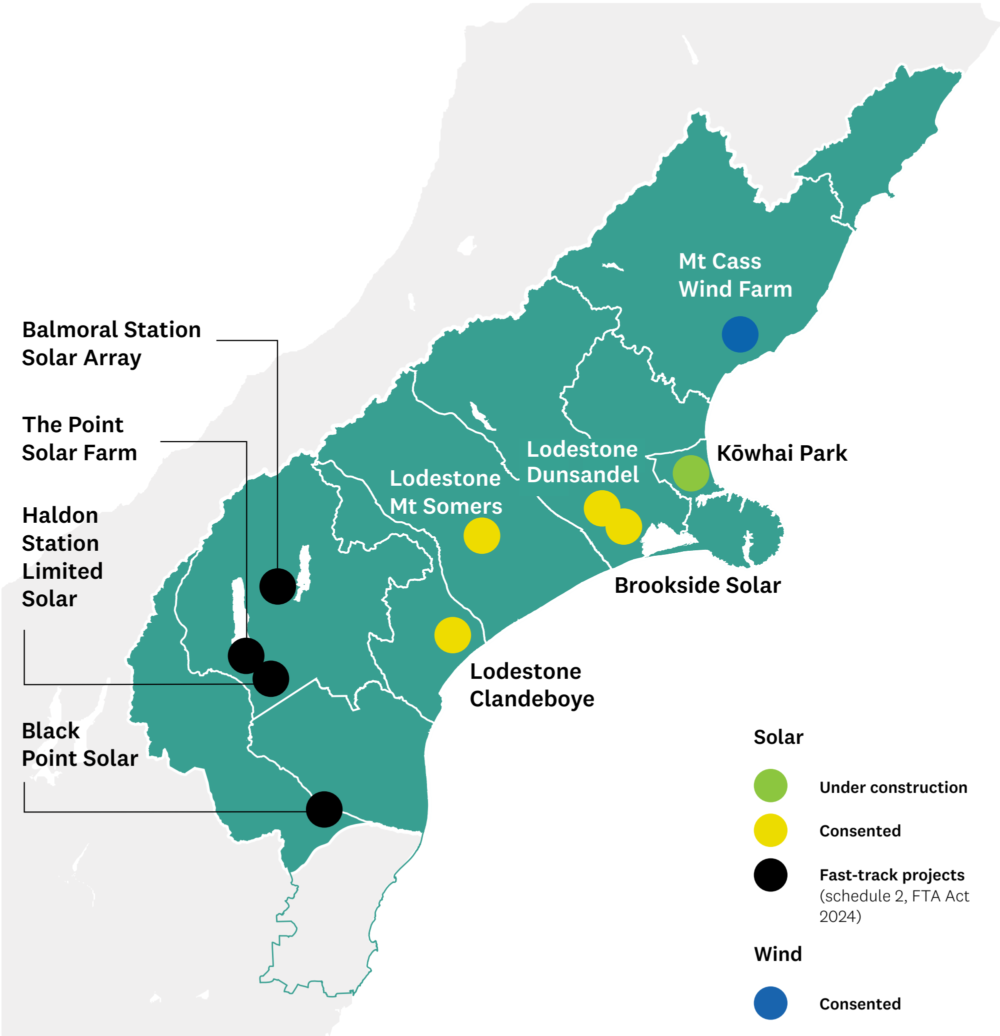
Two notable solar projects in North Canterbury, still in the process of seeking consent, include the Swannanoa Solar Farm and Ashley Solar Farm.

Australian company Energy Bay Ltd has applied to the Waimakariri District Council for consent for the **Ashley Solar Farm**, located on Upper Sefton Road, north of Rangiora. This 80-hectare site has the potential to generate enough power for 9,750 houses. This proposal gained media attention in early 2025, as neighbours are opposed to its construction. This is still under application.

The **Swannanoa Solar Farm** proposal by Meridian Energy is located approximately 12km northwest of Christchurch on flat land previously used as a forestry plantation and to grow crops. The 250-hectare site has the potential to host a 200MW solar array due to its topography, with existing transmission lines running overhead which enable electricity to be transmitted to Greater Christchurch and the National Grid.

A sizable wind project in the process of seeking consent is the **Kurow Wind Farm**. This would provide renewable energy to Canterbury and Otago and is proposed by two private owners who have partnered with Aquila Clean Energy. Maximum generation of 130MW is proposed to connect to the main grid via the Waitaki Livingstone 220kV line. Resource consent is expected to be lodged with Waitaki District Council and Environment Canterbury in 2025, with a view to commissioning the wind farm in 2028.

Figure 18: Map of potential large-scale solar and wind generation



Future hydroelectric generated supply

New consents for hydroelectric generation in the Canterbury region are limited, however, consent renewals include a recent Fast Track application for replacement resource consents for the Tekapo Power Scheme. Meridian has also applied to renew its consents for the power stations in the Waitaki hydro scheme.

These are significant applications as Hydro-power provides the stable base of Canterbury's renewable energy supply. There have been no new large-scale schemes constructed since the Clyde Power Station, commissioned in 1992.

Future supply through waste to energy

Bioenergy

The Christchurch City Council tendered for a new facility to process the city's organic waste. Ecogas was awarded the contract to establish the Ōtautahi Christchurch Organics Processing Facility.[37] Ecogas has been granted land-use consent by Christchurch City Council and has applied for a resource consent from Environment Canterbury. The bioenergy facility will transform approximately 100,000 tonnes of organic waste each year from kerbside collections, commercial and industrial operations into approximately 1,800Nm3 per hour of biogas, biofertilizer and wood chips. The dual solution will utilise anaerobic digestion for the wetter materials including organic matter collected at the kerbside. The more fibrous greenwaste streams will be run through a biomass processing line creating woodchips, another source of renewable fuel for industry.

Ecogas has chosen an Industrial Heavy zoned site in South Hornby to be close to collections agents, customers and critical infrastructure, while providing opportunities for the surrounding businesses to change to a renewable energy source. The Ōtautahi Christchurch Organics Processing Facility intends to start taking organic waste from the second half of 2026.

Wastewater heat

The crown agency Rau Paenga are installing a wastewater heat recovery system (designed by Environmental Technology Solutions), to heat Christchurch's Parakiore Metro Sports Facility, due to open in late 2025. This system, the first of its kind in New Zealand, will recover and use heat reclaimed from wastewater pipes that flow near the sports facility. Wastewater is warm because of the hot water entering the network from sinks, dishwashers, showers and washing machines throughout the city. This heat recovery system will produce approximately 3500kW of energy per year to help heat the sports facility. That is equivalent to the amount of power used in around 2,000 homes per day. This reclamation of heat from wastewater generates a renewable heat source that lowers greenhouse gas emissions and reduces energy costs.

Connecting new electricity generation to the grid

The South Canterbury region has a significant amount of existing hydro generation connected to the 220kV grid. There is interest in connecting new generation, particularly large-scale solar and some wind generation, to the 220kV grid. The transmission system's capacity to accommodate new generation depends on multiple factors. Due to the high volume of generation connection requests, Transpower maintains a queued process for conducting connection investigations.

Transpower has information on new connection inquiries that illustrate the potential pipeline including total MW of currently active enquiries, connection subtypes and enquiry stages, by planning region. As at May 2025, there are 19 active Transpower projects proposing to add over 4500MW of new generation capacity in Canterbury and South Canterbury.[38]

[37] Organics processing facility | Christchurch City Council
[38] New Connection Enquiries | Transpower

Chapter Four
What the future looks like

The energy system is facing major change - increasing demand for electricity, a changing climate, and evolving global technologies will result in a significantly different energy landscape over the coming decades.

