Genesis Energy Limited

FY22 Climate Risk Report

Prepared in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

Contents

Introduction
Whakaupoko

Purpose

Empowering New Zealand's sustainable future

Genesis is an energy company that procures electricity from a diverse portfolio of generation assets in New Zealand, including hydropower, wind, and thermal generation, as well as retailing gas and electricity.

We are committed to living our purpose of "empowering New Zealand's sustainable future" in all aspects of our business, from the way we generate and supply energy, care for the environments in which we operate and the way we interact with our customers, our people, iwi and wider communities. It guides our vision of the future and the way we build it.

Genesis has put achieving a sustainable future, including managing climate-related risks, at the heart of the business. Linking our purpose to a sustainable future brings the management of climate-related risks and opportunities into everything we do.

Climate-related risks are central to our business and our strategy

We recognise the impact of climate change and support meaningful, economy-wide planning to reduce emissions and transition New Zealand to a low carbon future. The climate challenge will drive New Zealand's and global decisions on how we live and work for the next 30 years and beyond.

The scale of change will be significant and Genesis will be a key enabler in achieving the successful transition. We are committed to taking action to reduce emissions while balancing climate change considerations, managing increasing energy demand and ensuring our customers have a reliable and cost-effective energy supply.

We understand the importance of our role in New Zealand's transition to a low carbon future. Decarbonising our activities, helping our customers do the same, and the individual actions of our people, will contribute to achieving the country's goal. This means meeting the needs of the present, without compromising future generations' needs.

Embedding sustainability into how we do business

Our purpose is underpinned by ambitious Science Based Targets, with the goal to remove 1.2 million tonnes of carbon by FY25 from a FY20 base, tied to the international benchmark of limiting global warming to 1.5°C. These targets ensure we can measure our progress and hold ourselves accountable. Progress through the current financial year can be tracked through our quarterly reports posted to the NZX and in this report.

Genesis adopts a holistic approach to understanding the impact of our business on people, communities and the environment. We seek to identify social, economic, and environmental risks and benefits as part of our strategic decision-making processes. Through our comprehensive and evolving sustainability strategy, Genesis has made significant progress in the areas that we believe matter the most to, and have the greatest impact on, our stakeholders. We also understand that a 'just transition' is vital and that for the communities connected to our assets, community support with investment in new energy, new industries and new jobs is important. We have embedded further accountability and transparency with our Sustainable Finance Framework.

Our business model

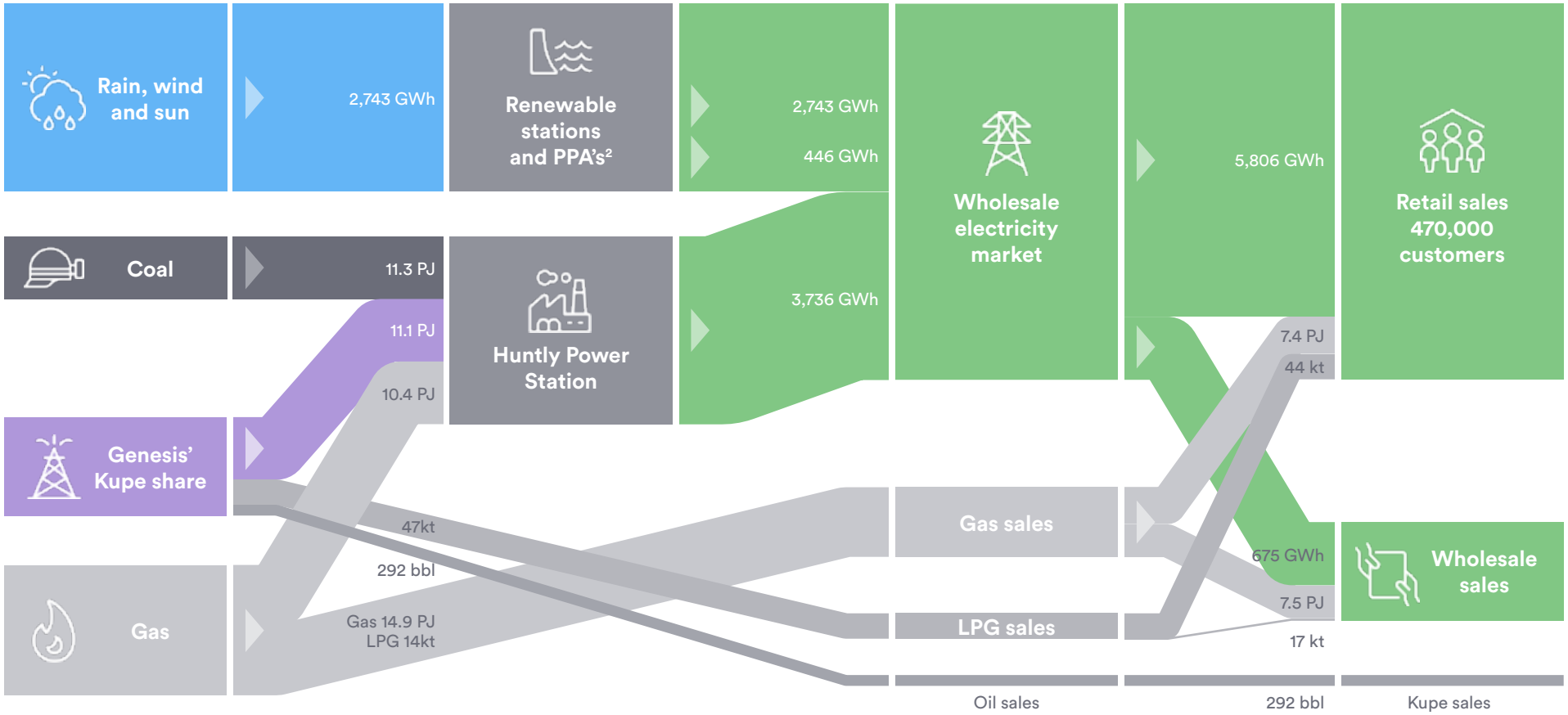
Genesis is a vertically integrated energy company

Genesis operates an integrated energy business spanning the generation and wholesale procurement of energy through to sales of energy to residential, business and wholesale customers, supplying electricity and gas to more than 470,000 customers. Genesis also owns a 46% share of the Kupe oil and gas field.

The geographic spread and diverse range of our generation assets provides vital support to the country's energy sector and includes hydropower, wind, and thermal generation[1]. This means our business is resilient to supply shocks and generates consistent earnings.

Our vertically integrated gas portfolio, from wellhead to our industrial and residential customers, is a vital part of the country's energy system providing flexibility, security and price stability.

We remain focused on evolving our business model away from pure energy supply to energy management. This is being achieved by continuing to develop the digital and virtual channels that customers can use to interact with us alongside a suite of products and services that provide knowledge and insights that our customers can act on, to manage their energy usage and reduce their carbon footprint.



1 Refer to the Appendix for a description of our physical assets.

2 Power purchase agreements

Governance

He mana whakahaere

TCFD requirement

- Describe the Board's oversight of climate-related risks and opportunities.
- Describe management's role in assessing and managing climate-related risks and opportunities.

Genesis' Board is responsible for the long-term stewardship of the Company, including climate change risks. Our strategy factors in climate-related risks as an important consideration in long-term value creation. The Board has delegated responsibility for monitoring and compliance with the policy to the Audit and Risk Committee, a subcommittee of the Board.

Board

Genesis Board

Establishes the purpose and overall strategic direction, oversees and approves risk management strategy, policies and risk appetite and monitors progress against climate-related risks and targets. All key climate-related risks and opportunities are approved by the Board as appropriate, when reviewing and guiding strategy and the operations of the Company, including as part of its Risk Management Policy and Framework. In addition to the reporting from the Audit and Risk Committee, the Board receives six-monthly updates on key sustainability trends and issues.

Audit and Risk Committee

Periodically reviews Genesis' Risk Management Policy and Framework to ensure these remain fit for purpose, with appropriate and effective risk management strategies in place. Within the framework is Genesis' Risk Appetite Statement which has a specific section on carbon emissions. This Risk Appetite Statement underpins the overall Risk Management Policy and Framework.

