

Meeting Date: 29 May 2025

## GENERATION ASSET MANAGEMENT AND AGING PLANT

## SECURITY AND RELIABILITY COUNCIL

This paper introduces presentations from Genesis, Contact and Meridian, on their approach to maintenance and management of their generation assets, to support a secure and reliable power system.

**Note:** This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority except where specifically noted.

# Generation asset management and aging plant

## 1. Introduction

- 1.1. The SRC has chosen generation asset management and aging plant, as the theme for this meeting and asked the secretariat to arrange a suite of papers and presentations by way of background.
- 1.2. To inform the scope of the presentations, the secretariat sought input from members on areas of focus, general questions and specific questions for presenters. The aim is to ensure presenters focus on the issues most relevant to the SRC's functions and to best support the SRC's discussions and advice to the Authority.
- 1.3. This guidance from members informed the approach and presenters. Genesis, Contact and Meridian have accepted the SRC's invitation and have prepared presentations on the points members have noted.
- 1.4. Meridian's presentation also outlines its environmental strategy and priorities and related initiatives to achieve them. It notes a range of security of supply risks and mitigations and Meridian's view on the principles informing strategic investment and market dynamics.
- 1.5. Meridian outlines their generation plan and gives views on what the challenges we face in the transition to renewables.
- 1.6. Contact's presentation also outlines its decarbonisation strategy and asset resilience, noting specific issues relevant to asset type and future mitigation options.
- 1.7. Contact's presentation also takes a deeper dive into the challenges of thermal asset management, the framework used and how it is preparing for future investment, including solar and batteries.
- 1.8. Genesis' presentation also outlines its risk management approach and examples of how this operates in action, with particular focus on Huntly.
- 1.9. Genesis outlines its approach to identifying key plant risks, its critical spares programme and the evolving role of its hydro and thermal assets, including uncertainties and barriers.
- 1.10. Members are invited to consider points of alignment and disagreement and bring these to the discussion to test thinking and gain clarity, if needed.
- 1.11. Members are encouraged to consider other topics for further information or deeper dives at future meetings.
- 1.12. Representatives from Genesis, Contact and Meridian will present and be available for discussion and questions.
- 1.13. The presentations are included as **Appendices A-C** to this paper.

## 2. Questions for the SRC to consider

The SRC is asked to consider the following general questions.

- Q1. What questions does the SRC have for presenters about their views, especially any points of difference from members' own perspectives?**
- Q2. What, if any, barriers gaps and opportunities can members identify to ensuring sufficient generation assets are available to support the power system?**
- Q3. What further information does the SRC seek to support its understanding of the current-state of asset management, whether generation or related to other parts of the sector?**
- Q4. What advice, if any, does the SRC wish to provide to the Authority?**

### **3. Appendix A: Genesis presentation**

### **4. Appendix B: Contact presentation**

### **5. Appendix C: Meridian presentation**

# Generation Asset Management

Presentation to Security and Reliability Council

29 May 2025



# Agenda

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1. Genesis Generation Assets
2. Risk Management
3. Asset Investment Strategy

# 1. Genesis Generation Assets

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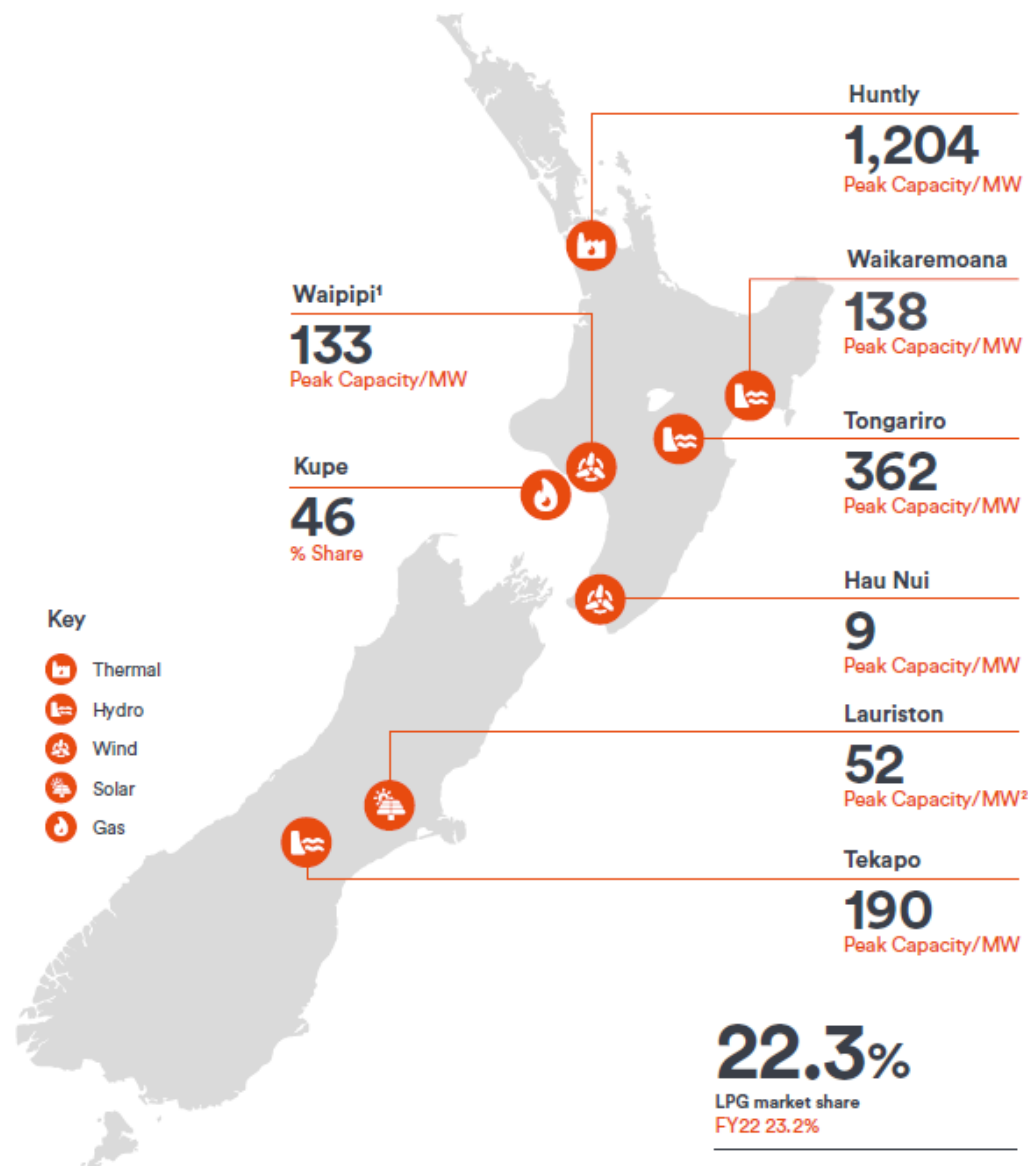
# Who we are and what we do



Genesis is an energy generator and retailer supplying electricity, natural gas and LPG to more than 480,000 customers. The geographic spread and diverse range of generation assets provide vital support to the country's highly renewable energy sector. This means our business has historically generated 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 choose to participate in markets for the long term to create value for shareholders in a sustainable way, and remain focused on evolving our business model away from pure energy supply to energy management. We achieve this through development of digital and virtual channels customers use to interact with us alongside a suite of market leading products and services providing insights our customers can act on to use energy more efficiently. This work is anchored by our people who are future focused and adaptive, seeking new and innovative ways of engaging our customers, operating our assets, and working smarter.

We understand we need to change some of the things we do to address climate change and are led by science in doing so. We've set Science Based Targets to remove 1.2 million tonnes of carbon by FY25 tied to the international benchmark of limiting global warming to below 1.5C. We acknowledge the impact our business has on the environment and communities around our generation sites, and strive for greater sustainability in the broadest sense of the word – for the environment, for people and for New Zealand.



**1,268**  
Full time employees (FTE)  
FY22 1,204

**483,721**  
Customers  
FY22 471,012

**41,751**  
Shareholders  
FY22 42,513

**5,858 GWh**  
Electricity generated  
FY22 6,481 GWh

**8.4 PJ**  
Gas from Kupe  
FY22 11.1 PJ

**30.71%**  
Natural gas market share  
FY22 29.94%

1. Genesis has an electricity offtake agreement for the energy from Waipipi.

2. Subject to final investment decision. Construction due to start late 2023 and be operational by late 2024.

# 2. Risk Management

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# Risk Management – Ageing Plant