Both the government and the energy sector are considering potential future scenarios and pathways that may impact and influence New Zealand, and Canterbury's, energy future. Although scenarios do not represent forecasts, they provide a useful consideration of potential outcomes and futures by examining plausible combinations of key assumptions. Some of the energy futures work and scenario modelling that has most informed this section is listed next:

- **MBIE** - Electricity Demand and Generation Scenarios (EDGS) explore potential future electricity demand, and the generation capacity needed to meet that demand, to 2050.
- **Transpower** - Whakamana i Te Mauri Hiko: Empowering our energy future 2020, takes a scenario-based approach to consider what the future may look like in the year 2050 and the actions required to get there.
- **Orion Group** – Future Energy Scenarios Report 2024 outlines various scenarios to navigate the evolving energy landscape, considering decarbonisation, technological advancements, and consumer empowerment, to help understand future risks and opportunities and guide strategic planning for energy infrastructure.
- **EECA** - NZ Energy Scenarios TIMES-NZ, is an interactive tool for analysts, researchers and modellers, to explore possible future scenarios and test assumptions about the New Zealand energy system.

Based on this list of future energy scenarios, a review of relevant literature, and input from sector stakeholders, this section identifies key factors likely to influence our future energy system.

Increasing demand for electricity

MBIE prepares an independent set of scenarios called the Electricity Demand and Generation Scenarios (EDGS). For EDGS 2024, five scenarios were developed to explore a range of potential futures for electricity demand and generation in New Zealand.[39] Total electricity demand increases across all scenarios to 2050 (see figure 19), by up to 82 per cent. This is primarily driven by increased electrification of energy use, as well as increased uptake of new technologies, including electric vehicles and large-scale data centres.

Transpower's monitoring of key trends and drivers indicates that New Zealand is currently tracking along the 'Accelerated Electrification' scenario identified in Whakamana i Te Mauri Hiko: Empowering our Energy Future 2020. This scenario expects that by 2050, electricity demand will increase by 68 per cent and installed generation capacity will increase by 137 per cent.

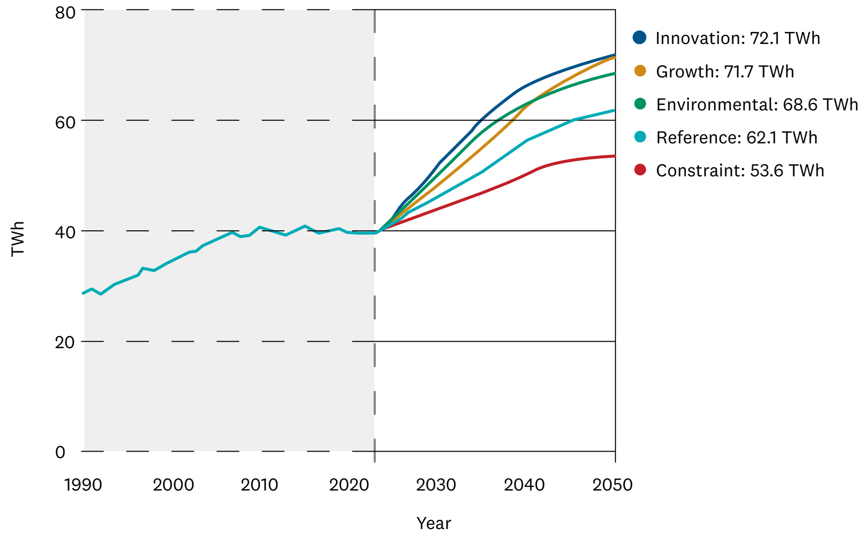
Substantial investment in generation and networks will be required to meet increasing demand for electricity, driven by the need to decarbonise and support population growth, and reach 100 per cent renewable electricity by 2030. A report prepared by the Boston Consulting Group[40] predicts that rapid decarbonisation of the energy system will require an unprecedented investment of $42 billion in the 2020s, including increased spend across generation, transmission, and distribution.

Under the EDGS 2024, new generation to meet this increased demand is mostly onshore wind and solar. These are also the lowest-cost solution to meet most new demand.

Chapter three outlines the potential new generation for the Canterbury region and indicates that our existing electricity generation (currently, predominantly from hydroelectric sources) will be bolstered by solar and wind in the future. While there has been consideration of geothermal potential in the South Island following drilling discoveries of hot water below the South Island Alpine Fault, the Institute of Geological and Nuclear Science (GNS) has indicated that work to date indicates it is likely a minor resource, only suitable for small scale direct-use applications.

The number of distributed generation installations is increasing and is expected to play an important role in the future. As renewable energy sources become more widespread, energy storage solutions such as large-scale batteries and pumped hydro storage, will become increasingly important to balance supply and demand. Similarly, consumer flexibility around energy use through initiatives such as thermal storage for domestic hot water and space heating, will play an important role.

Figure 19: Forecast electricity demand for New Zealand



[39] Electricity Demand and Generation Scenarios - July 2024 | MBIE
[40] Boston Consulting Group, 2022, The Future is Electric - A Decarbonisation Roadmap for New Zealand's Electricity Sector.

A changing climate

Climate change is expected to cause significant changes to both the demand and supply sides of electricity.

In 2022, the Canterbury Mayoral Forum published the Canterbury Climate Change Risk Assessment,[41] a technical assessment which identifies the range of risks and climate-exacerbated hazards the region is likely to face into the future. A summary of climate change projections for the Canterbury region is provided in figure 20.

Climate impacts on supply and demand

Hydro-power generation is currently the dominant source of energy generation in the region and is highly dependent on water availability – this may be impacted by the potential for drought. However, NIWA projections show South Island hydro lakes are expected to receive more rainfall over time. This provides Canterbury with some resilience against climate change scenarios, with a slightly reduced need for other new generation capacity, based primarily on increased hydro generation.

Wind and solar are 'intermittent' power sources. A changing climate will impact how windy or sunny it is and when, and this will in turn impact the generation potential from these sources.

Changing climate variables are likely to alter existing demand patterns. For example, warmer temperatures are likely to increase summer electricity demands for cooling. Other impacts include increases in drought, affecting demand for electricity for pumped irrigation. This could have significant impacts in Canterbury, as the region has the most irrigated land in New Zealand.[42] These changes could see electricity demand 'peaks' change, placing more pressure on transmission lines at different times of the year.

There is capacity for the sector to develop more diverse generation sources, and uptake of distributed private generation such as solar is increasing. Increased adoption of distributed energy generation increases resilience by diversifying energy sources and reducing reliance on major transmission lines.

Figure 20: Summary of climate change projections for Canterbury by 2100[43]

Sea level is projected to rise by up to 80cm above present day levels.
Annual mean temperature is expected to rise by 1.5-3.5 degrees Celsius, with seasonal mean maximum temperatures between 2-5 degrees Celsius warmer than the historic average. Alpine areas could have a 5-6 degrees Celsius increase in spring and summer mean maximum temperatures. In many parts of Waitaha Canterbury, there will be between 20 and 60 more hot days (over 25 degrees Celsius) annually by 2100.
Summer rainfall is projected to increase by up to 20 per cent in the inland Waitaha Canterbury Plains. A decrease of up to 10 per cent is projected for the area around Ōtautahi Christchurch, with as much as 15 per cent less summer rainfall expected on Te Pātaka o Rākaihautū Banks Peninsula. An increase in winter rainfall of 15-40 per cent is expected in the eastern, western and southern parts of the region.
Drought potential is likely to increase across most of Waitaha Canterbury
Wind is likely to increase in speed, and winter and spring are likely to be windier. This seasonal change is likely to be more strongly felt in inland areas north and west of Rangiora.
As temperatures rise, there will be fewer snow days, and fewer frost days, across the region.
Extreme weather events (e.g. severe storms) are likely to happen more often.
Wildfires will become more likely as hotter, drier summers occur. Rural areas will be more exposed.

[41] Canterbury Climate Change Risk Assessment 2022 | Canterbury Mayoral Forum
[42] Irrigation in New Zealand: IrrigationNZ
[43] Canterbury climate change projections | NIWA

Climate impacts on transmission infrastructure

The highest climate change-related risks to energy infrastructure in Canterbury include those from extreme weather events. Transmission and distribution infrastructure are highly sensitive to weather extremes, including high wind, heavy rain, flooding, snow and lightning. Overhead transmission lines are particularly sensitive to damage from wind and flooding. The risk to power transmission from fire is also likely to increase. Power transmission itself can also contribute to fire risk.