Quarterly review of risk reports from management. This review may include climate-risk developments; and at least annually will include a full review and endorsement of management's climate-related risk assessment. This includes an endorsement of the scenarios used in Genesis' climate-related risk assessments.

Reporting to the Board on the outcomes of Audit and Risk Committee meetings, including discussions concerning risks and making recommendations to the Board.

Executive

Chief Executive and Executive Leadership Team

Overall accountability for actions and commitments to embed climate change into risk management, business strategy and planning, budgeting processes and frameworks.

This includes identifying, considering and monitoring climate-related risks and opportunities and reporting to the Audit and Risk Committee and the Board. Reporting is primarily developed by Genesis' internal experts who are well informed on the matters they address. When appropriate, management engages third-party experts for services such as auditing, specific climate research or strategic management consultants.

Ensures the risks in each business area are identified, understood, managed and monitored and escalated appropriately.

Implements risk mitigation strategies approved by the Audit and Risk Committee and, where applicable, the Board. Reviews quarterly sustainability updates on the Company's progress against its sustainability goals.

Monitors emerging and developing risks. This is primarily performed by Genesis' strategy team and risk team, which both report to the Chief Financial Officer.

Preparation and presentation of quarterly risk reports to the Audit and Risk Committee. These reports include action taken to mitigate risks previously disclosed.

Executive team remuneration includes short-term incentives and long-term incentives. Sustainability objectives are included within these incentives. In FY22 each Executive had a sustainability objectives component, which varied from 18% to 36% of their overall short-term incentive, depending on the Executive's role.

Operations

At an operational level the identification and day-to-day monitoring and management of climate-related risks is dispersed throughout Genesis. Everyone has their part to play, which is emphasised by a strong 'tone at the top' which flows down throughout the wider business operations.

Risk Management

Whakatūpato Tūraru

TCFD requirement

- Describe the organisation's processes for identifying and assessing climate-related risks.
- Describe the organisation's processes for managing climate-related risks.
- Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.

Processes for identifying and assessing climate-related risks

Risk Identification

Genesis is cognisant of the ongoing and developing effects of climate change, along with the associated environmental impacts, and operational, regulatory and financial risks. Climate-related risks are managed through our Risk Management Policy and Framework.

- Climate-related risks are identified and assessed by the risk and strategy teams, who then work with subject matter specialists who identify risks both upstream (from suppliers and supply chains) and downstream (for customers). These processes result in a comprehensive register of risks that are actively managed.
- Risk specialists are tasked with ongoing research and market analysis to monitor Genesis' risk landscape and identify current and emerging risks. This includes staying up-to-date with climate-related research.
- The risk team provides day-to-day guidance to business units on how best to identify or manage risks.
- The risk team monitors emerging risks within the industry, the wider economy, and across international markets, and reports to the Executive and Board. This includes overlaying identified key business risks, strategic risks and climate risks with relevant international reports such as the World Economic Forum's Global Risk Report.
- Additional procedures for climate-related risks are applied, including the recommendations of the TCFD, climate scenario modelling, and analysis. Key experts use climate scenarios, described further on page 18, to identify a wide range of climate-related risks and opportunities. These are then categorised and assessed.

Risk Assessment

Climate-related risk and more specifically climate change, has long been factored into our risk assessments. Genesis recognises that climate-related risks are fundamentally different to the other risks we face, while also being integrated within the wider risk management operation.

- All risks, including climate-related risks, are assessed using the same framework, while also recognising key differences in the underlying characteristics of specific risk categories.
- Genesis assesses the significance of each identified climate-related risk using a risk management matrix. The matrix encapsulates a likelihood and consequence aspect, which allows us to determine the appropriate level of response for each key risk.
- Key risks and risk management tends to be weighted toward the near term to establish prioritisation. This approach is less suited for addressing risks such as climate change, which can occur across decades. One key difference between climate-related risk and other key risks is the 'likelihood' aspect which is difficult to accurately quantify over the long-term periods associated with climate risks.
- This differentiation is recognised in the way we assess climate-related risks specifically. A greater weighting is placed on the 'consequence' aspect of the matrix, than the 'likelihood'. This ensures the correct level of emphasis is placed on mitigating the risks ahead of time.
- This consequence aspect has a large factor when determining the materiality of the risks we face. Due to the magnitude of climate-related risks and their possible effects on our business, these risks are elevated to ensure they receive the appropriate attention even if extremely long-term, or low probability. Appropriate mitigation plans are developed for each risk, for example carbon offsetting or carbon displacement, as part of our overall emissions reduction strategies.
- Climate risk assessments are reviewed and approved by the Executive team and Board and incorporated into corporate risk management systems.

Process for managing and integrating climate-related risks into our Risk Management Framework

Process of risk management

Risks are managed throughout the business. These processes result in a comprehensive register of risks that are actively managed. Risks that are rated as “extreme” or “high” are reviewed six-monthly by the Audit and Risk Committee and additional strategic and climate risks are reviewed at least annually.

Developing the systems and policies to manage climate-related risk is a highly adaptive, ongoing process. Datasets are leveraged from both historical precedent and flexible forecasting to develop plausible scenario mapping.

These scenarios factor in the environmental impacts and associated operational, regulatory and financial risks to the business. Genesis continues to track and forecast the impacts of the changing climate on our generation assets, and make well-informed decisions based upon that data.

Depending on the characteristics of the specific climate risk identified, an appropriate management response is applied, aligning to other risks of a similar nature. Depending on that nature the approach will be to mitigate, monitor, transfer or avoid (refer to the table below for the general approach in relation to risk management, and pages 8 to 14 for a summary of Genesis’s top climate-related risks and opportunities and the management response to each).

Acute physical risks

Acute physical risks refer to those that are event driven, including increased severity of extreme weather events, such as cyclones, hurricanes, or floods.

The process of managing acute (‘event-driven’) physical climate-related risks aligns to other similar event-driven risk. For example, extreme weather events present a physical risk of catastrophic failure of infrastructure and generation assets, similar to seismic or volcanic risks.

Management is primarily through mitigation. Although financial risks are transferred through insurance, the primary focus is ensuring the highest level of safety. Assets are proactively managed to ensure the continued resilience of those assets in the face of potential events.

Genesis constantly assesses and reviews its assets and management plans, leveraging engineering best practice and evaluating new technologies to identify any opportunities to improve their resilience.

Chronic physical risks

Chronic physical risks refer to longer-term shifts in climate patterns, for example increasing air temperatures, weather patterns, sea level rise, and changes to hydro lake inflows. Chronic physical risks may result in financial risks or opportunities due to the direct and indirect impacts they can have on business operations, assets, markets or supply chains over time.

A number of these risks therefore underpin Genesis’ overarching generation strategy, and many are susceptible to the effects of climate change.

Management for most ‘chronic’ risks aligns to pre-existing risk management processes, however a small number of ‘chronic’ risks (gradual long-term shifts) share risk properties with ‘acute’ event-driven risks, with the only key difference being that this will be gradual rather than sudden.

Transition risks

Transitional climate impacts refer to risks and opportunities resulting from policy, legal, technology and market changes occurring in the transition to a low carbon economy.

Depending on the nature, speed and focus of these changes, transition impacts may pose varying levels of financial and reputational risk or opportunity. Many of the transition risks represent an evolution or change in the market. Some are an expected transition, and some are less predictable, such as the speed of technology advancement. In all cases these changes also reflect opportunities for Genesis.

The nature of transition risks aligns to other ‘strategic risks’ and as such climate-related transition risks and opportunities are managed through existing strategic risk management processes. This management includes regular monitoring to proactively identify associated risks and opportunities.

Strategy
He rautaki

TCFD requirements

- Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long-term.
- Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning.
- Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Climate-related risks and opportunities identified over the short, medium and long-term

An overview of Genesis' highest rated climate-related risks and opportunities are included below. Recognising that the climate scenario is dynamic and unknown to a certain extent, the classification represents Genesis' current assessment of the risk landscape. The impact rating corresponds to a defined Genesis risk management matrix. The risks below are discussed in more detail on pages 9-14.