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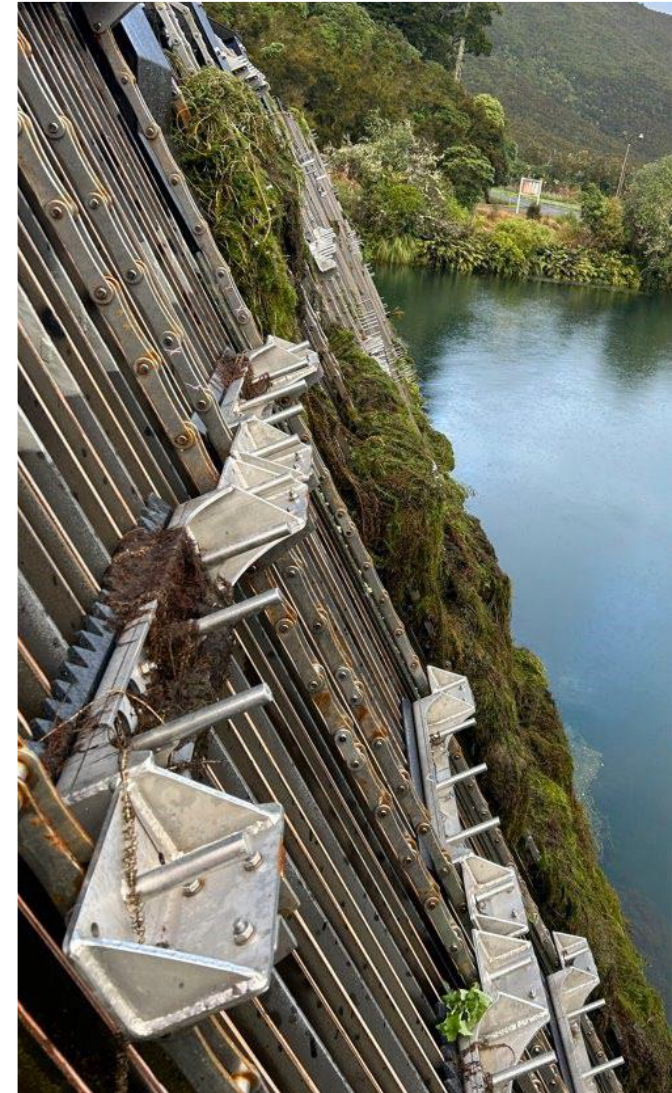
- Condition monitoring is essential to understand the plant status and risks.
- The periodic major outages/overhauls are essential to provide a solid base – in the case of thermal units, the forecast operational requirements are factored into work scopes (with some flexibility) with units differentiated on their expected role for the period.
- Our capex process and the resulting forecast allows for early initiation of projects, taking lead times and early engagement with suppliers into account.
- Consideration of new build, e.g. higher-efficiency plant with lower fuel specification sensitivity.



# Risk Management Examples

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1. Tokaanu station outage due to weed blockages
  - Screen cleaner(s) and purchase of weed boat.
2. Huntly unit outage
  - Historically risks have been mitigated by separating common station systems and incorporating redundancy.
  - Maintaining the third Rankine unit as back-up has provided additional capacity during peak generation periods and provides cover for outages.
  - On-going plant reliability and availability are supported by the major and routine maintenance programmes.
  - Operator training has been targeted to ensure competent staff numbers are available for running the 3x Rankines and GT's if required.
  - Coal contracts are able to flex with changing demand.



# Long Term Asset Management

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- Long term asset management is focussed on ageing infrastructure and major plant lifecycle investments.
- Condition assessment identifies key plant risks and drives the lifecycle investment/capex programme.
- Critical spares programme and contingency planning help manage unplanned outages.
- Business continuity scenarios are included in the corporate risk programme.
- Genesis have always taken a long-term view of hydro asset reliability and lifecycle asset management.
- Thermal has previously been shorter term, however is now focussed on its role over the next 10 years.



# 3. Asset Investment Strategy

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# Asset Investment Strategy

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## 1. Firming role:

- Life assessment complete for Rankine units to 2040.
- Potential to extend Unit 2 beyond 2026.
- Unit 5 on-going maintenance programme based on life expectancy of 10+ years.
- Units maintained to take into account the support required for the transition to renewables (more frequent cycling, extended dry year operation etc.).
- Work to provide additional fuel security and diversity is underway terms of gas storage and establishing a biomass supply chain.



# Asset Investment Strategy

## 2. Risks/uncertainties/barriers:

- Pathway for commercial viability of investment required to ensure sufficient generation is available when required - i.e. the value of having stand-by units needs to be recognised.
- The running pattern is increasingly volatile and weather (and fuel) dependent and this is reflected by the revenue uncertainty.
- Accordingly, relying on spot revenue isn't a sustainable option. Large thermal assets need to be supported by long-term contracts under the current market structure to provide certainty to invest in ongoing maintenance and upgrades.
- In the absence of long-term contracts, ensuring security of supply into the future may require lateral thinking about market design / arrangements.



# Long Term Plan for Huntly

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- Huntly Power Station is the ideal site to provide for New Zealand's peaking / firming / backup needs into the future, whatever these are. This is because it is ideally located, has ample electricity and fuel interconnection, and the skilled people necessary to perform this role.
- This is likely to involve a portfolio of assets with different operating profiles – deep storage via solid fuels, fast start gas and liquid fuel capacity, batteries, and potentially other future technologies.
- Life assessment for Rankine units completed with investment plan to enable three Rankine units to run through to 2040, if economic to do so.
- Ability to combust biomass has been proven and supply chain work continues.
- Unit 5 continues to be maintained (and upgraded) based on operating parameters (hours/starts) as part of the condition-based monitoring (CBM) programme.



# Contact Energy | SRC

Asset Management, reliability and  
security of supply

29 May 2025



# Contact 26 > Our strategy to lead NZ's decarbonisation

## Strategic theme

### Objective



## Grow demand

Attract new industrial demand with globally competitive renewables



## Grow renewable development

Build renewable generation and flexibility on the back of new demand



## Decarbonise our portfolio

Lead an orderly transition to renewables



## Create outstanding customer experiences

Create NZ's leading energy and services brand to meet more of our customers' needs

## Enablers

**ESG:** create long-term value through our strong performance across a broad set of environmental, social and governance factors

**Operational excellence:** continuously improving our operations through innovation and digitisation

**Transformative ways of working:** create a flexible and high-performing environment for New Zealand's top talent

## Outcomes

### Growth

Pivot our business to a new growth era that captures the value unlocked by decarbonisation

### Resilience

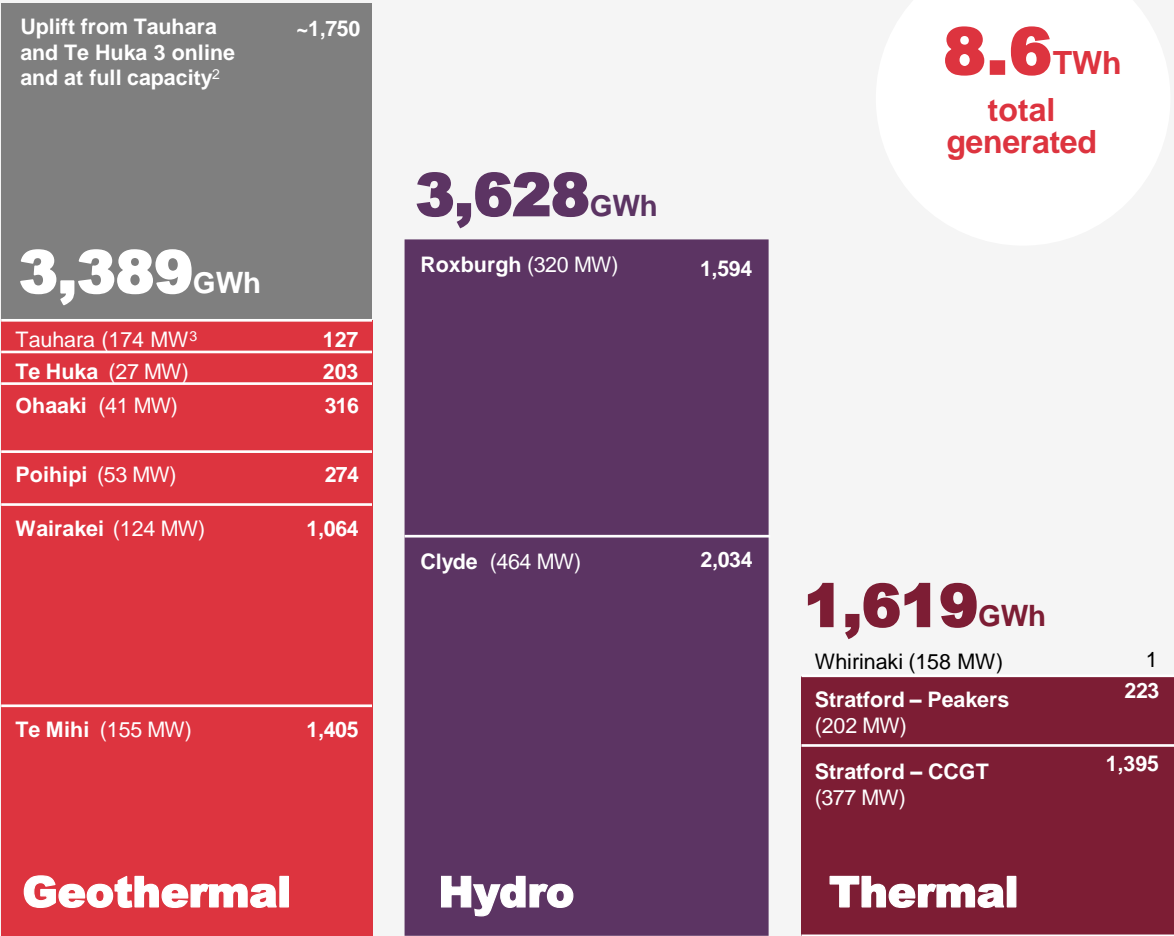
Deliver sustainable shareholder returns, aligned with our ESG commitment

### Performance

Realise a step-change in performance, materially growing EBITDAF through strategic investments