Other factors relating to severe weather events are the high level of interdependence on:

- Roads and rail for providing access to sites
- Telecommunications for control system management across the country
- Fuel (back-up energy sources for generators and back-up batteries).

Rising sea levels will exacerbate coastal hazards such as tsunami and storm surge, increasing the exposure of assets near the coast. Exposure of transmission lines to coastal flooding and sea level rise in Canterbury is among the highest in the country. The exposure of lines is spread across Christchurch City, Waimakariri, Waimate and Waitaki Districts. Timaru District is exposed to a lesser extent.[44]

There is a range of mitigations that can be considered to improve resilience for energy assets and infrastructure. For example, opportunities exist to relocate lines away from areas prone to flooding, or to bury lines underground. However, these options are often prohibitively expensive and/or disruptive.

Other solutions can include increased maintenance to strengthen infrastructure from potential damage or 'islanding' where part of a grid is isolated and operates separately from the main grid, to enable increased reliability of power supply in the event of a large outage event.

It is expected that a much greater emphasis will be placed on considering climate change risks to new infrastructure investment. Recent flooding events in the North Island demonstrate the importance of considering climate change risks carefully in planning energy infrastructure and systems.

The Canterbury Civil Defence Emergency Management Group is undertaking work that will provide an overview of risks and resilience for the electricity sector.

Evolving technologies

The accelerated transition to a low-emission economy has prompted the exploration and advancement of progressive initiatives nationally, including green hydrogen projects, offshore wind farm exploration, biofuels development, and offshore oil and gas exploration. The current coalition Government is re-evaluating energy policies, and this includes reversing previous bans on offshore oil and gas exploration to enhance energy security and manage costs associated with the energy transition. Significant regulatory reform is intended to promote investment in renewable energy and decarbonisation initiatives (see appendix 1).

Offshore renewable energy - As part of Electrify NZ (see appendix 1), the Government has committed to delivering a regulatory regime for offshore renewable energy, to enable investment and deliver clean energy at scale. The regime focuses on addressing gaps in our current system and enable development of our offshore renewable energy resources.

[44] Canterbury Climate Change Risk Assessment 2022 | Canterbury Mayoral Forum

Battery Energy Storage Systems (BESS) technology - BESS is expected to become an important component of the energy system in the future. These large-scale grid-connected batteries can store energy when supply is high and provide it back to the grid when demand is at a peak. They play an important role in increasing the resilience and value of intermittent renewable generation. However, grid-scale BESS solutions face economic challenges, and end-of-life management remains an issue.

Smart Grid Development - The energy system is becoming more complex with the integration of distributed generation (including home rooftop solar), energy storage, and smart grid technologies. Efforts are underway to develop a resilient electrical grid that can adapt to these changes, ensuring reliable and efficient energy distribution.

Irrigation - Energy efficiency is being built into irrigation schemes where viable, including through the substitution of groundwater for newly available surface water, which minimises the need for pumping. Many irrigation schemes have investigated options for hydroelectric power generation as part of upgrade projects, although these options are dependent on financial viability. Environment Canterbury reports against goals on energy security and efficiency relating to irrigation under the 2020 Canterbury Water Management Strategy. A survey of large Canterbury irrigation schemes shows that there is increased attention on energy use and ways to reduce electricity use. This includes through efficient use of (pumped) water and where water supply can be pressurised by gravity via piped distribution. Opportunities and actions vary between irrigation schemes (and between irrigation seasons).

Transport - A shift towards sustainable technology is underway in different transport sectors. These changes are not limited to electrification but also potentially include hydrogen (particularly for heavy freight), methanol or ammonia for vessels and alternative fuels such as sustainable aviation fuels (SAFs). However, the energy transition in transport is not solely about technological advancements. Energy demand is strongly tied to our travel patterns and behaviours. Changes in urban form, access to active modes, and investment in public transportation play a crucial role in reducing energy demand and fossil fuel dependency. A well-planned urban environment can significantly mitigate emissions by enabling more efficient and sustainable transport choices. More information on transport is provided in chapter 3.

Future considerations

Other key considerations that could potentially impact energy demand, supply and reliability of supply are discussed below.

AF8

AF8 stands for Alpine Fault magnitude 8 and is commonly thought of in the context of future resilience planning. It is based on research that indicates a 75 per cent probability of an Alpine Fault earthquake occurring in the next 50 years. This would have significant impacts on energy use in New Zealand, and electricity generation and transmission throughout the South Island will be significantly affected. It is likely that most hydro generation plants would shut down. Substations would likely sustain significant damage and the DC Link that transfers electricity back and forwards between the North and South Islands may also be damaged.

Cyber security

The Department of Prime Minister and Cabinet has a work programme on Critical Infrastructure Resilience that is considering a range of challenges. One of these challenges is that of technological change: while enhancing efficiency it is also potentially creating new vulnerabilities – to cyber-attacks for example. Canterbury planning for energy should align with this national-level critical infrastructure resilience planning which also supports the New Zealand Infrastructure Strategy. The 2024 National Risks Public Survey undertaken by DPMC listed 16 threats, ranked in terms of perceived likelihood. Emerging technology affecting NZ security was ranked fourth and disruption of critical infrastructure (e.g. energy generation and distribution) was ranked ninth.

New Zealand Aluminum Smelter – Tiwai Point

New Zealand's largest electricity consumer is the New Zealand Aluminium Smelter (NZAS) at Tiwai Point, located in Southland. The smelter uses approximately 572MW of electricity when running at full load, equivalent to about 12 per cent of New Zealand's total demand and about a third of the South Island's. Although it is located outside the Canterbury region, NZAS is considered relevant to this work due to the considerable impact it has on the transmission system and electricity industry.

The closure of the smelter was announced in 2020. However, it is now expected to remain operational until at least 2044, after the company secured long-term electricity contracts in 2024. These agreements include 'demand response', which means that Meridian Energy and Contact Energy can ask NZAS to reduce the smelter's electricity use.[45]

Closure of NZAS would result in an excess of renewable generation in the lower South Island (if not replaced by alternate large-scale loads). This has the potential to significantly impact electricity supply, demand, and pricing. The closure of the smelter is therefore a key scenario considered by the Southland Murihiku Regional Energy Strategy 2022-2050[46] and through Transpower's transmission planning.

Local area energy planning

Local Area Energy Planning (LAEP) is a relatively new process, designed to deliver effective local action to contribute to net zero emission targets. LAEPs are now a statutory requirement for Welsh local authorities, and some local authorities in the UK have also adopted LAEPs.

LAEP is gaining traction in New Zealand as a tool to support local net-zero plans and inform network planning. In Canterbury, Orion is supporting local area energy planning, leveraging best practice guidance from the UK. LAEP has the potential to be used as a framework to support more coordinated planning and investment, including with councils.

As part of the implementation of Selwyn District Council's Waikirikiri Ki Tua Future Selwyn Strategy, Area Plans are being developed for Malvern, Ellesmere and Eastern Selwyn. These are non-statutory, sub-district spatial plans which will provide integrated and place-based strategic direction for future growth, development and change. Development of the Area Plans will include the spatial identification of areas that could support new renewable energy generation in the future, particularly onshore wind and solar. Other mapped elements will include aspects of the local distribution network and national grid needed to support this. Early engagement has included Orion, Transpower, Lincoln University, and other partners. The Area Plans are likely to be finalised in 2026.