	Transition risks			Physical risks		
	1. Regulation	**2. Market**	**3. Technology**	**4. Chronic**	**5. Chronic**	**6. Acute**
Event	Regulatory changes impacting thermal generation or sale of fuel	Consumer and investor preference, and stakeholder perception, impacting our operating landscape	Technological developments	Environmental and physical changes impacting thermal generation	Long-term climate changes that impact hydro generation	Acute climate events causing damage to critical infrastructure and assets
Risk/opportunity	Risk & some opportunity	Risk & some opportunity	Opportunity & some risk	Risk	Risk & opportunity	Risk
Timeframe	Short-term (1-10 years)	Short to Medium-term (1-20 years)	Short to Medium-term (1-20 years)	Short-term (1-10 years)	Long-term (gradual increase in likelihood over next 20-30 years)	Long-term (gradual increase in likelihood over next 20-30 years)
Impact rating	Moderate	Moderate – High	High	Moderate	High	High

1 Climate-related risks and opportunities identified over the short, medium and long-term

Regulatory changes impacting thermal generation or sale of fuel

Genesis' emissions profile gives rise to the risk of Government intervention in the market potentially restricting or limiting our operation. Unanticipated changes in the market could have an adverse impact on the value of thermal generation assets or restrict the ability to enter into long-term investments and agreements increasing the risk of "stranded assets", long-term fuel purchase commitments becoming unprofitable and an over-hedged carbon position.

The asset values at risk are thermal generation and Genesis' investment in Kupe. Thermal generation assets are carried at 'fair value' calculated using discounted cash flows over an 8-to-10 year period. As a result, the financial impact reduces year on year. The carrying value as at 30 June 2022 of the Rankine Units is $61 million, Unit 5 is $645 million and Kupe oil and gas assets is $187 million net of rehabilitation obligations.

Risk / opportunity: Risk & some opportunity **Risk type:** Transitional **Impact rating:** Moderate **Timeframe:** Short-term (1-10 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Legislative or regulatory activity that restricts importing or use of fuels for thermal generation (gas and coal) and/or sale of fuel (gas and LPG). • Regulatory intervention resulting in carbon price increases that increase the cost of thermal generation and in turn wholesale prices. • Heightened environmental focus and restrictions when renewing operating consents for generation assets. • Legislation creating short-term uncertainty and result in increased or volatile prices.	Many of these risks would be economy-wide, impacting emissions-intensive businesses. Regulatory changes that drive electrification, increase demand in our core market and create opportunities to partner with companies as they transition to electrification. An alternative sustainable use for the assets, such as switching to biomass at Huntly Power Station, may positively impact asset valuations and align with our commitment to reduce thermal generation.	The 'Moderate' risk rating and 'short-term' timeframe is primarily driven by thermal generation being only part of our overall generation fleet. This is expected to reduce over time as we transition our business to a low carbon future through our Future-gen strategy. Genesis has already committed to a 1.5°C Science Based Target. The financial impact on asset values decreases year on year as they are depreciated, and given the discounted cash flow valuation is based on a finite period of 8-to-10 years.	• Genesis actively engages with industry and regulators to align on effective regulation, and has opportunities to influence regulatory outcomes through public consultation processes. • Renewable generation would not be impacted by this risk, and we could benefit from increased market prices or volatility if the risk transpires. • A biomass trial is planned to provide a transition path for Huntly, which could extend the asset life of the Rankine Units by replacing coal with a more sustainable fuel source. • Genesis hedges its exposure to carbon price increases primarily through forward contracts and its forestry investments.

2 Climate-related risks and opportunities identified over the short, medium and long-term

Consumer and investor preference, and stakeholder perception, impacting our operating landscape

Risks in this area reflect potential shifts in investor, customer, iwi and stakeholder sentiment around carbon emissions which could create brand and reputation risks with consumers and other stakeholders. Particularly brand and reputation risks that lead to a perceived loss of "social licence to operate". If capitalised upon, the opportunities could outweigh the risks.

Risk / opportunity: Risk & some opportunity **Risk type:** Transitional **Impact rating:** Moderate to High **Timeframe:** Short to Medium-term (1-20 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Increased consumer awareness of carbon-emitting businesses, and negative sentiment for non-renewable energy reducing retail demand and resulting in customers migrating to other retailers. • Shifting investor preference reducing access to funding options and restricting access to capital. • Investors blacklisting carbon-emitting businesses in their activities. • Reduced access to insurance if insurers reduce their exposure to carbon-emitting businesses. • Breakdown of relationships with mana whenua and others such as iwi, government agencies, and community groups could hinder our strategy and future opportunities. • Increasing "ESG drag" negatively impacting our share price.	• An opportunity for Genesis to engage with all stakeholders, to reinforce our commitment to emissions reductions across our assets. • Increasing consumer awareness of carbon footprints is an opportunity to engage with customers, and build their engagement with their energy. The Genesis Energy IQ platform and EcoTracker already enable customers to track electricity use and make informed choices that reduce peak demand. • Increased emissions awareness from investors also increases interest from potential partners to develop renewable energy solutions, which is a key part of our Future-gen strategy. • ESG drag is already factored into our share price, so emissions reductions could increase access to potential investors.	Given the significant potential consequences, a moderate-high risk rating and short-to-medium-term timeframe are applied to these risks. However, there is unpredictability in the level that stakeholders will engage with the transition to a low carbon economy, and the resulting actions taken. This risk decreases as Genesis' emission profile decreases and in particular as we grow renewables replacing baseload thermal generation and if we are able to transition the Huntly Power Station to renewable fuels.	• Genesis has the ability to adapt to market dynamics and customer expectations through our efforts to build the agility of our retail business, improve our capability to expand into new markets, and evolve business models. • A transition to a low carbon future is incorporated into our strategy which includes transitioning our generation business to renewables, and reinventing how customers engage with energy. • The introduction of our Science Based Target supported by the delivery of the Future-gen strategy, provides mitigation with a clear target. Failure to meet the target also represents a risk.

3 Climate-related risks and opportunities identified over the short, medium and long-term

Technological developments

Developments in technology could change demand or the market. Risks in this area reflect potential market shifts, many of which would also create opportunities. This could require a response in the form of our strategy, business structure or operations, and the success of this response would determine the impact level. If capitalised on, the opportunities would outweigh the risks.

Risks at a macro level could be summarised as management making unsuccessful investments or strategic decisions in the transition to a lower emissions company and country, thereby not seizing the opportunities.

Risk / opportunity: Opportunity & some risk **Risk type:** Transitional **Impact rating:** High **Timeframe:** Short to Medium-term (1-20 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Economically balancing supply and demand in the market as we transition. The efficiency of renewables increases over time, but development costs are subject to global inflation and logistics challenges. Renewables will assist in replacing baseload thermal generation, but uncertainty could challenge efforts to transition our generation portfolio. • Increasing electricity demand outpacing renewable build, risking security of supply and ability to meet emissions commitments. If renewable investment outstrips demand, this may decrease wholesale prices and revenues due to over-supply. Balance is therefore required between: - the commitment to remove baseload thermal, - when the additional renewables required in the market will be active, and - how much demand will increase from the added electrification (e.g. EV uptake etc). • Increased demand for key minerals used in the manufacture of renewable technologies, resulting in supply chain constraints.	• Efficiencies increasing and costs decreasing for renewable technologies (i.e. the cost of solar panels, next generation wind turbines, etc) aids the replacement of baseload thermal generation in a profitable way, supporting efforts to grow the renewable portion of our portfolio. • Electric vehicle uptake accelerating significantly, increasing demand and load on the grid, and requiring additional generation capacity and leading to increased retail revenue. • Increased consumer engagement and use of technology, such as EcoTracker to plan their energy consumption around off-peak times. • Grid-scale and customer battery power storage, alleviating New Zealand's seasonal storage challenges and helping Genesis meet its emissions commitments.	The short-to-medium-term timeframe applied to these risks, considers the key transition period for New Zealand. The 'high' impact rating factors in the level of disruption possible, however there is also unpredictability, such as the speed of technology advancement and adoption. This impact could also be positive - the extent to which this is a risk, or opportunity, depends on Genesis' ability to learn, adapt and capitalise on change.	A key aspect of Genesis' strategy involves capitalising on this transition with a focus on this changing landscape. We are actively pursuing new technologies that could contribute to a more renewable future. An example is our 20 year off-take agreement for the Waipipi wind farm in Taranaki which is being followed up by a number of additional similar power purchase agreements as part of our efforts to grow the renewable share of our portfolio. We are also continuing to build the capabilities for agility and efficiency into our retail business to enable it to adopt new technologies and services as they become ready for market adoption.