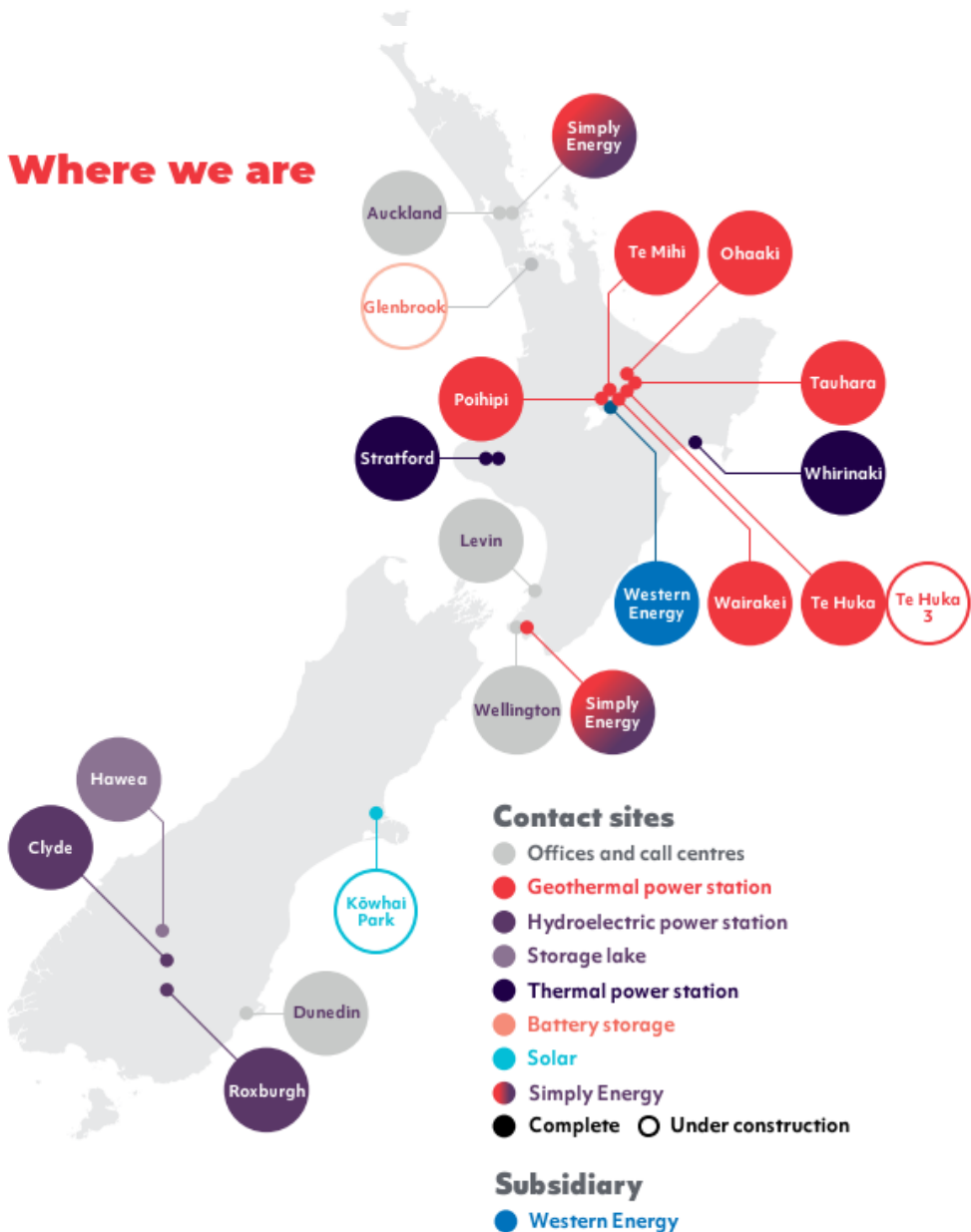
# Contact has a diversified and resilient portfolio of generation assets

FY24 generation output by station and type<sup>1</sup>







<sup>1</sup> Numbers shown are net capacity.  
<sup>2</sup> Based on capacity of 174 MW and 51 MW for Tauhara and Te Huka 3 and 95% capacity factors. Less FY24 Tauhara generation.  
<sup>3</sup> First steam May 2024.

## Where we are



# Current portfolio

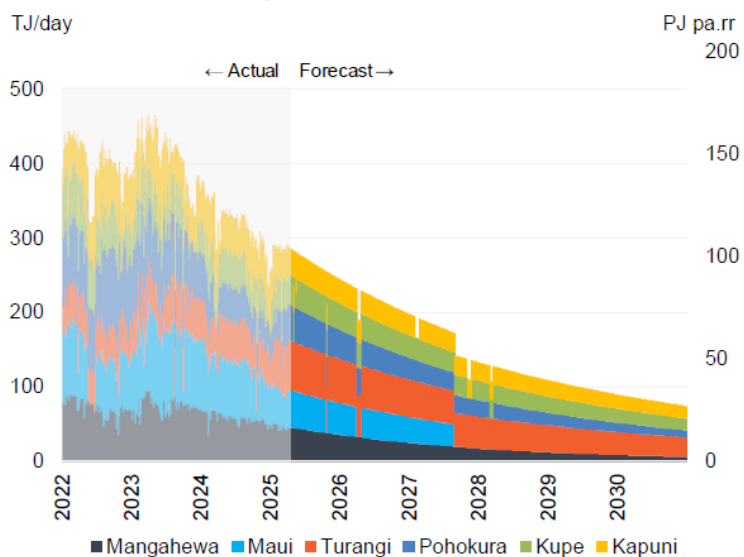
	Role	Risks / Issues	Mitigation	Future
 <b>Geothermal</b>	<ul style="list-style-type: none"> <li>▪ <b>Base load</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Winter unplanned outages</li> <li>▪ Must run generation creates “spill” risk during off-peak periods</li> </ul>	<ul style="list-style-type: none"> <li>▪ Planned outages targeting spring</li> <li>▪ Portfolio flexibility</li> </ul>	<ul style="list-style-type: none"> <li>▪ Development pipeline for the next 5-10 years will depend on geothermal economics.</li> <li>▪ Flexibility?</li> </ul>
 <b>Hydro</b>	<ul style="list-style-type: none"> <li>▪ <b>Base load with limited flexibility</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Outage timing</li> <li>▪ Climate change impact on hydrology.</li> <li>▪ Regulated operational ranges impede optimal use of water intra-season, inter-season.</li> <li>▪ Summer weighted inflows</li> </ul>	<ul style="list-style-type: none"> <li>▪ Industry advocacy for greater operational ranges on existing hydro schemes (river and lakes) for greater flexibility (intra-day and inter-season).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Wider operating ranges</li> <li>▪ Use of contingent storage</li> <li>▪ Small pumped hydro schemes</li> </ul>
 <b>Stratford Thermal</b>	<ul style="list-style-type: none"> <li>▪ <b>Intra-day flexibility</b></li> <li>▪ <b>Seasonal cover</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Domestic gas supply in terminal decline</li> <li>▪ OEM support</li> <li>▪ “Wear and tear” from frequent starting and stopping</li> </ul>	<ul style="list-style-type: none"> <li>▪ Thermal right-sizing to reflect gas availability and gas-fired generation value in a transitioning electricity market.</li> <li>▪ <b>AGS</b> – Ahuroa Gas Storage</li> </ul>	<ul style="list-style-type: none"> <li>▪ Thermal assets will continue to play an important role</li> <li>▪ Fuel diversity</li> </ul>
 <b>Whirinaki</b>	<ul style="list-style-type: none"> <li>▪ <b>Reserve capacity / energy</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Dispatch uncertainty</li> <li>▪ Fuel supply constraints during base-load operation (e.g. 2008)</li> </ul>		<div> <ul style="list-style-type: none"> <li>▪ Flexible fuel supply</li> </ul> </div>

# TCC deep dive: Challenges of aging thermal assets

TCC is a prime example of an ageing thermal asset ill-suited to NZ's energy transition – unit commitment issues, lack of flexibility, limited OEM support and no long-term fuel certainty

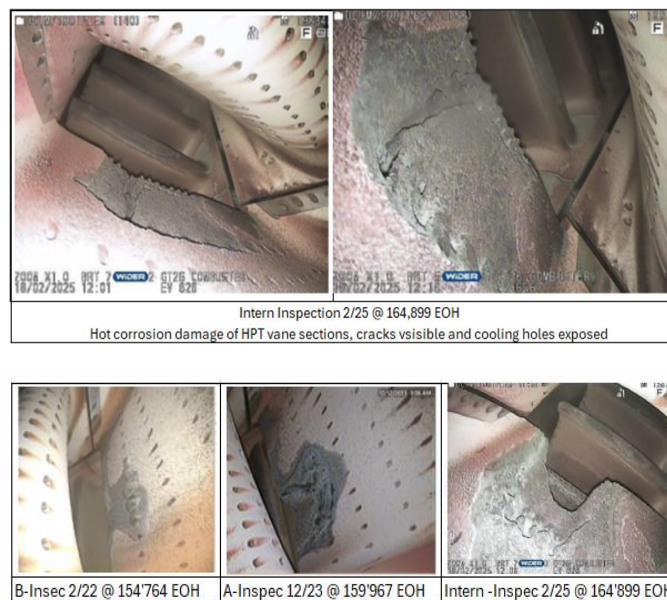
## NZ Gas Supply Decline

### Baseline scenario, daily



Source: Enerlytica

## Physical Condition



Representative Turbine borescope images showing degradation of condition over time

## Dispatch Economics

- **Large size** - TCC is a combined cycle gas and steam turbine plant, designed for baseload generation (366MW - design, current 310MW limit)
- **Lack of flex** - No fast start, peaking capability for intra-day firming.
- **Declining capacity factors** - Started as baseload and now used for dry-year winter generation cover .
- **Fuel uncertainty** - Decline in domestic gas supply leading to supply risk issues and higher gas prices for contracted gas (when available), making baseload gas-fired generation uneconomic.
- **Market design challenges** - The lack of support for ThermalCo, an initiative to get industry contribution to overhaul and maintain aging thermal assets such as TCC

# Asset Management Framework

Our asset management approach contributes to stable and secure electricity supply in NZ.