[45] Tiwai Point smelter demand response 2024 | Electricity Authority
[46] Southland Murihiku Regional Energy Strategy | BECA

Chapter Five
Opportunities and challenges

Energy transition creates wide-reaching opportunities and challenges for New Zealand and the globe. This section is focused on some of the opportunities and challenges for Canterbury. Key takeaways include:

- **A regional approach to energy enables co-benefits and system-level collaboration**
- **Energy and economic growth are inextricably linked**
- **Investment is needed in generation and distribution assets to achieve Canterbury's decarbonisation goals**
- **Opportunities exist in renewable energy sources such as solar and biomass**
- **The possibilities that could eventuate with hydrogen technology**
- **Managing peak capacity issues is a pressing challenge in a changing climate**
- **Community and consumer education is needed.**

A regional approach to energy

Canterbury can coordinate and work better as an energy system, linked closely with the South Island and the rest of New Zealand. Energy cannot be looked at in isolation, as it intersects with the transport system, housing and urban development, resilience of infrastructure, regional skills and immigration, water, climate change, industry, food production, community wellbeing and more. A regional approach to the energy system would enable co-benefits of the energy transition to be realised. Aligning around a compelling vision will help attract partners and provide certainty for necessary and innovative investment. Several other regions are seeing the benefits of taking a regional approach to energy, including Southland, the Westcoast and Waikato.

There are a multitude of pathways being explored as part of the energy transition, with obvious progress in some areas – electrification of vehicles, heat pump technology including high-temperature heat pumps, proposed large waste-to-energy projects, grid-scale solar farms, and local solutions such as using wastewater to heat public buildings. Other possibilities are emerging and being tested, but still have an infrastructure cost barrier or a degree of uncertainty as to whether they will succeed, all combining to make transition slower. These possible solutions include hydrogen, woody biomass for bioenergy, synthetic aviation fuels, battery energy storage systems and electrifying process heat demand. A shared approach or view would help the region navigate the energy transition collectively, rather than district-by-district.

Spatial planning at a district or regional scale could provide an opportunity to collaboratively identify areas that may be appropriate for future energy development and those that are subject to development constraints. Local authorities could work together to develop a consistent approach to the consideration and assessment of resource consents for wind and solar – for example collaborating on good practice consenting guidelines and conditions. Other opportunities could include working with Transpower and EDBs to develop processes for planning for, and consenting new infrastructure, upgrades and maintenance.

There is considerable regulatory and policy change happening at a national level, with further information provided in Appendix 1. Some of the changes seek to remove barriers to consenting and fast-track the process of delivering infrastructure projects, including for renewable energy. They also aim to achieve greater levels of energy system reliability and resilience. A coordinated approach at a regional level will ensure Canterbury is well-positioned to respond and align with national-level change as it happens.

The regional approach to energy could address a wide range of the opportunities and challenges noted in the next section.

A coherent and agreed-upon approach to energy would aid Canterbury to move forward confidently

Economic growth

Energy is the backbone of our economy. Decarbonising our regional economy both supports, and generates, economic opportunities. Canterbury is well positioned geographically, with 19 per cent of the country's farmed land and 70 per cent of New Zealand's groundwater. Canterbury has the potential to be at the forefront of an energy transition to more renewable sources, as evidenced by the queue of renewable projects in the consenting process.

The opportunity to invest in renewable infrastructure, innovation in clean technologies, and the development of new energy markets, would have positive impacts through job creation, technological advancement, and supporting industry growth and diversification. The transition of Canterbury's energy system to prioritise renewable sources fosters regional economic development through localised energy production, currently focused on grid-scale solar, but with opportunities in wind, hydrogen, biomass and biofuels. The OECD estimates 25 per cent of jobs in Canterbury contribute to environmental objectives – 'green jobs'.[47]

Roading and electricity supply are likely to be key contributors to growth during 2026 and 2027 - Infometrics' Building Forecast

[47] Job creation and local economic development OECD 2023

Workforce

Each renewable energy project creates jobs (project management, business development, engineering, environmental science, trades, administration) bringing money to the region as well as skilled workers. This region has the advantage of the University of Canterbury being an established engineering university, and Lincoln University specialising in land-based horticultural and agribusiness as well as an established trade school in Ara Institute, with campuses in Christchurch, Ashburton and Timaru.

The opportunity exists to develop a workforce to maximise the economic benefits associated with the energy transition. This will ensure labour markets are equipped to supply the specialised skills and expertise required to design, install, maintain, and operate renewable energy infrastructure. By aligning education and training systems with industry needs, skills shortages can be addressed, workers can be re-skilled and up-skilled, and young people can explore training opportunities and employment pathways in the energy sector.

This has the added benefit of reducing 'poaching' within the currently small workforce pool that exists in Canterbury (and in New Zealand). Current and ongoing challenges include a reliance on immigration to bring energy talent into the region and the length of time it will take to establish a workforce pathway in a rapidly changing and growing field. It may take years before we have the training pool expanding at a rate that can keep up with demand.

Investment considerations

Canterbury can benefit from existing and future investment in a diversity of generation infrastructure and assets. To decarbonise the wider economy, heating and transportation will need to be electrified. Development of large quantities of new renewable electricity generation, at pace, will be key to achieving Canterbury's transformation goals. To facilitate this, and as our system becomes more decentralised with generation assets and distributed energy resources increasingly deployed within local networks, investment will be required in network infrastructure. A key challenge for Canterbury (and New Zealand) is securing the necessary investment for grid modernisation while navigating extended lead times caused by global supply chain disruptions and increasing global demand for infrastructure upgrades.

There is considerable proposed and consented investment in large-scale solar farms. There are also other projects in the pipeline, including battery storage and other generation types, some of which are commercially sensitive and therefore not acknowledged in this document. There is still uncertainty as to what the future holds in terms of the next steps for decarbonisation: hydrogen, battery storage, synthetic aviation fuels, or a combination of all of these.

There is considerable planned investment by several companies who are looking at multiple solar arrays throughout Canterbury, including Far North Solar Farm, Lodestone Energy, Energy Bay, Bison Energy, Lightsource bp and our energy distribution companies. Public Private Partnerships hold political appeal with benefits such as shared risks and shared rewards; the ability to draw on private sector expertise and innovation, and greater budget certainty for projects from inception to delivery. Some partnering examples are the Kate Valley Landfill and the transition away from coal to wood pellets at the Clandeboye Fonterra site, which will receive some capital co-funding from Fonterra's partnership with EECA.

The rapid expansion of Artificial Intelligence (such as ChatGPT) presents a significant investment opportunity but also introduces challenges for renewable electricity supply. AI-driven computing demands up to ten times more electricity than traditional internet searches, increasing pressure on renewable generation infrastructure. Major global companies, including Microsoft, CDC, and Amazon, are responding by investing in renewable-powered data centres, particularly in Auckland.

At the same time, data centres are becoming one of the fastest-growing sources of waste heat, with usage increasing by over 250 per cent in the last five years.[48] This presents an opportunity: waste heat from data centres could be recovered and integrated into district heating and cooling (DHC) networks, transforming an energy-intensive challenge into a valuable resource for sustainable heating solutions.

Renewable Energy Opportunities

Canterbury has a range of renewable energy opportunities to help with decarbonisation of existing energy use and to support growth. Further details on some of these opportunities are detailed below.

Solar opportunities

There are opportunities to increase the uptake of solar across the region, both at the individual/community level, and at large-scale grid level. Solar pricing at the household and commercial levels has decreased substantially over the last decade due to the decrease in costs of solar panels and their component parts, and solar has become more attractive because of an increase in the lifespan and efficiency of the panels.

Canterbury land is well suited to solar, with the Mackenzie District and Waitaki Valley having the advantage of existing infrastructure which connects to the national grid via the 220kV transmission network from the Tekapo, Ōhau, and Waitaki Valley generation stations. The location of large-scale solar farming is important as it can displace other farming activities. Commercial viability is enhanced if it sits on poor quality pasture land which is used for mixed purposes such as sheep farming.

Solar generation at the household level can be made more usable through battery storage technology. On the grid-scale level, investment in large-scale Battery Energy Storage Systems (BESS) is needed. The costs of this solution are decreasing with time and the quality of available systems is increasing. EECA states that, 'rooftop solar is the cheapest source of energy a household can use with zero emissions'.[49] It is important to note that utility-scale solar remains significantly cheaper than household solar due to economies of scale, optimised placement, and more efficient grid integration.