4 Climate-related risks and opportunities identified over the short, medium and long-term

Environmental and physical changes impacting thermal generation

The primary risk is reduced short-term availability of thermal generation assets due to weather or climate-related events. Risks predominantly relate to the Huntly Power Station's operating consents (such as river heating) or physical impacts to production at Kupe.

Risk / opportunity: Risk **Risk type:** Physical **Impact rating:** Moderate **Timeframe:** Short-term (1-10 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Increased constraints on generation from the Rankine Units due to warmer Waikato River temperatures through atmospheric heating or reduced river flow due to drought or upstream water abstraction. • Reduced Unit 5 output due to higher ambient air temperatures for the inlet and cooling water cycle. • Gas supply restrictions resulting from storms and strong sea currents restricting Kupe platform access that could lead to supply disruptions and reduced Kupe revenues. These constraints could result in reduced wholesale revenues and increased costs because Genesis may be relying on the wholesale market to meet retail demand, being 'short' when prices are likely high. Higher wholesale prices are likely at that time as removing Huntly capacity reduces market reserve capacity and security of supply. The cause of the constraint could also impact hydro (e.g. drought).	This is predominantly a risk. As disclosed within the regulatory change risk category, Genesis thermal assets are valued using discounted cash flows over a short timeframe (8-to-10 year period). Any use for the assets beyond the short-term would create value not currently recognised.	Major disruptions to gas supply due to storms would likely be short-term, as demonstrated by similar past incidents, where a stockpile of alternative fuel at Huntly has mitigated potential impacts. For a larger impact, multiple events would have to coincide. The low probability of this occurring significantly reduces the likelihood of the risk.	• If the challenge persisted a mitigant could be adding additional cooling equipment at Huntly to extend asset life or increase operating capacity. This capital investment is dependent on favourable economics. • Kupe remains an important asset supporting the transition. Disruption to Kupe pipelines due to weather events may mean revenue is reduced for a period, however the reserves remain, so it would likely just be a deferral of value between financial years. • Planned thermal reduction as we grow the renewable portion of the portfolio will reduce the exposure to river heating.

5 Climate-related risks and opportunities identified over the short, medium and long-term

Long-term climate changes that impact hydro generation

The potential of long-term gradual effects of climate change on weather and rainfall patterns impacts market conditions through decreasing or increasing inflows, and the amount stored in our hydro catchments.

This could see a shift in energy usage in New Zealand. Increasing summer temperatures could see an increase in cooling demand, while warmer winters could reduce heating load, which would help to smooth the seasonal supply and demand imbalance.

Risk / opportunity: Risk & opportunity **Risk type:** Physical **Impact rating:** High **Timeframe:** Long-term (over 20-30 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Altered catchment inflows due to warmer temperatures, less snowpack and more irregular and intense rainfall. • Less water being available for generation. Water may be required for other uses, such as agricultural irrigation, resulting in regulation to restrict the amount of water flowing into our catchments. • Increased temperature could reduce generation capacity of current assets. For example, weed proliferation due to elevated water temperatures, which then constrains hydrological generation sites. These examples could result in either a decrease or increase in wholesale revenue.	• Although there is a risk of decreased inflows into our hydro catchments, this is unpredictable and climate changes could also result in increased inflows to our catchments, or inflows better aligned to seasonal energy demand. • Increased hydrology volatility could drive demand for alternative generation sources, creating development opportunities. • Models forecast New Zealand's climate risk as being some of the lowest in the world. Increased international migration driven by climate change could increase immigration to New Zealand, driving electricity demand and economic growth.	The risks are concentrated around the change in generation potential and availability at each of our hydro catchments. The estimated useful lives of our hydro assets are up to 85 years, therefore climate-related risks or uncertainty have the potential to be significant to our business, which is reflected in our 'high' impact rating.	As our three hydro catchments are geographically spread, Genesis has some flexibility and risk mitigation: • Climate change projections continue to change. Currently forecasts for Waikaremoana suggest drier conditions at all times of the year, while rainfall may vary in the Tongariro region from season to season. Rainfall events in the Tekapo catchment are expected to increase over the coming decades. Warmer average temperatures forecast for the Southern Alps may reduce snowpack, reducing inflows from melt during summer, while winter inflows would increase as precipitation would fall as rain instead of snow. • Genesis continues to track and forecast the impacts of climate change on our generation assets, and where necessary makes generation decisions based on these impacts, continually maintaining a renewable generation pipeline through Future-gen.

6 Climate-related risks and opportunities identified over the short, medium and long-term

Acute climate events causing damage to critical infrastructure and assets

Extreme climate-related weather events represent a risk of damage to generation assets or other infrastructure. While our assets are well placed to manage events much larger than the current historical highs, in the long-term the extremity of events could become unpredictable and exceed current maximums.

Risk / opportunity: Risk **Risk type:** Physical **Impact rating:** High **Timeframe:** Long-term (over 20-30 years)

Risk Impacts	Opportunities	Rating Methodology	Mitigation Considerations / Response
• Loss of civil integrity of generation and ancillary infrastructure (e.g. dams, spillways, storage ponds) due to significant rainfall or flood events and increased probable maximum flood volumes. • Dry days combined with extreme rain increases the risk of landslides in many areas. These could disrupt transport and communication, restricting access to generation assets such as gas pipelines or transmission lines. • Increased wind speed or an extreme wind event could damage transmission lines or wind turbines. • Prolonged drought leading to fires affecting transmission lines or other generation infrastructure. Increasing costs through repairs and maintenance or capital work. These risks are not currently rated as "high", however, are included as this category as "long-term" as they could increase as Genesis' generation mix evolves.	N/A	Long-term risk assessments are informed by current literature. We are aware of the unpredictability presented, and these risks are actively managed to reduce residual risk to the lowest level possible. This unpredictability is a key factor in the high rating associated with long-term climate predictions. Although categorised as long-term, it would not be responsible to delay mitigation decisions due to the unpredictability of such events.	• Continually assess for structural or infrastructure improvements to reduce these risks to the minimum feasible level and maintain the safety of our dams consistent with best practice on an ongoing basis and as technologies advance. • The long-term nature of these risks also aids with mitigation. Genesis' most robust assets (hydro dams) are also Genesis' assets with the longest asset lives. Forestry investments, which are susceptible to bushfires, are more exposed but are a lower risk as they are short-term assets. • The diversity and geographical spread of our generation assets mitigates the loss of capacity at individual sites. The risk will reduce further as we grow the renewable share of our portfolio.

How our strategy addresses the impact of climate-related risks and opportunities

Actively enabling the energy transition

Transitioning our generation portfolio

Genesis' Future-gen strategy identifies renewable opportunities to transition away from baseload thermal generation at our Huntly Power Station, while seeking to ensure that reliable and affordable electricity enables other sectors to decarbonise through electrification.

Our Future-gen strategy aims to reduce emissions through to 2030, on a pathway consistent with limiting climate change to 1.5°C.

Our Future-gen strategy has 3 areas of focus

1. Growing renewables

- Contract for new renewable generation
- Partner to build a pipeline of solar options

2. Creating value from flexibility and reliability

- Contract for fuel flexibility
- DrylandCarbon and Forest Partners partnerships
- Sell contracts that support market reliability (swaptions)

3. Transitioning Huntly Power Station

- Trial biofuels as a fuel option for Huntly
- Plan for emerging technologies (batteries)

1. Growing renewables

The economics of renewable baseload electricity generation have now reached the tipping point where it has become cost-effective to build geothermal, wind and solar which economically displaces baseload thermal volume.

We are aiming to secure 2,650 GWh a year of renewable electricity generation by 2030, with 1,650 GWh of that by 2025. The first step was realised when the Waipipi wind farm in South Taranaki commenced operations in March 2021. Waipipi generates approximately 450 GWh of zero emissions electricity per annum.