## 1 Availability and reliability

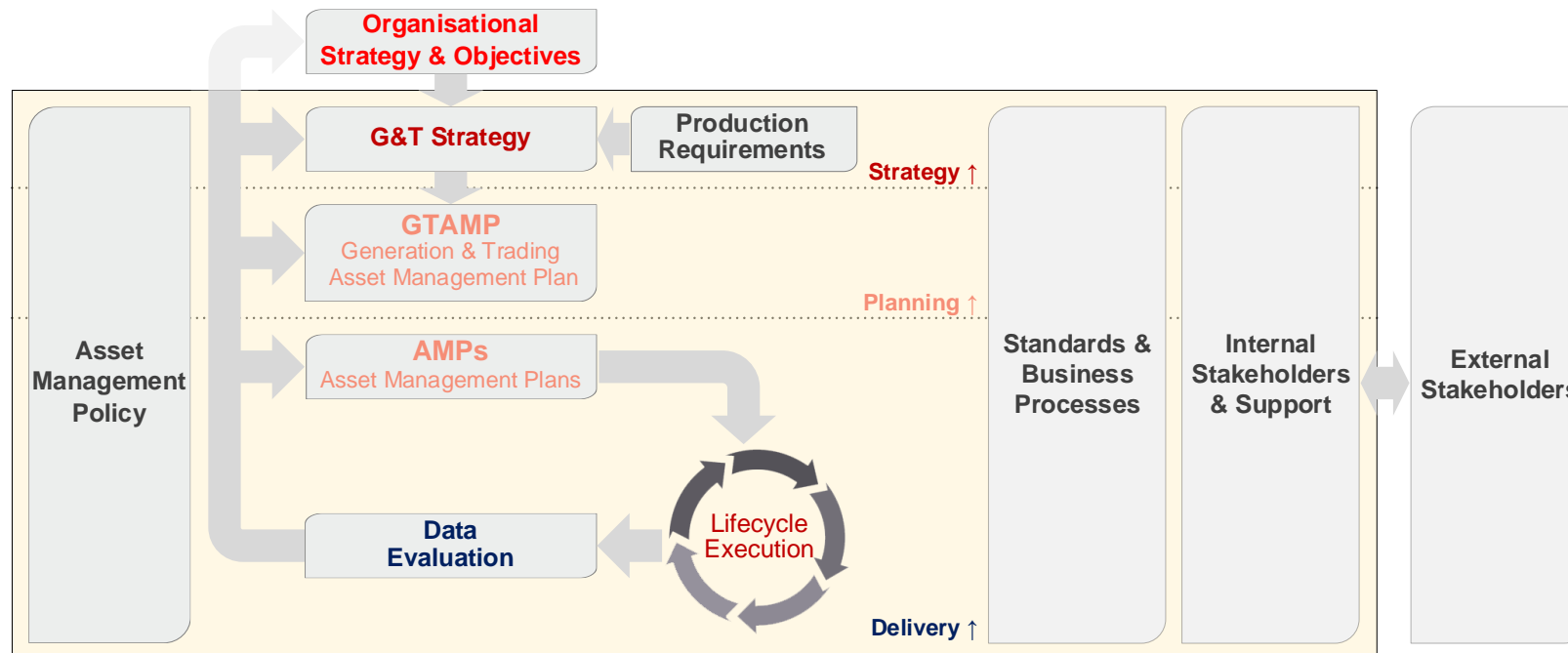
- Annual reliability review of asset performance.
- Recommendations on focus areas to improve reliability and availability.
- Fleet outage planning to maximise winter generation.
- Strategic spares holding risk strategy review (e.g. Stratford peakers).
- Tri-annual site risk review for each fuel type (risks, mitigation plans).

## 2 Reporting and monitoring

- ISO 55001 accreditation evaluated by Telarc
- Asset Health Maps: a record of an asset's performance and risks informing investment requirements to meet Contact's overall strategy which is defined every year by the Leadership Team.
- Asset Management plans document capital investment programmes and outage plans over the life of the asset to cover asset risks,

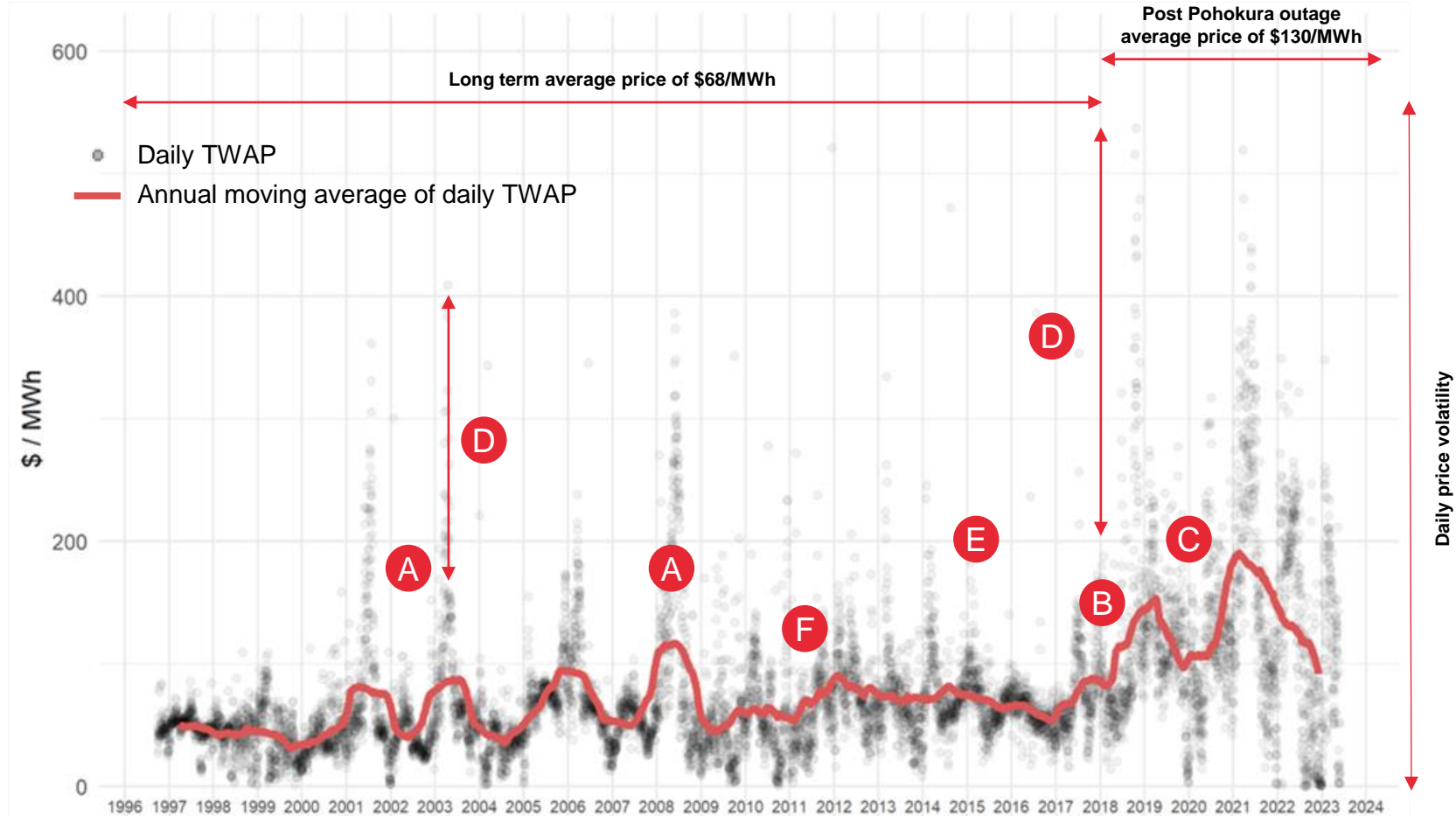
## 3 Maintenance and testing

- Bi-monthly reliability engineering reviews to discuss recent failures and proactively address emerging risks.
- Reliability engineering tools: root cause of failures, document spares holding via Lifecycle Asset Management Plans
- Annual Plant Status Reviews with Subject Matter Experts to focus engineering on short term weak points and long-term sustainability, tied to Asset Management Plans.



# A new market is emerging...

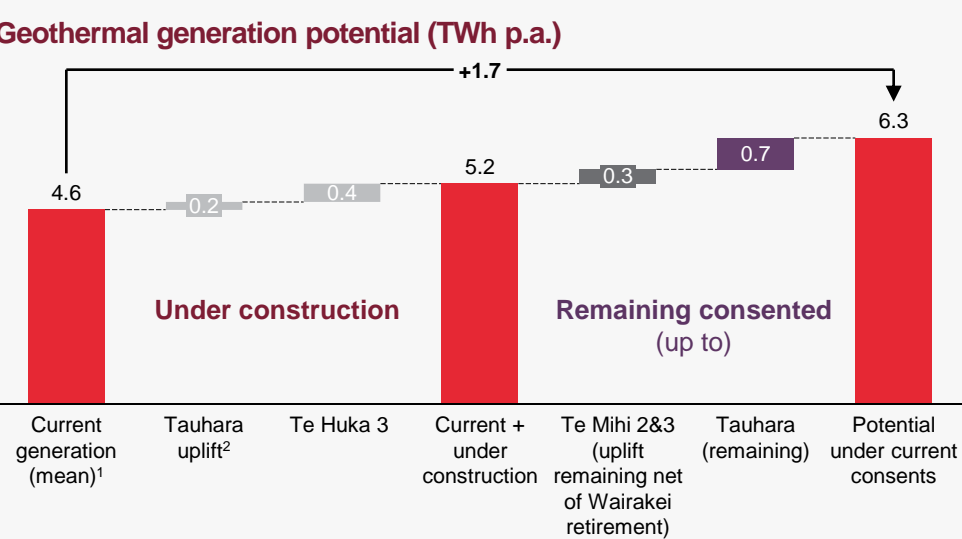
The market needs to manage a wider range of conditions and there are clear investment signals for new flexible generation.