Chapter 3 outlines some applications for grid-scale solar and BESS in Canterbury and points to opportunities for further investment. BESS provides a short-term storage solution to enable greater resilience in the energy system and allow for flexibility in managing supply and demand.

There is a caveat to this opportunity: too much solar (or renewable) generation can have negative price impacts on the grid as demand drives prices. Where there is more supply than demand, generators must pay grid operators to deliver electricity. Wealthier households can afford to install solar and benefit from low or no-cost power. This can increase pricing for lower-income households.

New Zealand has been experiencing increases to the cost of living and ideally, energy transition should not contribute to rising household costs. Otherwise, it could have an impact on equity of access to energy or increase energy poverty. People in poor-quality housing and those who can least afford electricity pay the most per unit relative to their income.[50]

Hydrogen opportunities and challenges

The Hydrogen Action Plan states: Hydrogen can carry and store energy like a battery. This energy can then be used to produce electricity through a fuel cell to power machines or combusted for heat and energy.[51] The energy sector, industry and heavy transport, including air transport in Canterbury could benefit from hydrogen (see figure 21). Hydrogen is energy-intensive to produce, difficult to transport and store, and energy recovery is inefficient and expensive. Electrolysis and fuel cell conversion result in energy losses that exceed 50 per cent, making it far less efficient than direct electrification. Additionally, hydrogen's low volumetric energy density requires costly compression, liquefaction, or chemical conversion for storage and transport. For Canterbury to benefit from hydrogen, significant investment in generation infrastructure and assets is needed. Funding that investment is a significant challenge.

[48] World Energy Outlook 2022
[49] EECA | Solar
[50] Energy poverty | PPHC
[51] Hydrogen Action Plan 2024 | MBIE

Figure 21: Hydrogen uses in New Zealand

Hydrogen offers opportunies in sector that are hard to electrify, as well as export opportunies:

Hydrogen

Heavy vehicles, specialty vehicles, planes, shipping

Industry

Chemicals, e-fuels, steel, process heat

Power

Back-up generation, electricity peaking and demand response

Export

Of hydrogen and derivatives such as ammonia, methanol, and eSAF

Fabrum is a Canterbury company that delivers solutions to support a zero-emission future for mobility in aviation, marine, heavy transport, and heavy industry. There is a New Zealand Hydrogen Aviation Consortium whose membership includes: Airbus, Air New Zealand, Christchurch International Airport Ltd, Fabrum, Fortescue Future Industries and Hiringa Energy. Fabrum has partnered with Christchurch International Airport as part of its Kōwhai Park renewable energy precinct, to provide a hydrogen testing facility to support the development of hydrogen technology and systems, primarily in aviation. This facility will explore liquid hydrogen as an aviation fuel and liquid hydrogen storage solutions.

"Having liquid hydrogen as an aviation fuel available on-site is vital for the aviation sector, rapidly advancing towards hydrogen-fuelled operations to unlock a zero-emissions future. This collaboration with Christchurch Airport further positions Christchurch as a hub for liquid hydrogen activity."

Fabrum Executive Chair,
Christopher Boyle

Biomass and heat pump opportunities

EECA has done a considerable amount of analysis on the potential offered by biomass, mainly in decarbonising existing boilers (process heat) and heat pumps, across their two Canterbury RETA reports. The opportunity exists to coordinate process heat users and forestry companies to build confidence in the long-term viability of biomass as a fuel source. There is significant carbon reduction potential in Mid-South Canterbury – given the reliance on coal, a budding biomass industry and proactive and engaged process heat users, many of which have already mapped out a pathway with EECA. This has an additional benefit of improving air quality as wood-burning fires are pollutants. Shifting to heat pumps has a significant impact on improving air quality.

The challenge of an interconnected energy, production and transport system is that biomass currently requires diesel to harvest and transport it. New Zealand's railway network may be able to move biomass around, enabling the replacement of substantial fossil fuels and making the energy supply more resilient. In North Canterbury, there is an opportunity to reduce electricity demand by increasing the adoption of heat pumps which: "would meet 24 per cent of today's North Canterbury energy demands from process heat, which in turn reduces the necessary fuel switching infrastructure required."[52]

The two Canterbury RETA reports outline a huge opportunity to decarbonise process heat, eliminating more than 90 per cent of process heat emissions in the region through electrification and use of biomass. The equally huge challenge is managing supply and demand, and cost in that scenario.

[52] RETA North Canterbury Summary | EECA

Managing peak capacity and pricing pressures

In 2024, Canterbury experienced a significant cold snap and reduced hydro inflows, contributing to increased peak capacity risks and higher electricity prices for both households and businesses. Transpower highlighted the resulting pricing pressures on industrial users while signalling future growth in electricity demand. Addressing capacity risks will require sustained investment in flexible resources such as batteries, demand response, and peaking generation.

Achieving long-term energy security and affordability will require a diverse mix of renewable energy sources across the economy. Transport, dominated by fossil fuels, represents approximately 40 per cent of delivered energy. Light vehicle electrification is underway, although EV sales have declined following the removal of incentives such as the Clean Car Discount, and the transition for heavy transport remains uncertain. Electrification of heavy transport would significantly increase electricity demand. The electrification of heavy freight vehicles faces significant challenges, primarily related to battery technology, infrastructure, and cost. However, innovative solutions like dynamic charging, overhead catenary systems, and smart charging strategies offer promising pathways to overcome these barriers and make electrification a viable option. Building resilience in the energy sector will depend on diversifying energy sources, expanding production capacity and transmission. Where this building takes place will have a meaningful impact on both cost and resilience.

Managing peak demand in a high electricity future is one of the major challenges facing Transpower and Canterbury's EDBs. Understanding unique region-specific needs, opportunities and barriers is critical. Decisions about investment in infrastructure that meet future demands requires coordination of the collective impact of decisions across multiple individual sites.

Technology will fundamentally alter what is needed from transmission and distribution infrastructure. Distributed generation (such as rooftop solar generation), combined with battery storage and effective demand-side management like smart-chargers for EVs, has the potential to reduce the need to build additional infrastructure capacity to cope with peak demand. This is a strength in relation to other infrastructure sectors where forms of congestion pricing are less or not prevalent. Adopting transmission and distribution pricing that more closely reflects marginal costs will be important for funding and incentivising efficient investment in these sources of energy and peak demand management.

New Zealand Infrastructure Commission
– Sector State of Play: Energy Discussion Document

Energy transition for transport and industrial heat

Aviation, heavy land transport, industrial heat, and agriculture are challenging aspects of an energy transition. While around 80-85 per cent of New Zealand's electricity generation is currently from renewable sources, the country is reliant on fossil fuels for 99 per cent of transport energy and around 60 per cent of industrial energy. A high-technology approach to these systems requires highly concentrated energy sources close to the point of use. Electricity is an ideal solution, but battery technology is still advancing, and cost is a barrier to uptake at the time of writing. Some heavy industry is also less well suited to electrification. Challenging, sometimes dangerous chemical reactions and the high temperatures needed to support heavy industry are a problem. Rapid advances in technology are improving the prospects for cost-effectively decarbonising heavy transport and process heat. One alternative to electricity for aviation, heavy land transport and industrial processes is hydrogen. An example of another alternative being explored outside of Canterbury is synthetic aviation fuel, which can be used in heavy trucks and aircraft without significant technological change.

Social licence and consumer behaviours

Consumer behaviours are shifting and decision-makers and leaders have the opportunity to build energy literacy in the New Zealand population. With greater literacy, communities will have more opportunities to collaborate within their local energy system. According to Transpower, a typical car with a two-litre internal combustion engine requires 77kWh of petrol to drive 100 kilometres, while a Nissan Leaf electric vehicle (EV) requires only 16kWh of electricity to cover the same distance – it's nearly five times as energy efficient. A heat pump heating 100 litres of water to 100°C requires 3kWh of electricity but requires 12 kWh of coal or natural gas to deliver the same result.[53] These comparisons are becoming more widely understood and accepted by consumers. There is greater acceptance of household solar panels and confidence that investment in renewable generation at the household level has individual benefits.