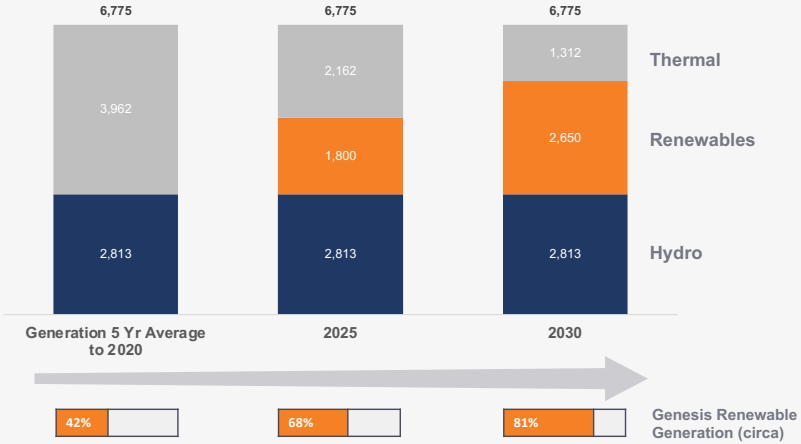
In addition to Waipipi we have signed power purchase agreements for all the electricity from a new wind farm to be built at Kaiwaikawe in Northland (expected to produce approximately 230 GWh per annum) and approximately 520 GWh of the electricity generated from Contact Energy's geothermal plant being built near Taupo.

Further renewable opportunities in wind, solar and geothermal are being assessed.

We are progressing grid-scale solar development in New Zealand and have confirmed FRV Australia as a joint venture partner. FRV Australia is a leading developer of utility-scale solar farms and will bring its expertise to work with Genesis in delivering up to 500MW of solar capacity over the next five years. The joint venture has been investigating potential sites and working arrangements in New Zealand. Genesis will own 60% of the partnership and will provide offtake agreements for the projects. Solar is uniquely suited to Genesis' flexible generation portfolio and will support generation during Huntly river heating periods and as we transition the Huntly Power Station towards a decarbonised future.

Future-gen strategy will displace baseload thermal

Portfolio changes assuming flat demand



How our strategy addresses the impact of climate-related risks and opportunities

2. Creating value from flexibility and reliability

Flexible generation is essential to manage and provide back-up to the growing share of variable renewable energy. Genesis continues to maximise the flexibility and back-up value that thermal generation at Huntly Power Station provides to the market.

Currently, there are limited commercially feasible zero-carbon options to manage the challenges posed by seasonal demand variability and hydro variability (dry-year risk) in New Zealand. The wholesale electricity market will become increasingly tested as the country becomes more reliant on renewable generation. The pressure on the wholesale market can be further increased by seasonal and intra-day weather conditions that could intensify with climate change.

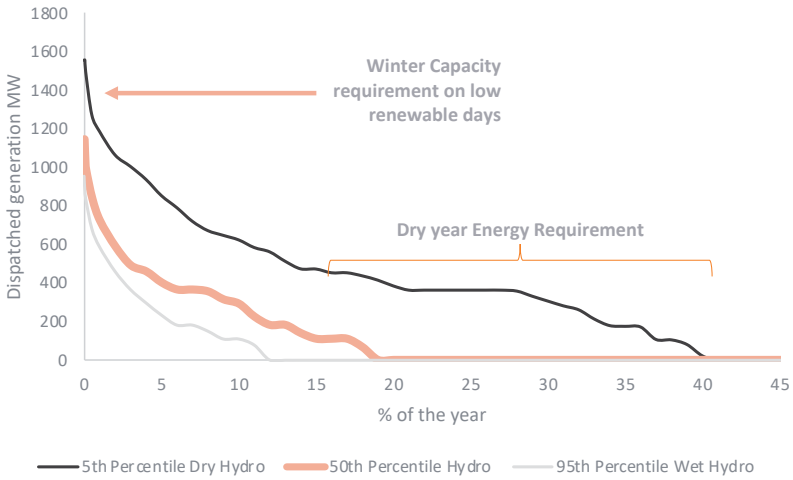
The ongoing gas supply issue is anticipated to remain for some time. Coal will need to be used to fill the shortfall from time to time. The diversity of our generation assets and our position at the intersection of the electricity and gas markets, positions Genesis well to coordinate energy deals and fuel supply to help manage security of supply.

3. Transitioning Huntly Power Station

Emissions from Huntly Power Station will decrease sharply through this decade. While the future is focused on renewable generation, the country continues the search for clean storage alternatives to offset dry-year risk. New Zealand faces the challenge of needing about 7,000 GWh of energy storage to meet seasonal shifts in demand. Existing hydro lakes provide about 4,000 GWh of energy storage. Huntly fills the gap of 3,000 GWh. This seasonal risk is unique to New Zealand and clean thermal fuel solutions that can provide generation on demand are currently uneconomic.

We believe that using renewable biomass at Huntly could be a viable alternative to the Government's proposed hydro generation at Lake Onslow.

A highly renewable grid draws on backup generation to cover infrequent peak capacity needs and dry-year firming



- More than 750MW of peaking capacity is required in less than 1% of hours in typical hydrology (50th percentile) to maintain security of supply.
- 1,650GWh of energy storage is drawn on 40% of the time in dry-years (5th percentile) compared with 700GWh in normal years (50th percentile).

Kupe oil and gas platform, providing fuel through the transition

Kupe remains an important asset in New Zealand's energy transition. While production is anticipated to reduce in line with our Science Based Targets as Kupe approaches end of life in the 2030s, a secure supply of gas is currently required to support the energy needs of New Zealand businesses and homes. We are mindful of balancing our decarbonisation efforts with the need to ensure our country has affordable and reliable energy.

Forestry partnerships

Genesis is involved in two forestry partnerships that help remove carbon from the atmosphere and provide emission units that enable Genesis to meet its obligations under the New Zealand Emissions Trading Scheme (ETS). These units help manage the future costs of thermal generation or can be sold to other emitters.

How our strategy addresses the impact of climate-related risks and opportunities

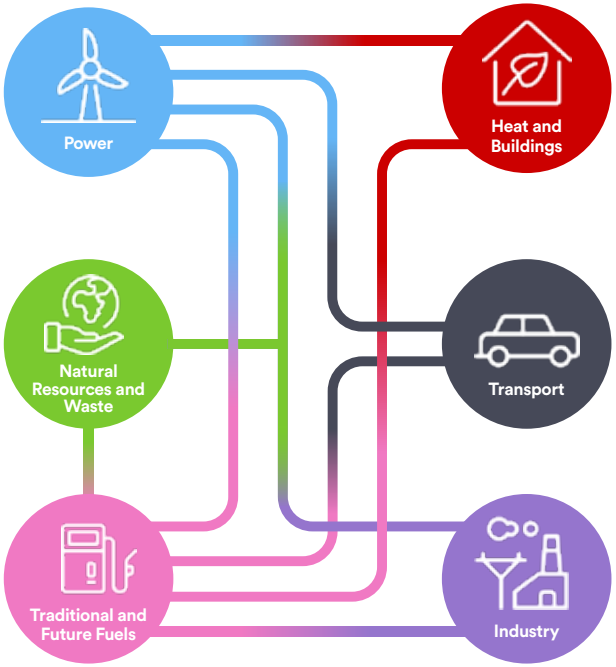
Engaging with industry and regulators to align on an effective transition

Genesis sits at the intersection of supply and demand for several energy sources as well as being the generator of last resort. This places us in a unique position to see the interdependencies, opportunities and risks that lie ahead for the country, our customers and Genesis. It helps us to understand the transition from non-renewable fuels that will enable New Zealand to meet its Nationally Determined Contribution (NDC) to the Paris Agreement, and its first three emissions budgets, without creating negative economic consequences.

With one of the most renewable electricity systems in the OECD, New Zealand has an opportunity to lead the world in electrification.

However, this transition is subject to its own climate-related risks. For example, poor regulatory or policy settings could have the opposite effect and disincentivise electrification through a higher-cost and less reliable electricity system.