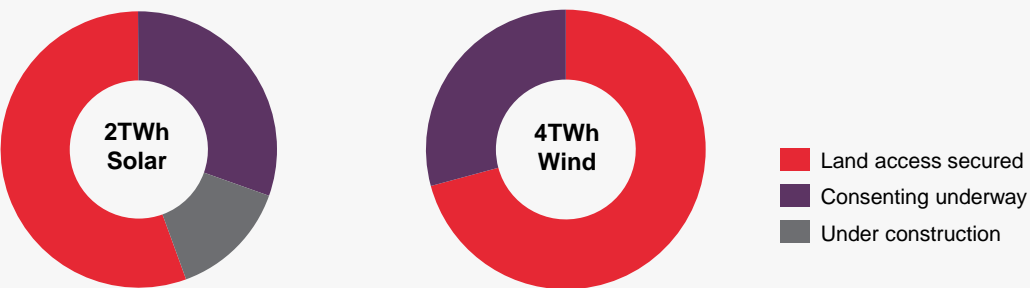
## Key Events

- A** Dry years: 2001, 2003, and 2008.
- B** Pohokura gas field outage and the start of a period of uncertainty about the cost and availability of coal and gas. The start of decarbonisation and thermal substitution.
- C** Trebling of NZU carbon price.
- D** Volatility in price.
- E** Period of underinvestment in generation due to NZAS exit risk, flat demand.
- F** Last major period of generation development.

# Contact is preparing for further investment in renewable generation and storage

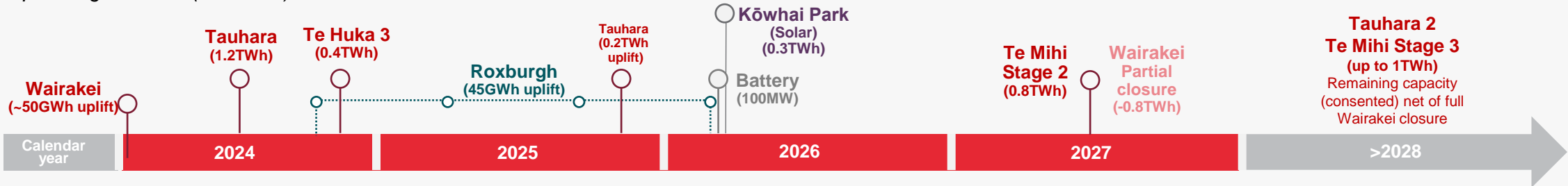


Wind and solar options under development (TWh p.a.)



**Grid-scale battery options:** Contact has consent for a 100MW battery at Stratford and is seeking consent for additional battery capacity at Stratford and Glorit in conjunction with solar farm consenting.

Planned Geothermal plus other renewables under construction<sup>3</sup>  
Expected generation (indicative):



<sup>1</sup> Includes mean geothermal generation (existing stations) plus Tauhara volume based on 152MW online. Also includes ~50GWh uplift already delivered on Wairakei field from an increase in consented fluid take.

<sup>2</sup> Represents uplift in Tauhara output expected from the first planned outage in October 2025 (0.2TWh).

<sup>3</sup> All uncommitted investments are subject to Board investment decisions. The Tauhara, Te Huka 3, Roxburgh, Kōwhai Park and Glenbrook battery investments have been committed to.

# Delivering 225MW new geothermal generation

Supporting the decarbonisation of NZ by bringing two world class geothermal power stations online in 2024

## Tauhara



- Tauhara came online in May 2024 providing new renewable generation as the gas market tightened.
- Power station ran continuously during 30-day reliability run at ~152MW and was successfully tested at ~174MW.
- The operation of Tauhara through winter 2024 provided an important source of renewable baseload generation, at low marginal cost, as fuel constraints (hydro and gas) deepened.
- Final commissioning activity was undertaken in Q1 FY25 to lift initial operating capacity above ~152MW.
- Minor modifications will be made during the first outage in October 2025 to uplift operating capacity to ~174MW.

### Key stats:

Capacity (planned)	174MW
Annual output (at full capacity) <sup>1</sup>	~1,450GWh
Status	On line
Capacity under PPA <sup>2</sup>	87.5MW
Total project cost <sup>3,4</sup>	\$924m

## Te Huka 3



- Recent project milestones include:
  - Completion of the NCG reinjection system to capture and reinject carbon released from geothermal fluid.
  - Power station commissioning underway with first synchronisation to the national grid completed 14<sup>th</sup> November 2024.
- Power station remains on track to be online in Q4 CY2024.
- This will take the total new geothermal plant completed and commissioned by Contact in 2024 to over 200MW, delivering 1.9TWh<sup>1</sup> p.a. of renewable output when at full capacity.

### Key stats:

Capacity (planned)	51MW
Annual output (full year)	~430GWh <sup>1</sup>
Status	Commissioning
Expected online	Q4 CY2024
Total project cost <sup>3</sup>	\$300m

<sup>1</sup> Annual output is calculated based on 174MW / 51MW for Tauhara and Te Huka 3 respectively at 95% capacity factor across 365 days (24-hour operation).

<sup>2</sup> PPAs totalling 25MW to Oji Fibre and Pan Pac have commenced; PPA of 62.5MW to Genesis commences 1 January 2025.

<sup>3</sup> Total project cost under board approvals. Tauhara includes performance payment to the EPC contractor as a result of bringing the plant online earlier than scheduled.

<sup>4</sup> In FY25 Contact expects to recognise Tauhara assets of around \$1,080m which includes capitalisation of interest and is after adjusting for the write-off recognised in FY24 relating to remediation work.

# Glenbrook battery investment to enhance Contact's renewable energy flexibility

Battery investment metrics are compelling, supported by a range of strategic benefits

## Battery investment key metrics



## Sources of value

- ✓ Participation across physical, reserve and frequency-keeping markets
- ✓ Supports retail shape and can support price cap and virtual battery products for tier 2 retailers
- ✓ Expansion option with Tesla to increase capacity to 130 MW / 260 MWh
- ✓ North Island location, close to retail load, reducing North/ South Island price separation
- ✓ Reduces reliance on gas peakers by offering intra-day peaking
- ✓ Supports new wind and solar on an intra-day and intra-week basis

Note: Battery will be located on a three hectare site leased from NZ Steel, adjacent to Transpower's GXP at Glenbrook. Consent granted by Auckland Council to operate for 35 years.

<sup>1</sup> Based on a range of revenue sources including ancillary services (instantaneous reserves and frequency keeping), price arbitrage and fuel cost savings.

<sup>2</sup> Includes sunk cost of \$5.4m.

# Investment in Kōwhai Park solar diversifies Contact's renewable generation base

Speed to market expected to enhance returns available to Contact from this attractive investment

## Key investment metrics (Contact)

Generation under PPA to Contact | **80% ~210GWh p.a.**  
(Remainder sold merchant within JV)

Contact PPA term | **15 years**

Contact PPA price | **<\$90/MWh (With CPI escalation)**

Contact target IRR<sup>1</sup> | **Over 12%**

## Key investment metrics (Project)

Capacity | **~168MWp ~150MWac**

Annual output | **~275GWh p.a.**

Project costs<sup>2</sup> | **~\$273m \$1.8m/MWac**

Opex and SIB capex | **~\$20/MWh**

Target schedule | **Online in Q2 CY2026**

## Strategic benefits

✓  
Technological and regional diversification of Contact's generation base

✓  
One of New Zealand's largest solar farms with 300,000 panels and a 35 year expected useful life

✓  
Speed to market (target online by winter 2026) capturing opportunity in wholesale markets

✓  
Delivers on the combined strengths within Contact's JV with Lightsource bp

✓  
Comprehensive solar EPC contract with CHINTEC (with network connection by Ventia)

✓  
JV structure (50/50) and 77% project finance<sup>3</sup> reduces Contact's required total capital outlay

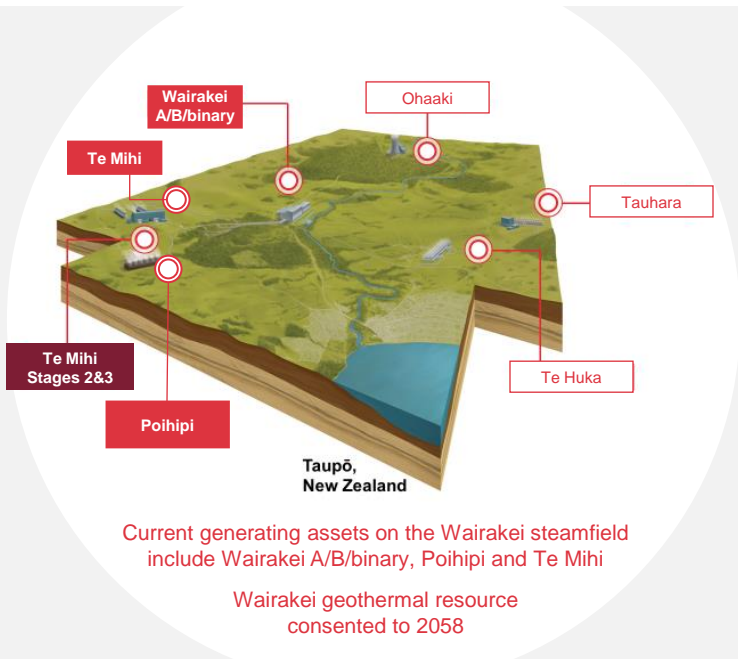
<sup>1</sup> Includes JV returns and acquired generation. Return on acquired generation will ultimately depend on sales channel and market conditions.

<sup>2</sup> Excludes financing costs of \$43m. Includes development costs.

<sup>3</sup> Bank facilities executed with remaining lender conditions precedent being completed in coming weeks. The final numbers could deviate slightly from those presented here once outstanding activities are completed.