The same is not always true for public perception of large-scale solar. A Lincoln University research paper looked at Canterbury perceptions of solar farms, with most respondents coming from rural communities.[54] The findings show that negative attitudes towards solar farms increase with proximity to the proposed farm. This finding is supported by the many headlines in Canterbury and national newspapers outlining concerns about grid-scale solar, and feedback through public consultation carried out by Councils through consent processes for specific local projects. Local government has a potential role in promoting renewable energy development through the provision of information, public education campaigns and encouraging best practice.

[53] Whakamana i Te Mauri Hiko: Empowering our Energy Future 2020 | Transpower
[54] Establishing social licence to operate solar farms in Aotearoa New Zealand: An analysis of community perceptions in Canterbury. Portia Sutherland

Chapter Six

Where to next?

Considerable feedback, thoughts and ideas about what that next phase should or could look like have been shared through targeted engagements and interactive workshop sessions. A summary of what we heard follows.

Stakeholders want a regional approach to energy

There is consensus that change is happening in the energy system and that Canterbury needs to be in the driving seat with a clear plan if we are to realise the economic, social and environmental benefits for the region.

There is a variety of ways in which a regional plan for energy could be framed – we have discussed the potential of a strategic framework, ambition, blueprint, roadmap and more in almost all stakeholder engagement sessions. Overall, there seems to be more concern about having a collective and agreed-upon approach rather than its exact form. Most important, is that this work takes a long-term view about what's best for Canterbury, with a clear set of actions.

It was also widely agreed that while the next phase of work needs to be led with a pro-Canterbury view. It must also carefully consider our alignment with national direction and the impacts on nearby regions, the wider South Island and New Zealand as a whole.

The intrinsic link between energy and the economy was raised and this was a theme running through almost all conversations about energy. A clear plan for energy would help provide confidence and security, both for existing industry, and to encourage new industry and investment in the region.

"Without a clear shared vision for energy – change will be done to us and we will lose out on the benefits and the value"

– Energy workshop participant

A collaborative approach should be taken

There was strong support that the design and development of the next phase should be collaborative and include contributions from technical experts, energy sector, industry, iwi, universities, central and local government and communities.

While there was a strong consensus that the work should be collaborative, there was an equally strong view that the work would need to be led and driven by a group or entity that had the mandate to do so.

It was also noted that the strategy and action plan should explore where there are opportunities to work in partnership and use hybrid models of funding and resourcing.

"We should all be part of setting the goal – this needs collective involvement"

– Energy workshop participant

A strong sense of why we need to do this, and soon

A range of reasons were put forward regarding why Canterbury needs a regional plan on energy. Some of the key themes were:

Working together – people noted that working together and coordinating efforts would lead to the most cost-efficient way of progressing change as well as having the biggest impact for CO2 reduction. Others noted that working together provides scale that is critical for investment and in getting things done efficiently and effectively. Others spoke about sharing knowledge, expertise, and best practice, with a view to realising co-benefits across the region.

Alignment/Coordination – a strong theme was the need to have alignment across local, regional, and national plans and with the existing structures. Some people commented that a collective vision for energy was needed that could align and create consistency with other plans across a range of areas e.g. transport, land use, industry growth, resilience, and urban development.

Clear direction – many people raised the importance of the need for a big vision, with a clear direction. People spoke about a vast range of topics and areas that they would like to see the energy strategy or plan cover including the need for direction on:

- energy efficiency
- energy affordability and equity
- demand management
- accelerating renewables
- energy generation and supply
- the management of private ownership models
- long term planning for infrastructure
- the response to changing technologies
- the push for decarbonisation
- supporting climate resilience.

We need to be careful about risks and unintended consequences

The engagement process also raised the need for careful consideration in some areas.

This included concerns about the risk of potential duplication with national-level legislation and regulation and making sure that any strategy would be enduring and strike the right balance between giving clear direction and having enough flexibility to adapt to change. There was also the point made that any actions should be concentrated on what will make the most difference, rather than trying to do it all.

Some stakeholders commented that any future work should be careful about managing unintended consequences e.g. negative electricity prices (when supply exceeds demand).

The World Energy Council 2025 also indicated that energy transitions cannot succeed if people feel left out or worse off and that affordability is now a frontline disruptor.

Another stakeholder raised concern about developing a strategy with only one assumed future in mind, noting that we should consider multiple scenarios concerning how the energy transition may eventuate over time.

Finally, there was concern about developing another strategy that didn't achieve what it set out to – to avoid this outcome, many noted the importance of having collective ownership, collaboration and buy-in throughout the development process.

"Must not create a strategy for the mere sake of it... a strategy is only relevant if there is formal commitment to using it"

– Energy workshop participant

A shared vision

Trusting, purposeful and enduring relationships are needed to realise Canterbury's prosperous, resilient energy future. This will enable the creation of a shared vision and direction and will support unified action. A Regional Energy Plan could be a catalyst for a resilient and clean energy future, with Canterbury in the driving seat.

Appendix 1
Energy regulatory system

Regulatory framework in New Zealand

Regulation for energy and resources in New Zealand is complex, with responsibility for energy sitting with different agencies and in some cases across different ministerial portfolios. Below is a description of who is responsible for what. It includes:

- Central government agencies/departments with energy responsibilities
- National-level regulation and policy direction relevant to energy
- Regional-level regulation, plans and strategies relevant to energy.

Key agencies/departments with energy responsibilities

Ministry of Business, Innovation and Employment	MBIE acts as the steward for the NZ energy market and leads system strategy and policy advice in this area. They have the primary responsibility for monitoring and managing the energy market regulatory system, including electricity, gas, and liquid fuels.
Ministry for the Environment	MfE are the stewards of the regulatory systems for environmental management and climate change. They advise the Government on all matters concerning New Zealand's built and natural environments, including the Resource Management Act and the Climate Change Response Act. Both Acts have significant relevance to energy.
EECA	The Energy Efficiency and Conservation Authority (EECA) is a Crown agent. EECA's functions, as set out in section 21 of the Energy Efficiency and Conservation Act 2000, are to encourage, promote and support energy efficiency, energy conservation and the use of renewable sources of energy.
Electricity Authority	The Electricity Authority is an independent Crown entity responsible for overseeing and regulating the New Zealand electricity market. The Electricity Authority regulates the electricity market by developing and setting the market rules, enforcing and administering them, and monitoring the market's performance.

National level regulation and policy direction relevant to energy

A range of work relates to energy through primary and secondary legislation, regulations and national direction, national strategies, action plans and more. Some of these are listed below - noting this is far from an exhaustive list.

Electrify New Zealand **The coalition Government plan to make it easier and cheaper to consent, build and maintain renewable electricity generation, distribution and transmission**	The coalition Government has outlined its plan to make it easier and cheaper to consent, build and maintain renewable electricity generation, including distribution and transmission. The electrify NZ plan involves fundamental changes to planning and regulatory setting. The plan is to: • Establish a one-stop fast-track approvals and permitting regime • Reduce consent and reconsenting processing times for most renewable energy consents to within one year • Extend the default lapse periods for consents from five years to 10 years • Increase the default consent duration for consents to 35 years. These have been, or are planned to be, implemented through the following legislation.
Fast-Track Approvals Act Administered by MfE	A fast-track decision-making process to facilitate the delivery of infrastructure and development projects with significant regional or national benefits. This supports a range of energy projects.
Resource Management Reforms **Bill One – RM (Freshwater and Other Matters) Amendment Act 2024** **Bill Two – RM Amendment Bill 2025** **Administered by MfE**	Bill One – made targeted changes including alignment for coal mining with other mineral extraction activities and streamlining the process for preparing and amending national direction. Bill Two - covers a range of areas including a section on infrastructure and energy, with the intent of making it quicker and simpler to consent for renewable energy. Still to come (as at April 2025) is the legislation to replace the Resource Management Act, which will be a new Planning Act and a Natural Environment Act.
Other work indicated that supports the Electrify NZ plan **Delivered either/or jointly by the Ministry of Business, Innovation and Employment and Ministry for the Environment**	• Amend the National Policy Statements for Renewable Electricity Generation and Electricity Transmission, so they are more directive and enabling of renewable electricity and transmission • Develop further national direction to enable a range of energy and infrastructure projects (including a new NPS-Infrastructure and subsequent standards for different types of energy generation and infrastructure) • Introduce a Bill to enable a regime for offshore renewable energy to be in place by mid-2025 to give developers greater confidence and certainty • Update a variety of regulatory settings, so New Zealand's infrastructure system can cope • The Statement of Government Policy to the Electricity Authority, October 2024 – which provides a statement of Government policy in relation to the electricity industry, with particular focus on updating the wholesale electricity market and security of supply • The Minister for Energy and the Minister for Resources have initiated a review of the performance of electricity markets. The review began in early 2025 and is expected to be completed in June 2025.