Genesis works with regulators and industry groups to support the sector to align on the direction and effective regulations that will help the country move quickly and safely towards a sustainable future. Refer to the FY22 Annual report: Building a Sustainable Business for a summary of submissions we have made in FY22.



Genesis' retail business Together, inspiring millions of sustainable choices

While New Zealand's net zero goal points towards a world without fossil fuel in homes and businesses, we recognise the importance of these fuels to our customers which have been and currently remain the right choice for many. Significant improvements to technologies and their costs are required before it will be practical for many New Zealanders to transition away from gas and LPG to renewable options.

We see this transition as an opportunity, with electricity and possibly other low carbon fuels, as alternatives to existing fossil fuel use in homes and businesses.

Helping customers engage with and manage their energy

We have made sustainability a focus for our brand and customer propositions, to share our commitment to empowering New Zealand's sustainable future with our customers.

Empowering New Zealand's sustainable future includes providing tools and insights to help customers understand and make informed decisions to reduce their carbon footprint. We do this through Energy IQ and the Climate Change Hub (refer to our FY22 Annual Report: Navigating the Transition for more information).

Reducing transport emissions is a focus for the country, and we have developed some unique offerings for electric vehicle owners. More than 1,000 customers have taken up our EV Plan over recent months, and we have developed a portal on our Energy IQ platform where they can access data on their usage and find the most cost-effective and emissions-friendly times to charge. Among those on the plan so far, we have seen 7% moving their household usage from day to night.

Helping our customers reduce emissions

Genesis continues to investigate emerging technology options that can help customers transition to lower carbon options. Through this effort, Genesis is positioning itself to identify early opportunities which might be ready to scale into propositions that are appealing to a broad customer base in the near term.

To support our business customers, we have:

- Delivered energy management and decarbonisation products and services to 42 commercial and industrial companies in FY22, with the objective of improving energy efficiency and decarbonising their operations.
- Provided free decarbonisation workshops for Government agencies.
- Launched a new digital platform for our large industrial and commercial customers to measure energy consumption, costs and emissions from electricity usage. We can then work with them to help them achieve the actions they want to take to reduce emissions.

Scenarios used to inform our financial planning and test the resilience of our strategy

Climate change scenario mapping

Genesis stress tests its climate change strategy against a number of scenarios, these include (but are not limited to) four scenarios specifically modelled to align to identified climate-related risks. These scenarios inform our comprehensive climate-related risk assessment while being integrated with other strategic processes.

The first two scenarios involve global efforts to heavily reduce emissions and limit global temperature increase to below 2°C. These two scenarios differ in their methods needed to reach this target. The first scenario is driven primarily by Government legislation. The second is energy sector transformation through the private sector, such as innovative technological advances and change in consumer choices. Both have the potential to succeed in being the main driving force in keeping climate change within the 2°C goal of the Paris Agreement.

The third scenario defined, is where greenhouse gas concentrations continue unabated (the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway (RCP) 8.5) and includes greater climate change and associated physical impacts.

The fourth scenario defines a scenario based on a 1.5°C transition consistent with the aim of our Science Based Targets. This scenario also factors in Climate Change Commission recommendations.

These scenarios were selected to provide integrated scenarios with a mix of factors but also allowed relevant and appropriate stress tests against extremes from both a transitional and physical risk or opportunity perspective.

Specifics of the scenarios were created from published climate-risk related models, including work published by the National Institute of Water and Atmospheric Research (NIWA) and the Ministry for the Environment for physical risks. This is supported by long-term scenarios modelling the supply and demand balance in the New Zealand electricity system by internal subject matter experts.

The scenarios used to test the robustness of our strategy have differing timescales applied. For each of the four climate-specific scenarios, the timeframes applied are:

- Short-term: one to 10 years
- Medium-term: 10 to 20 years
- Long-term: 20+ years

In all scenarios modelled, Genesis' strategy proved resilient. A key factor supporting this resilience is that with many risks, a corresponding opportunity is often created. Genesis' strategy seeks to identify opportunities, while also providing a level of risk mitigation. An example of this would be the entrance of new types of renewables into the local market. While this is needed to reduce the reliance on thermal generation, and potentially diversify away from hydro-dominated renewables, a financial risk of displacement for Genesis' thermal assets is created. However, this also places Genesis in a strong position to make informed and structured long-term investment in these renewables.

Metrics & Targets

Ngā Whāinga

TCFD requirements

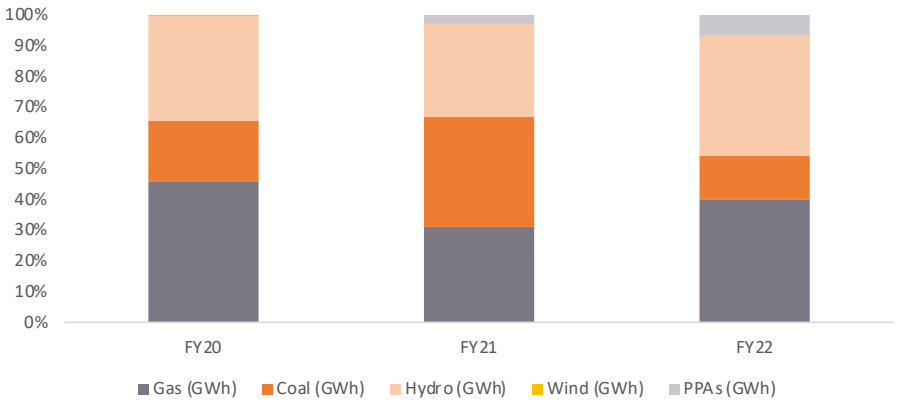
- Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.
- Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
- Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.

Where does our revenue come from?

The majority of Genesis' external revenue (over 80%) comes from the sale of electricity. Of the total electricity sold in FY22, 45% comes from generation of electricity (wholesale revenue) and 55% from the resale of electricity to end users (retail revenue).

Wholesale electricity revenue is currently made up of generation from gas, coal, hydro and wind.

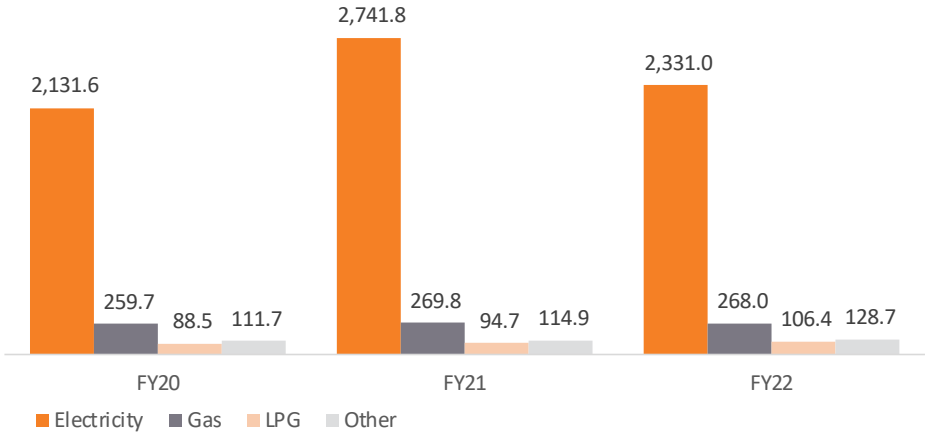
Wholesale Generation in GWh



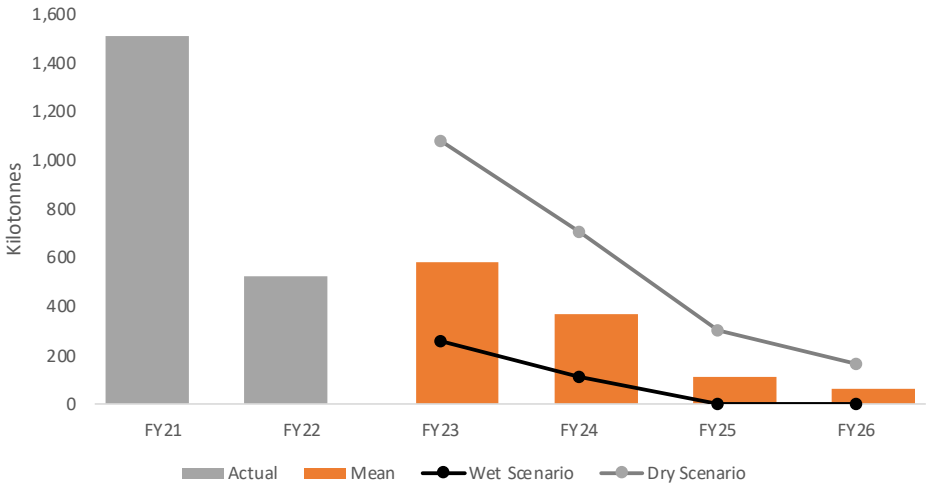
As noted in the strategy section, Genesis is committed to enabling a low carbon future and has a plan to transition its thermal generation assets away from baseload operations through its **Future-gen strategy**. Coal generation is expected to rapidly decline as a result from FY21 levels.