# Phased development plans for Wairakei geothermal

Contact remains committed to the long-term development of the Wairakei geothermal field



From	
Development approach	Single build
Project	GeoFuture
Scale	Up to 200MW
Technology	Binary or Steam Turbine
Target online	2H CY2026
Plans for Wairakei A/B/binary	Closure CY2026

Not proceeding

To		
Development approach	Phased build	
Project	Te Mihi Stage 2	Te Mihi Stage 3
Scale	Around 100MW	Around 100MW
Technology	Binary (2 units)	Binary (2 units)
Target online	Mid CY2027	Mid CY2031
Indicative plans for Wairakei A/B/binary	Full extension of Wairakei A/B/binary to mid CY2027 + Extension of 30MW steam turbine + 7MW binary to mid CY2031	

New builds and extensions remain subject to Board final investment decisions

## Te Mihi Stage 2 – Key metrics

 Schedule (final investment decision)	<b>Q4 CY2024</b>	 Estimated MW (net export to grid)	<b>~100MW</b>
 Estimated forward capital expenditure <sup>1</sup>	<b>~\$600-700m</b>	 Estimated plant capacity factor	<b>95%</b>
 Production / injection capacity secured	<b>100%</b>	 Estimated annual output	<b>~0.8TWh p.a.</b>

## Wairakei geothermal station extension – Indicative costs

Extension works (indicative)	Full extension of Wairakei A/B/binary to mid CY2027	Indicative SIB capex (FY26- FY27) \$25-35m
	Extension of 30MW steam turbine + 7MW binary unit to mid CY2031	

- Costs associated with the 1-year extension of the full Wairakei geothermal station reflect maintenance costs, those associated with statutory recertification, and final steps to comply with June 2026 consent conditions (consented to operate to mid CY2031).
- Working case assumes the extension of 1 steam turbine and 1 binary unit with identical standby units (steam and binary) maintained on reserve shutdown. This allows for increased reliability with 24 hour return to service capability.
- Costs to be confirmed at the same time as Te Mihi Stage 2 FID (Q4 CY2024).
- Total cash cost of extensions (SIB capex, opex) FY26-FY31 of \$30-35/MWh based on the Wairakei station indicative output profile on slide 34.

<sup>1</sup> Excludes capitalised interest and sunk costs. Contact is assessing the allocation between Te Mihi Stage 2 and 3 of the \$114m sunk costs (approved prior to May 2024) and this will be confirmed at FID for Te Mihi Stage 2.

# Changes to market settings to improve security of supply



## Consistent security forecasts

- SOSA vs Quarterly Forecast vs NZGB
- Different assumptions and implications



## Better use of existing hydro reservoirs

- Increase lake operating ranges (including “Contingent Storage”) to allow lower value energy (at risk of being spilled) to be stored for use in later months. It effectively increases the amount of energy that can be moved from summer to winter.
- It can also help to manage dry periods, and reduce wholesale prices by relying less on coal use.



## Wholesale Market

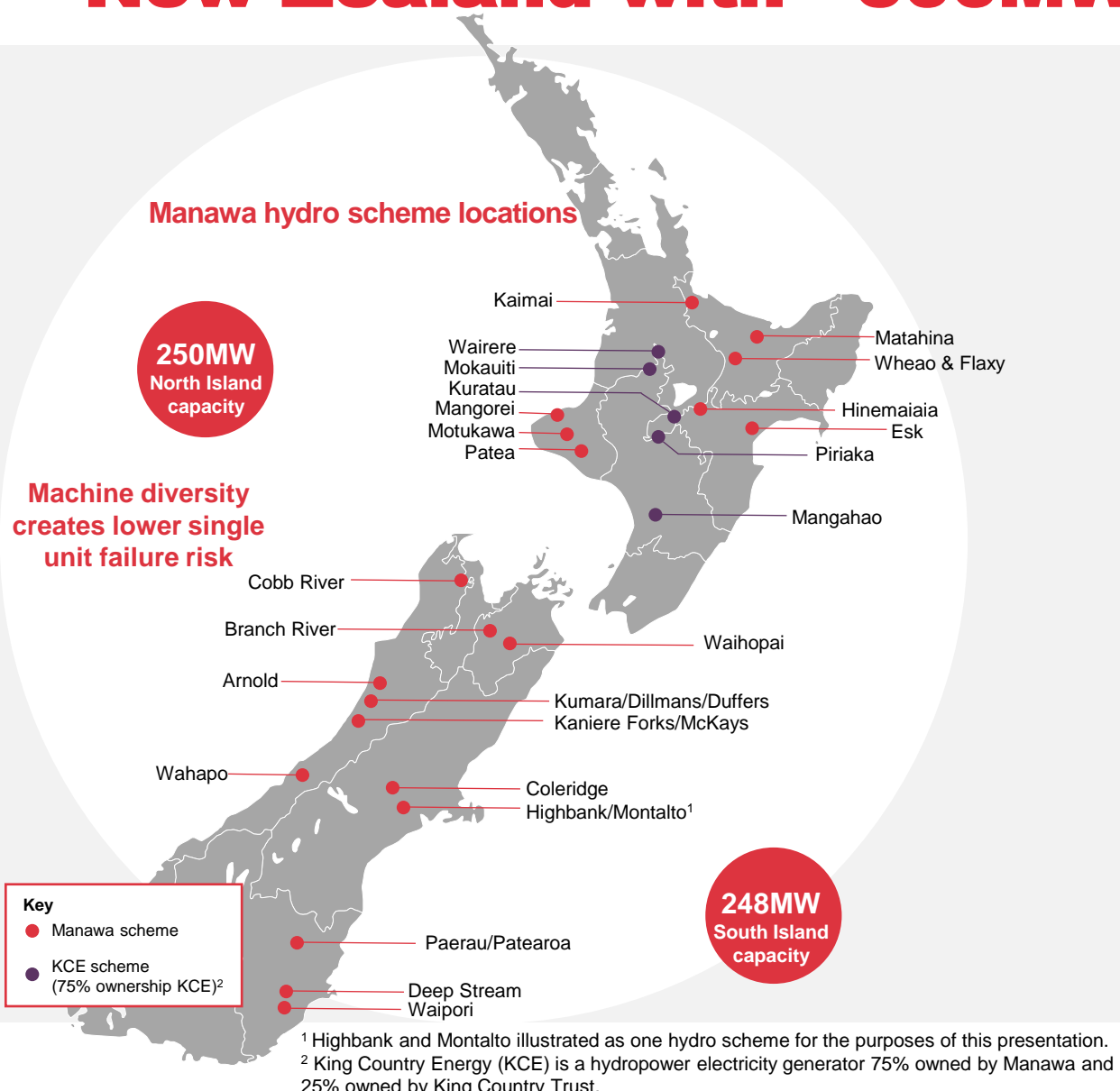
- Extend the duration of the forward curve to 5 – 10 years.
- Implement 5-min settlement instead of half-hourly to improve price signals for more efficient investment in capacity and demand response.
- BESS working group



## Consents, regulations and compliance costs

- Reforms to reduce consenting lead times (e.g. SWF, Glorit).
- Reclassify geothermal reservoirs from research to development.
- Review geothermal compliance requirements to meet oil and gas regulations.

# Manawa owns and operates 25 hydro schemes around New Zealand with ~500MW of capacity



## Key metrics

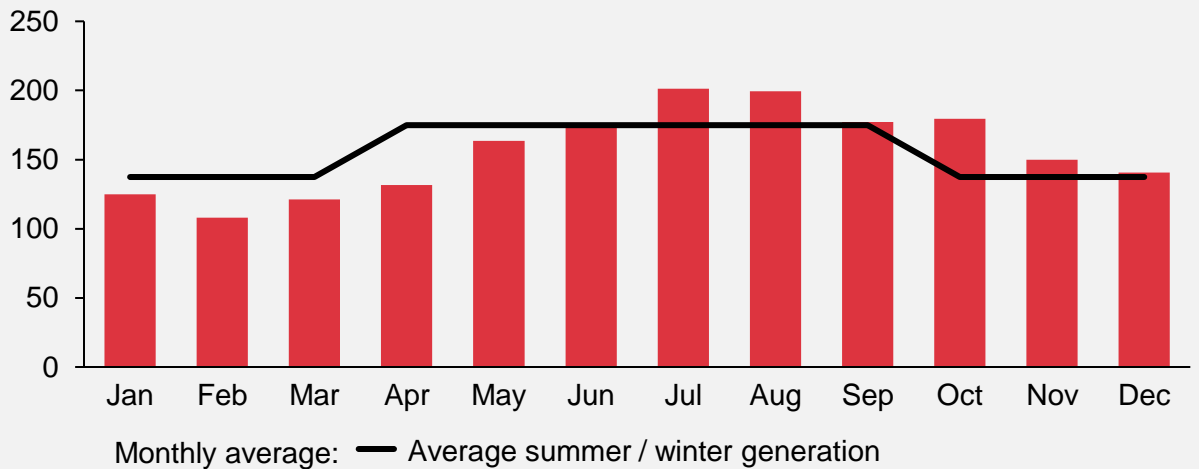
**Total hydro generation volumes of 1.9TWh in FY24**

**>99% of FY24 generation from renewable sources**

**Owns and operates 25 hydro schemes with ~500MW of capacity and one diesel peaking station**

**40% / 60% summer / winter generation (long term average)**

## Winter dominated generation<sup>3</sup> Average output by month (GWh)



<sup>3</sup> Manawa company information. This data is from 2017-2023 to include King Country Energy generation information.