Emissions Reduction Plan 2026-30 **Delivered by MfE**	The plan to meet the second emissions budget (EB2) for the period 2026-30. Energy is a key pillar within this work, namely: • Electrify NZ to help achieve the goal of doubling renewable energy capacity • Enabling energy efficiency and a smarter electricity system • Enabling carbon capture, utilisation and storage • Enabling woody bioenergy.
Crown Minerals Act **Administered by MfE**	The Government is proposing a package of changes to the Crown Minerals Act 1991 to meet our gas security challenges and seize economic opportunities for the benefit of all New Zealanders.
Overseas Investment Act reform **Administered by Treasury Toitū Te Whenua are regulators of the Act**	The proposed reform will reduce the regulatory burden imposed on investors and shift to a more permissive and risk-based approach. The proposed OIA reform, in combination with the Fast Track Approvals Act, is likely to make investing in New Zealand energy quicker and easier.
New Zealand Infrastructure Strategy 2022 -2052 **Delivered by the NZ Infrastructure Commission**	This sets a pathway for transforming New Zealand's infrastructure over the next 30 years. The strategy focuses on the critical importance of enabling a fast-paced and sustained build of energy infrastructure to provide low-emissions energy. It also identifies key steps to making the right infrastructure choices and minimising carbon emissions from building new infrastructure. The NZ Infrastructure Commission is working on a National Infrastructure Plan to build a more complete picture of New Zealand's infrastructure needs and priorities for the short, medium and long term. The Plan is expected to be finalised by the end of 2025.
Hydrogen Action Plan 2024	The Hydrogen Action Plan outlines the Government's plan to unlock private investment in hydrogen technologies. The Government sees hydrogen production playing an important role in New Zealand's transition to a low-emissions economy in sectors that are hard to electrify.

Regional level regulation, plans and strategies relevant to energy

At a regional level, energy is relevant to a wide range of plans and policies that are either in place or planned. Some of these are listed below.

Plan for Canterbury 2023-2025 Canterbury Mayoral Forum	This Plan summaries the interests and priorities of local government leaders for Canterbury to focus on three priority areas: • Sustainable environmental management of our habitats • Shared prosperity for all our communities • Climate change mitigation and adaptation.
Climate Partnership Plan 2024-2027 Canterbury Mayoral Forum	The Canterbury Climate Partnership Plan is about councils pulling together to help Canterbury thrive and prosper in a changing climate. It's our collective vision for a better future.
Canterbury Regional Policy Statement	Provides the overarching policy direction for regional and district plans in the Canterbury / Waitaha region, ensuring a coordinated development of land use and infrastructure. Considerable work had gone into drafting a replacement for the 2013 RPS but this is paused, at least until January 2026, at central government's direction. As the first RPS with a specific focus on addressing climate change-related issues, it has the potential to hugely influence our response to changing energy demand, use and distribution as well as the resilience of transmission infrastructure.
Canterbury Land and Water Regional Plan	Provides direction on how land and water are to be managed in the region. It sets outcome targets to deliver on, one of which is energy security and efficiency.
Greater Christchurch Spatial Plan	The Greater Christchurch Spatial Plan (GCSP) is the Future development Strategy for Greater Christchurch required by the National Policy Statement on Urban Development. It sets a desired urban form for a projected population of 700,000 (to 2051) and beyond that to 1 million people to ensure Greater Christchurch is future-proofed in the context of population growth and climate change. The GCSP acknowledges that achieving a low carbon future for Greater Christchurch will require the provision of reliable renewable energy, and the importance of ensuring that planning for energy infrastructure is well integrated with new development.
Canterbury Regional Land Transport Plan	The Canterbury Regional Land Transport Plan (CRLTP) 2024-34 became effective in July 2024. It sets out how we plan to develop our land transport system over the next 10 years. Plan priorities reflect regional, national and international challenges and trends, and provide actions to address these for Canterbury's regional, city and district councils and Waka Kotahi NZ Transport Agency.

Appendix 2
Additional supply and demand information

The following graphs are developed with regional data from 2006/2007, overlaid with current national energy demand totals. The proportional change in energy use has not been captured in this model and the use of this data to reflect the current state should therefore be treated with caution.

The graphs below show the types of fuel usage by sector across different timeframes for the Canterbury region, Christchurch City and Ashburton District. This indicates significant growth in household and industry energy demand across the three areas.