External Revenue by Product

$ Million



Coal Consumption Forecast



Scope 1, 2 and 3 greenhouse gas emissions

What are our GHG emissions and what are we doing about it?

Genesis measures its absolute GHG emissions using the GHG Protocol and is committed to taking action to reduce emissions. Total scope 1 and 2 GHG emissions for the year ended 30 June 2022 was 2,223,343 tCO_2e. This is 44% less than FY21. The decrease is mainly driven by the decrease in thermal generation (32% lower than FY21) and a decrease in the volume of coal burnt (67% lower than FY21).

Scope	Category	FY20 tCO_2e	FY21 tCO_2e	FY22 tCO_2e
Direct emissions (Scope 1)	Attributable to customers	2,539,863	3,132,879	1,934,978
	Attributable to supply contracts (swaptions)	149,491	805,398	286,398
	Stationary combustion attributable to thermal generation	**2,689,354**	**3,938,277**	**2,221,376**
	Mobile combustion	579	1,624	1,733
	Fugitive emissions	80	162	17
	Total scope 1	**2,690,013**	**3,940,063**	**2,223,126**
Indirect emissions (Scope 2)	Electricity consumption	240	262	217
	Total scope 2	**240**	**262**	**217**
Indirect emissions (Scope 3)	Purchased goods and services ^	15,348	14,898	15,492
	Fuel and energy related activities (upstream emissions) ^	412,475	438,837	410,177
	Waste generated in operations	19	26	21
	Business travel	1,975	215	146
	Use of sold products	1,366,852	1,269,957	994,686
	Investments ^	8,080	8,547	7,184
	Total scope 3 ^	**1,804,749**	**1,732,480**	**1,427,706**
	Total scope 1, 2 & 3 ^	**4,495,002**	**5,672,805**	**3,651,049**

^ FY22 is the first year that purchased goods and services, fuel and energy related activities and investments have been disclosed. FY20 and FY21 have been restated to include these categories to enable comparability between reporting periods.

EY have provided an unqualified limited assurance opinion on the GHG inventory. Refer to our FY22 Greenhouse Gas Inventory Report for a copy of EY's report and for further information on our GHG emissions and the basis of preparation.

The carbon intensity of our generation is expected to reduce over time as a result of the Future-gen strategy and our Science Based Targets.

Key performance indicator	FY20	FY21	FY22
Total thermal generation (GWh)	4,461	5,501	3,736
Thermal generation carbon intensity (tCO_2e / GWh of thermal generation)	603	716	595
Total generation (GWh)	6,805	8,027	6,481
Total generation carbon intensity (tCO_2e / GWh of total generation)	395	491	342

Genesis also plays an important part in helping customers transition to a low carbon future. Currently for every dollar Genesis earns in revenue, approximately 0.74 kg of CO_2e is produced. This is expected to decrease as customers and generation transition to more renewable sources.

Key performance indicator	FY20	FY21	FY22
Total retail revenue ($m)	1,558	1,575	1,565
$ktCO_2e$ *	1,182	1,175	1,158
Carbon intensity of retail revenue (Kg of CO_2e / $ retail revenue)	0.76	0.75	0.74

* Emissions from electricity purchases is based on factors published by the Ministry for the Environment

Science Based Targets

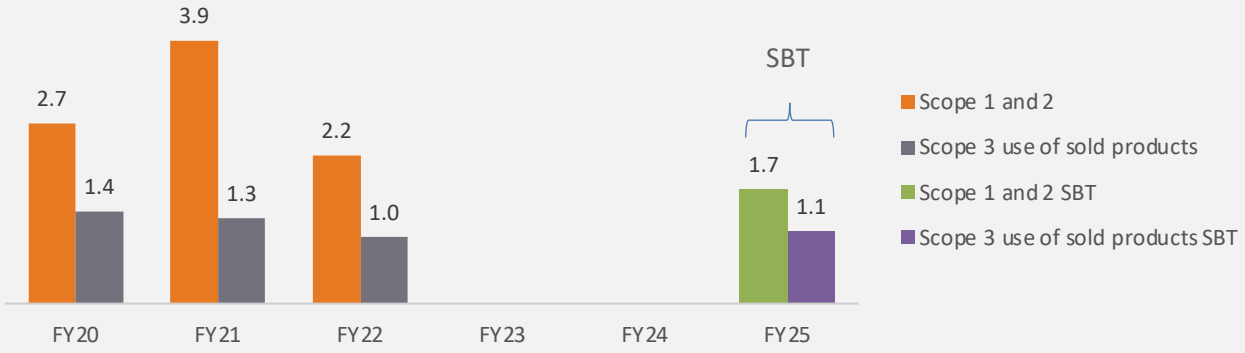
How are we tracking against our Science Based Targets?

We have set ambitious emissions reduction targets aligned with limiting global warming to 1.5°C above pre-industrial levels to support New Zealand's commitments under the Paris Agreement. The targets have been verified by the internationally recognised Science Based Targets initiative. We have committed to reducing absolute scope 1 and 2 GHG emissions by 36% by FY25 from a FY20 base year and to reduce absolute scope 3 emissions from use of sold products by 21% by FY25 from a FY20 base year. That is a commitment to reduce more than 1.2 million tonnes of carbon dioxide equivalent (tCO_2e) by FY25.

Scope 1 and 2 emissions in FY22 were 17% lower than FY20 (base year) which equates to a reduction of 466,910 tonnes of CO_2e. Scope 3 emissions from use of sold products was 27% lower than FY20 (base year) which equates to a reduction of 372,166 tonnes of CO_2e.

Performance compared to Science Based Targets (SBT)

MtCO2e



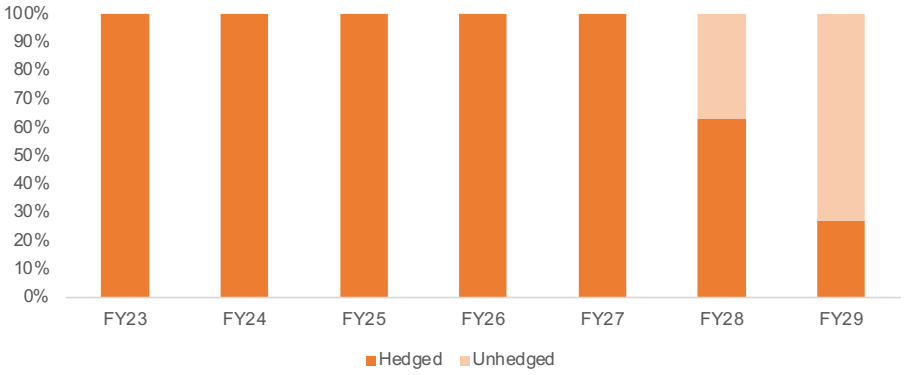
Cost of carbon

How protected is Genesis from the rising cost of carbon?