**Thank you**



# Security & Reliability Council

**Asset management and aging plant and the implications for security and reliability of New Zealand's electricity supply**

MAY 2025

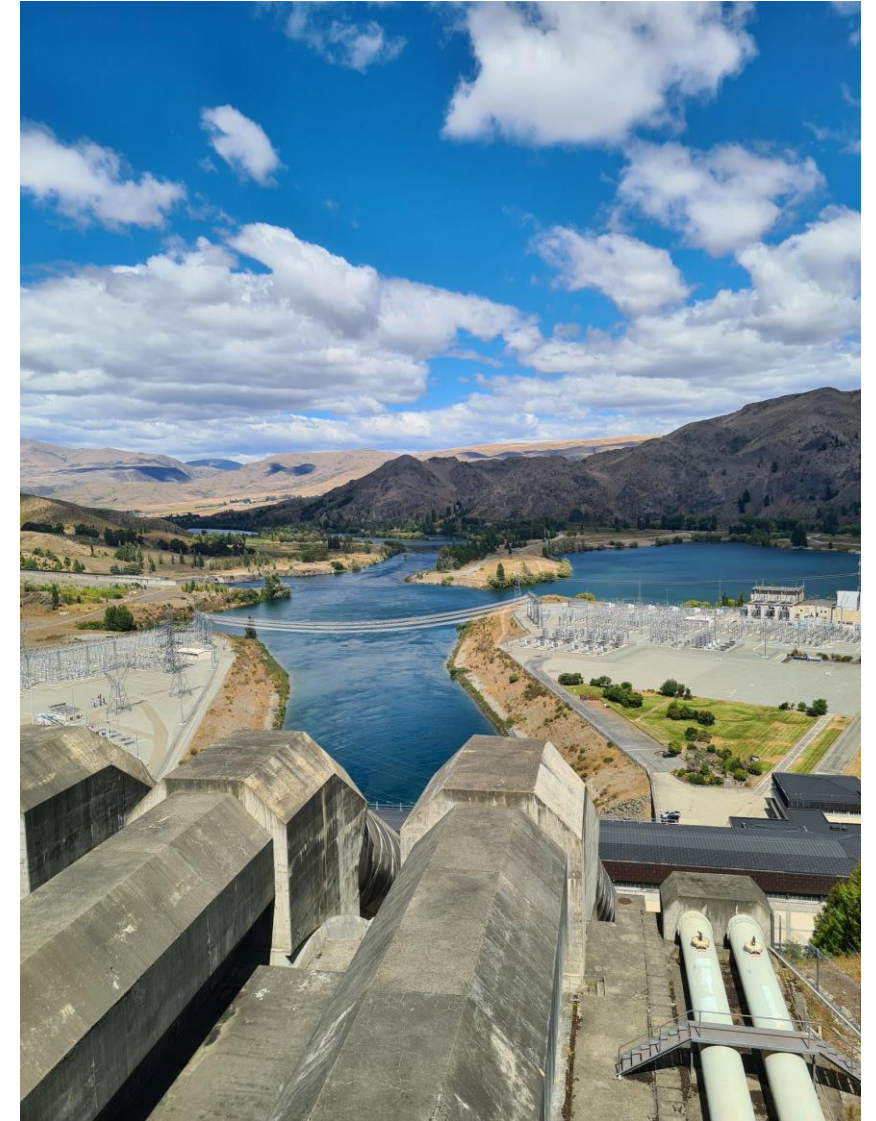
TANIA PALMER – GM GENERATION

MAT BAYLISS – HEAD OF GENERATION STRATEGY

BRENT WILSON – ENGINEERING AUTHORITY

# Agenda

- Meridian Overview
- Security of Supply Risks & Mitigations
- Strategic Investment
- Revenue Adequacy and Market Dynamics
- Near-term Capacity Gains and Long-term Investment Challenges
- Generation Asset Management
- Transition from Gas to Renewables
- Summary
- Question time



# Our strategy map

*Te kaupapa*  
Our purpose

**Clean energy for a fairer and healthier world**

*Te rautaki*  
Our strategy

**An all-encompassing focus on climate action**

*Te kaupapa matua*  
Our priorities

**Grow renewable generation**

**Deliver cleaner, cheaper energy**

**Deliver operational excellence**

**Grow capability and culture**

*Te arotahinga*  
Our focus

**To speed our path to a resilient, net zero future**

**Through innovation that unlocks value for customers**

**So everything we do aligns to deliver on our goals**

**Because how we do the mahi is what will make the real difference**



*Te mahi*  
Our key initiatives

- Accelerate Aotearoa New Zealand's decarbonisation by delivering scale energy projects at pace:
  - Build renewable generation options.
  - Deliver on our 7 in 7.
  - Secure long-term access to water.
  - Accelerate electrification of transport and process heat.
- Grow system flexibility:
  - Grow our dispatchable MW capacity.
  - Bring dispatchable customer capacity to market.
- Develop an innovation culture that delivers digital, and data driven customer experiences.
- Expansion of the energy product set that unlocks the value of transport electrification, process heat and demand flex.
- Continued investment in energy hardship and community programmes that promotes equitable access to the benefits of the energy transition.
- Policy advocacy that promotes climate action and supports New Zealanders through the energy transition.
- Build operational flex and agility while sustaining excellent asset productivity.
- Modern data and digital systems to promote collaboration, operational efficiency, innovation and data-driven decisions.
- Grow a diverse and inclusive, skilled workforce that reflects the country we live in.
- Nurture leadership capability to support the cultural and digital maturity of a future Meridian.
- Our developing understanding of the Māori world view helps build long term relationships with tangata whenua and better outcomes for all.
- Safety leadership that grows in maturity as we build into the energy transition.
- Sustainability culture and leadership that benefits people and planet, inspires climate action, and attracts investors.

# Climate Action Plan

## Our purpose

Meridian's purpose of **Clean energy for a fairer and healthier world** is at the centre of our journey to a resilient, net zero future.

## Our priorities

### Renewable generation

### Customer decarbonisation

### Manage our emissions and build capability



## Our key initiatives

### Development pipeline

Creating a pipeline of resilient grid-scale projects for construction. Our '7 in 7' first horizon goal aims for seven projects in seven years to 2030.

### Build new generation

Beginning with Harapaki wind farm, we're building new assets to increase the supply from our existing 100% renewable energy asset base.

### Grow system flexibility – grid scale

Enhancing the capability of our assets – 500MW by the end of FY28 – and increasing overall system flexibility via demand response.

### Grow system flexibility – customer

Helping to create a more flexible energy system that delivers cheaper, cleaner energy for our customers.

### Electrify transport and heat

Helping businesses replace fossil fuel boilers, growing the electric vehicle (EV) charging network and making it easier for homes and businesses to drive electric.

### Increase access to energy and community good

Investing in our programmes to reduce energy hardship and supporting communities to decarbonise.

### Construction emissions

Staying focused on minimising emissions and waste as we grow.

### Half by 30

Halving total Scope 1, 2 and 3 operational emissions by FY30 from a FY21 baseline. Work to our new Net Zero by 2050 target.

### Forever Forests

Growing a permanent, and over time 100%, native forest sink for our emissions.

### Build capability

Growing capability to reduce emissions and adapt to climate change impacts across Meridian and our suppliers.



**Meridian.**

# Security of Supply Risks & Mitigations

## Scarcity of fuel (drought)

- Management between catchments – Waitaki, Waiau, Wind
- Demand side management e.g. NZAS agreement
- Call swaptions – gas and coal

## Restricted access to fuel

- Asking Transpower or consent authorities to reverse 2019 Transpower decision to effectively block access to contingent storage unless Transpower exercises discretion to allow it (e.g. SOSFIP review, and Government fast-track application) – up to 545 GWh and up to \$500M per annum less in wholesale market costs
- The Guardians' agreement for Lakes Te Anau and Manapouri access below minimum control level, this recommendation is with the Minister for Energy – 45 GWh
- Active engagement with our resource consent stakeholders and regulators

## Aging plant

- Committed long term asset management program
- Robust condition, criticality and risk assessments resulting in a prioritised program of work
- Clear Asset Policy, Goal and Strategies
- Maintenance practices and performance of our maintenance delivery



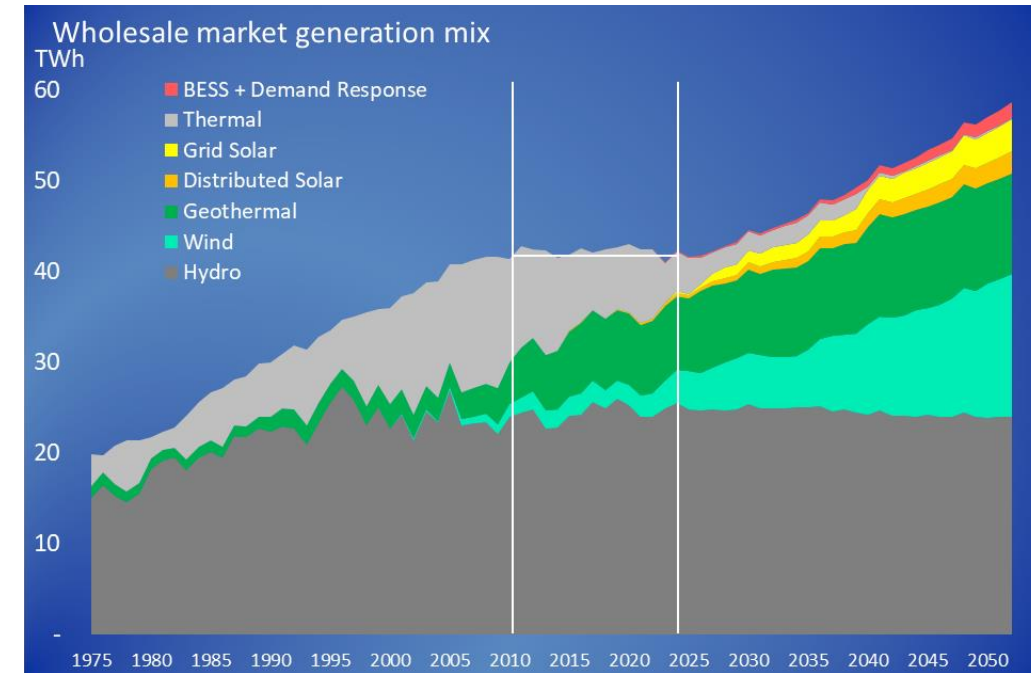
# Strategic Investment

## Open-Access Wholesale Market

- Any party can invest in technologies with a 30+ year asset lifetime, and investment risks lie with decision makers
- Expectations shape the future power system's makeup, timing, value, and pricing
- Balanced approach: avoid too early/big or too late/small investments
- Markets operate well on good information, so encourage good transparency on key inputs such as forecast gas production and contracted levels to help investment making decisions
- Contrast with pre-1990s government central planning failures