Figure 22: Energy use by sector in Canterbury

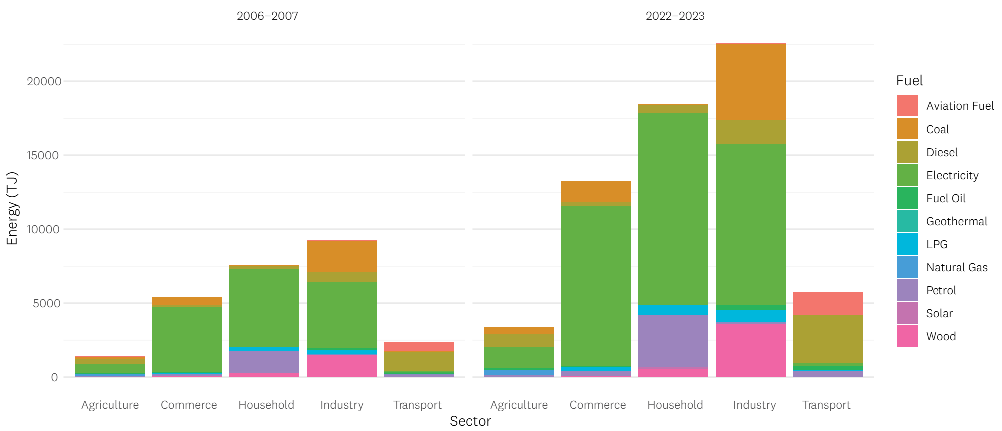


Figure 23: Energy use by sector in Christchurch City

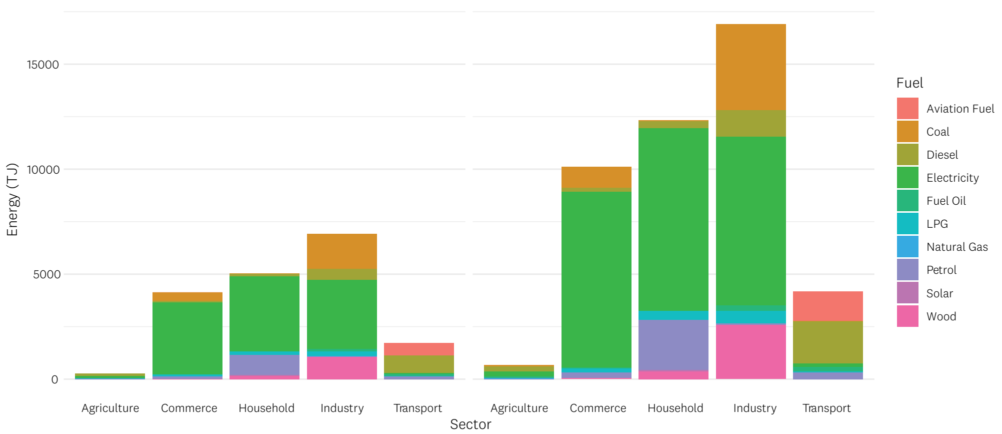
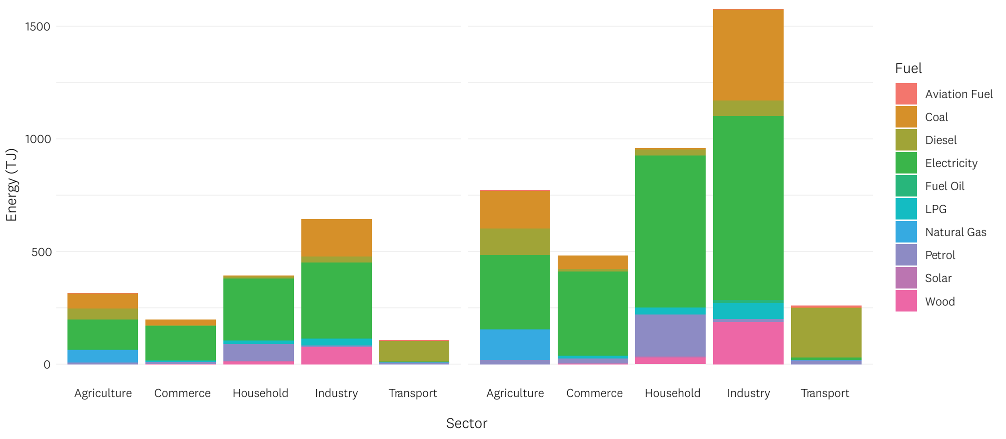


Figure 24: Energy use by sector in Ashburton District



Seasonal supply and demand

Data from nodes can help to show electricity demand patterns over the seasons, as illustrated in figure 25. In Canterbury, we can see that in three out of the six 'high-consumption' nodes (Bromley, Islington and Timaru), peak demand occurs during winter, likely due to their proximity to residential areas and increased demand for heating. The opposite is true in Ashburton and Temuka, which experience their highest demand in summer, which may be attributed to increased irrigation loads.

Low-consumption nodes in Canterbury show patterns similar to those in Ashburton and Temuka, with higher energy demand and greater variability during summer months - likely due to irrigation needs - see figure 26.

Figure 25: Seasonal electricity demand patterns for high-consumption nodes

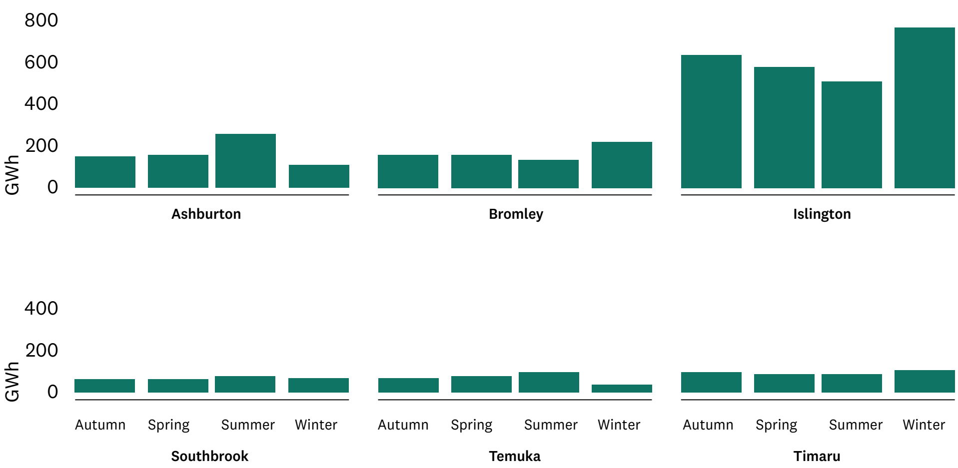
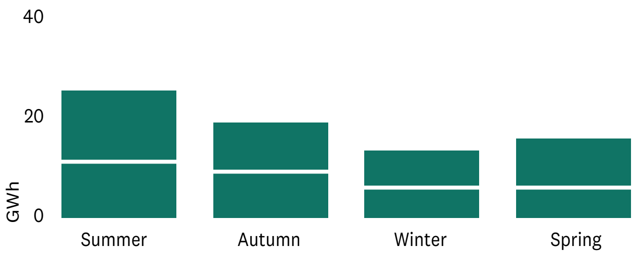


Figure 26: Variability in seasonal demand for low-consumption nodes



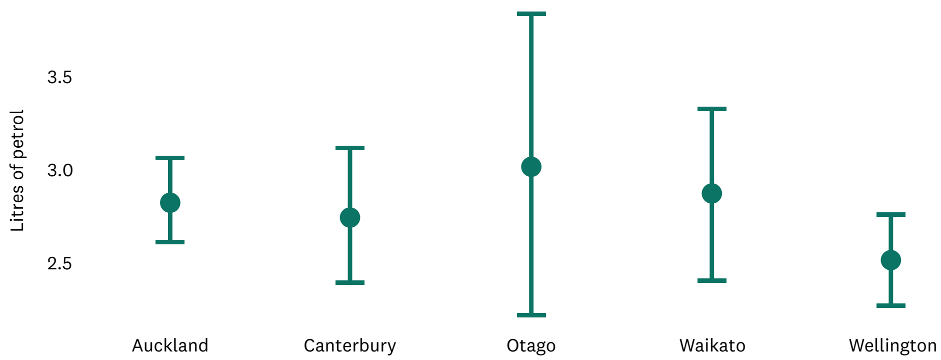
Additional transport supply and demand information

Canterbury is extremely reliant on its transport system, which remains predominantly fuelled by fossil energy sources such as diesel, petrol, and bunker fuels. The transport sector is responsible for 44 per cent of New Zealand's energy-related emissions, with on-road vehicles being the primary contributors.[55]

On average, New Zealanders spend nearly 80 per cent of their travel time in a motor vehicle, either as a driver or passenger. In Canterbury, each household travels approximately 32km per day by car, consuming about 2.75 litres of petrol daily (assuming a low heating value).

Figure 27 displays both average values and their 95 per cent confidence intervals. The width of the confidence intervals varies inversely with sample size (number of households surveyed per region). Data is derived from the Ministry of Transport's national transport survey.

Figure 27: Average Daily Car Travel Fuel Use per Household, by region



The Canterbury Regional Land Transport Plan has a range of actions, either planned or underway, that are likely to make a positive difference in the reduction of transport-related fossil fuel consumption. The Greater Christchurch Spatial Plan, Transport Plan, and Regional Public Transport Plan also support reduced vehicle movements through urban areas and promote public transport improvements. There are numerous co-benefits to this, including a reduction in climate greenhouse gas emissions and improved air quality.

[55] New Zealand's Greenhouse Gas Inventory

Canterbury regional transport fleet by motor tech type[56]

Current fleet by motor tech – Canterbury region (as of Feb 2025)	Percentage %
Diesel	22.83
Petrol	68.24
Hybrid petrol	6.11
Battery electric	1.87

At a national level, petrol and diesel cars make up about 98 per cent of our vehicle fleet. Canterbury-level vehicle fleet data is shown in table 5.

Urban form and access to active transport modes will play a critical role in shaping future transport energy demand. Densely populated, well-connected urban areas with access to public transport, cycling, and walking infrastructure can significantly reduce reliance on private vehicles, leading to lower energy demand and emissions.

In line with these benefits, the Canterbury Regional Land Transport Plan 2024-2034[57] prioritises improving intermodal connections to enable seamless freight movement, enhance economic efficiency, and strengthen network resilience. This includes investments in alternative routes to mitigate disruptions.

[56] Fleet statistics | Ministry of Transport
[57] Canterbury transport plans | Environment Canterbury

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