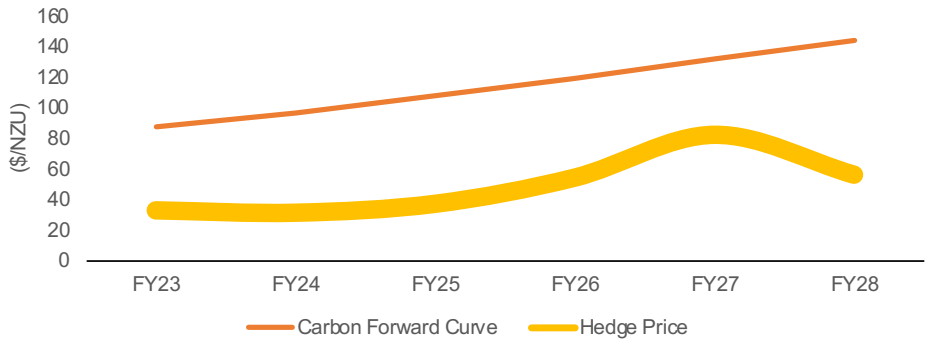
Despite rising carbon costs, Genesis remains hedged through to FY27 with a supply of units well below the current market price. Genesis has made further investment in long-term carbon abatement during the year, investing in Forest Partners. Our investment in DrylandCarbon and Forest Partners provides Genesis with a long-term supply of units over the next three decades.

Genesis is cognisant of the risks of a rising carbon price. The internal cost of carbon used for investment decisions is based on the forecasted spot price at the time the decision is being made.

Carbon Hedge Position



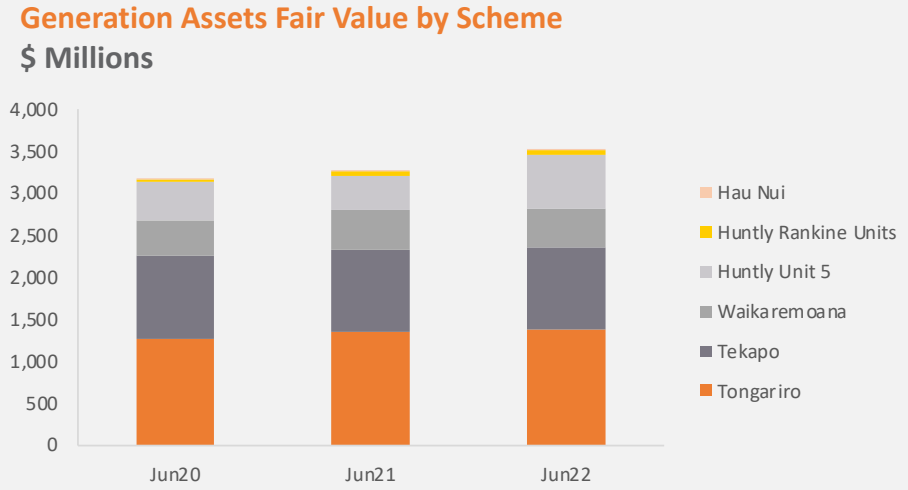
Carbon Hedge Prices



Generation asset values

How does the transition impact our generation asset values?

Generation assets are carried at fair value on our balance sheet. Fair value is based on a discounted cash flow model prepared by management. Refer to our FY22 Annual Report, note B1 in the consolidated financial statements for more information. As noted in the graph, thermal assets make up a small portion of the total value of generation assets due to the fact the discounted cash flow model for these assets assumes a solution for New Zealand's dry-year risk has been found and implemented by the market within the next 8-to-10 years. These assets could be worth more if thermal generation is required to support the market after this time.



Capital committed to climate-related initiatives

How much capital are we committing to climate-related initiatives?

Genesis is committed through its Future-gen strategy to transition away from baseload thermal generation.

We are aiming to secure 2,650 GWh of renewable generation through a combination of power purchase agreements and investment in up to 500 MW (approximately 740 GWh) of grid scale solar in New Zealand through our joint venture with FRV Australia. The solar joint venture expects to make public its first projects in FY23. To date, we have signed three power purchase agreements for 1,200 GWh of new renewable generation.

Increased efficiency to reduce our carbon footprint is embedded in all our capital decisions.

Long-term investment to improve the reliability and efficiency of generation assets undertaken during the year includes:

- $2.9 million invested in the Tekapo B runner upgrade project. The overhaul of both turbine runners has resulted in 2.5% improved efficiency for the 800 GWh station which equates to 25,229,000 KWh per annum. This is enough to power 3,153 homes at 8,000 KWh per year.
- $1.8 million invested in replacing the Wairehu canal screen cleaner. The project involved converting a 30 tonne excavator from diesel to electric. This will reduce the amount of diesel burnt by 5,700 litres per annum which will remove 15 tonnes of CO_2 per year. It will also remove the risk of spills and waterway contamination.
- $0.6 million invested to date on the overhaul of the Piripaua power station turbines. The investment is expected to increase efficiency by 3.3% for the 42 MW station which equates to more than 4,204,800 KWh per year. This is enough to power 525 homes at 8,000 KWh per year.
- $5.8 million invested in the Tuai generator replacement (one of three being replaced over a three-year period). The replacement of all three generators is expected to be completed in FY24 and has the potential to enable up to 6 MW of additional capacity for the Tuai Power Station.

We are also working on incorporating embodied carbon assessments into capital projects. This involves measuring the carbon footprint of a project so that we understand the unavoidable emissions of the project, and can weigh up the impact different options have, so that we can make more informed decisions about what materials we purchase. This will help us identify how we can minimise the carbon footprint of our projects.

Appendix

Description of physical assets

Kupe

Genesis, through its wholly owned subsidiary, has a 46% interest in the Kupe Joint Venture, which owns the Kupe oil and gas field situated off the south Taranaki coast.

Kupe's assets comprise three wellheads, an unmanned offshore platform, a 30 km pipeline and subsea utilities umbilical cable to an onshore production station near Hawera, oil storage facilities at New Plymouth, and an onshore gas pipeline.

Reflecting its interest in the JV, Genesis receives 46% of the natural gas produced. It has also entered long-term contracts with the other JV partners to purchase the remainder of the current natural gas produced and has rights in respect of all future production from the field.

LPG is a secondary product of the field. Genesis also receives 46% of the LPG produced.

LPG depots and networks

Genesis owns and operates a network of LPG distribution hubs across New Zealand and two reticulated LPG networks (Piped LPG) in the South Island: Dunedin and the Faringdon development.

Huntly Power Station

Huntly (Raahui Pookeka) is on the banks of the Waikato River and is close to both Auckland and Hamilton. Several types of thermal generation operate at the site.

Rankine Units
Three Rankine cycle units are the original plant, built to be able to operate on either natural gas or coal. Each unit has a nominal capacity of 250 MW.

Water cooling for the units from the Waikato River is limited at higher river temperatures, however cooling towers enable one of the Rankine Units to operate even when river temperatures are approaching limits.

Unit 5
This Combined Cycle Gas Turbine (CCGT) is the most efficient gas generator in New Zealand and has a capacity of up to 403 MW.

Unit 6
This is a 50.8 MW open cycle gas turbine, which can burn 100% gas or diesel to generate electricity.

Waikaremoana Hydro scheme

The Waikaremoana Power Scheme is a hydro-electric power development in northern Hawke's Bay and consists of three power stations fed from the Lake Waikaremoana. The scheme is located between Te Urewera and Wairoa, along the upper 7 km of the Waikaretaheke River. The 138 MW hydro scheme comprises three power stations – Kaitawa (36 MW), Tuai (60 MW) and Piripaua (42 MW).

Tongariro Hydro scheme

The Tongariro Power Scheme comprises three hydro power stations – Rangipo (120 MW, underground), Tokaanu (240 MW) and Mangaio (1.8 MW) and has a catchment area of more than 2,600 km^2 in the North Island's central volcanic plateau.

Tekapo Hydro scheme

The Tekapo Power Scheme is at the head of the Waitaki Valley in the Mackenzie District of the South Island. It has been owned and operated by Genesis since June 2011, and has a generation capacity of 190 MW and uses water from the glacial-fed Lake Tekapo/Takapō to generate electricity through two power stations – Tekapo A and Tekapo B. Tekapo B sits in the bed of Lake Pūkaki.

Hau Nui Wind farm

Hau Nui Wind Farm is in the hills south of Martinborough in the Wairarapa. Its 15 turbines have a combined capacity of 8.65 MW.

Power Purchase Agreements

Waipipi
Genesis has a 20-year electricity offtake agreement for the energy from Waipipi's 31 wind-turbines. The site generates 133.3 MW and produces approximately 450 GWh per year.