## Current Investment Landscape

- High investment run-rate in the wholesale market
- Multiple companies and technologies targeting energy and flexibility
- Increased investment in HV/LV lines
- \$10B of new generation investment in the last 15 years by generators
- Geothermal, wind and some solar has met thermal capacity retirement
- Resulting in a more renewable electricity system, but one still dependent on thermal fuel storage to firm hydro drought



Source: Meridian 2025 Interim Results Presentation

2010-2025: 0 GWh demand growth, 14,000 GWh new generation growth  
2020-today: 8,000 GWh new generation, >\$7B new capital committed

Meridian alone has 680 MW of development projects now consented representing \$1B capital commitment

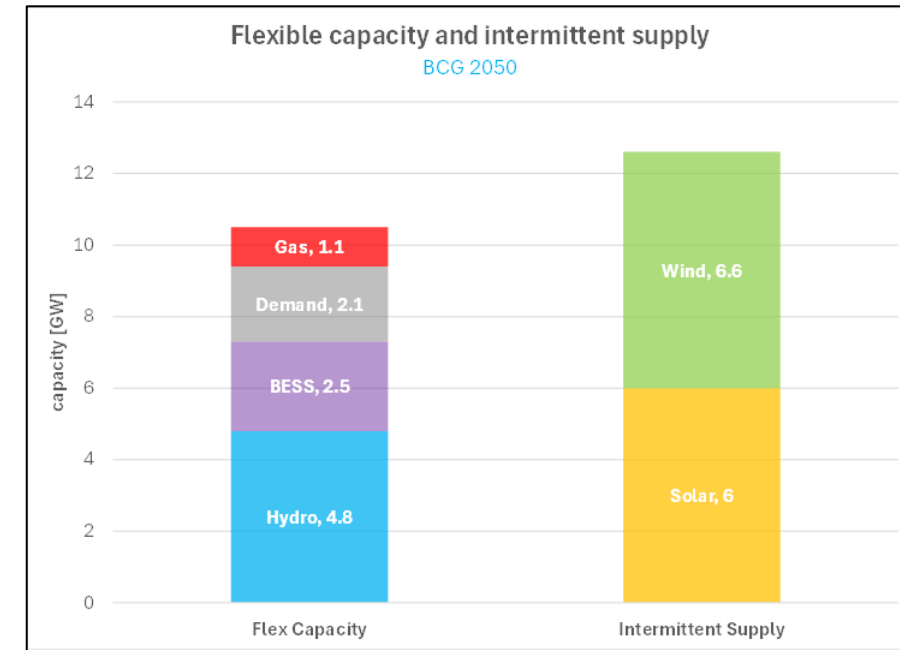
# Strategic Investment

## Meridian's Strategic Response

- Engages in generation and portfolio management, self-build, JVs, acquisitions, and underwriting PPAs
- Development: new renewable energy (wind, solar, modest hydro), BESS (2 hrs), early-stage pumped storage
- Wholesale: demand response (Tiwai flex), thermal-backed swaptions (gas and coal)
- Retail: Virtual Power Plant (aka smart grid), Vehicle to Grid (V2G), Commercial & Industrial (C&I) load-shifting, demand-response from boiler conversions
- Generation: "500 in 5" (refurb, flexibility, peaking), additional consents flexibility (Pukaki contingent storage, Waiau range), target reduction of 100 annual outage days, currently achieved 219 days reduction from wind and hydro

## Investment Adjustments and Firming Solutions

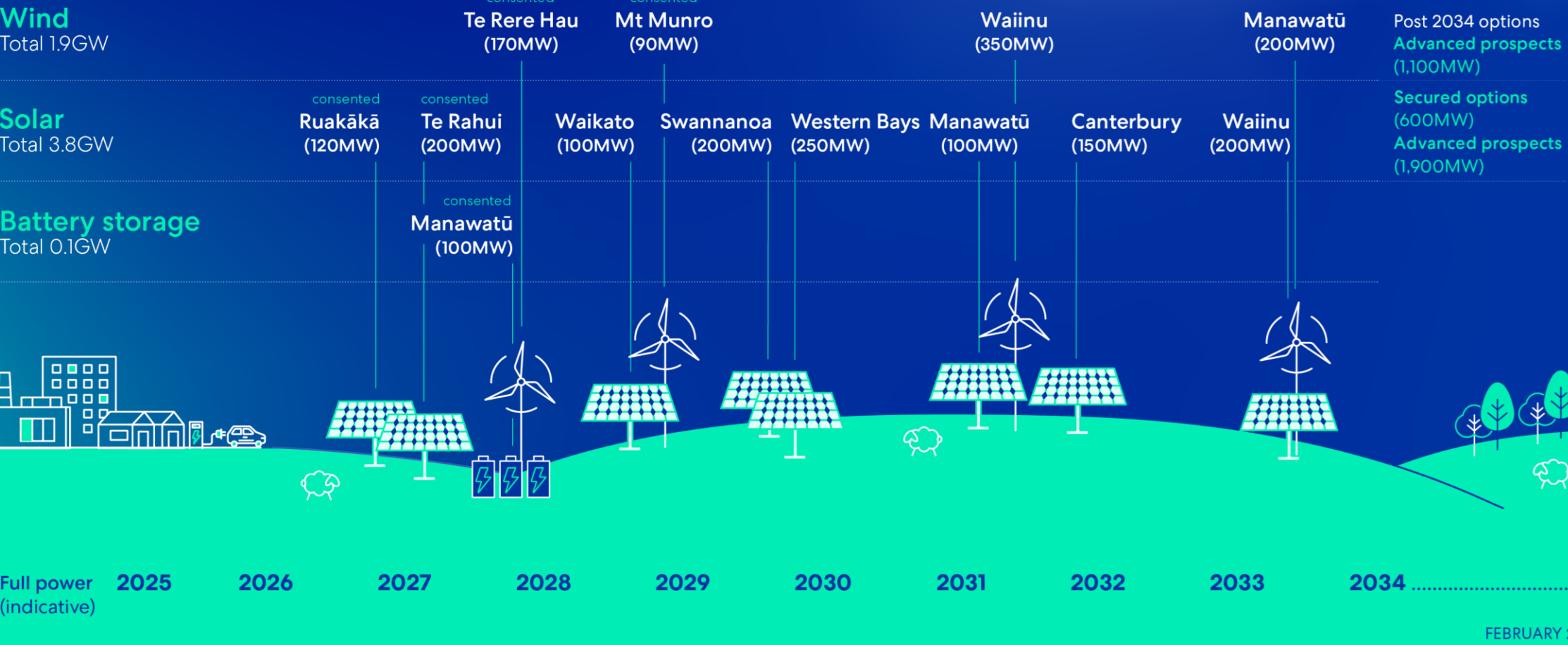
- Meridian adjusts investments based on prudent value recovery
- Importance of scale and timing of firming solutions
- Residual thermal generation may or may not be involved
- Future power system needs met by a combination of BESS, demand response, gas, and hydro – ref. Boston Consulting Group (BCG) 'The Future is Electric'



Source: BCG 'The Future is Electric' data

# Renewable development pipeline

5.8GW (13.8TWh) of development options  
2.6GW secured, 3.2GW in advanced prospects



# Revenue Adequacy and Market Dynamics

## Revenue Adequacy

- Guiding principle for intermittent generation investment and flexibility
- Risk levels vary by technology class; flexibility is more fickle
- Life-time and contract length matter: LCOE is a 30+ year price, not necessarily reflected in short-term prices

## Understanding the Power Market

- Market is physically self-firming by design, ensuring cost-efficient operation
- Financial exposure depends on load shape
- No single asset class can perfectly cover load (LWAP); an asset portfolio approach is essential for managing risk

## Customer Product Pricing

- Long-term firmed load product: priced on request
- Long-term generation following PPA product: priced on request
- Long-term flexibility product: priced on request
- All these products incur costs – there is no free lunch



Meridian's Ruakākā Battery Energy Storage System near Whangārei

# Near-term Capacity Gains and Long-term Investment Challenges

## Near-term Capacity Gains

- Reliance on existing assets for additional firming/peaking capacity requires different plant operations and collaboration to balance risk profiles
- Transpower grid requirements necessitate changes in risk management
- Modest capacity gains at Manapouri for 2023 and 2024 winters required significant effort
- Need for a balanced and collaborative risk assessment approach to avoid the risk of not achieving near-term capacity and energy gains if adhering strictly to historical conventions and established contingencies

## Regulatory Challenges

- Hydro asset operations bound by Resource Consents; minor changes trigger exhaustive processes, and there is a reluctance to trigger RMA processes due to unpredictability
- Enhancing existing hydro assets and storage is the fastest and most economical source of flexible capacity

## Long-term Investment Challenges

- Enhancing hydro plant capability involves costly and complex projects with long lead-in times
- Investment decisions based on long-term returns (40+ years design life)
- Uncertain regulatory environment challenge economic assumptions in business cases
- Uncertainty about long-term revenues undermines investment in growth

# Generation Asset Management

## Critical Importance of Maintaining Existing Plant

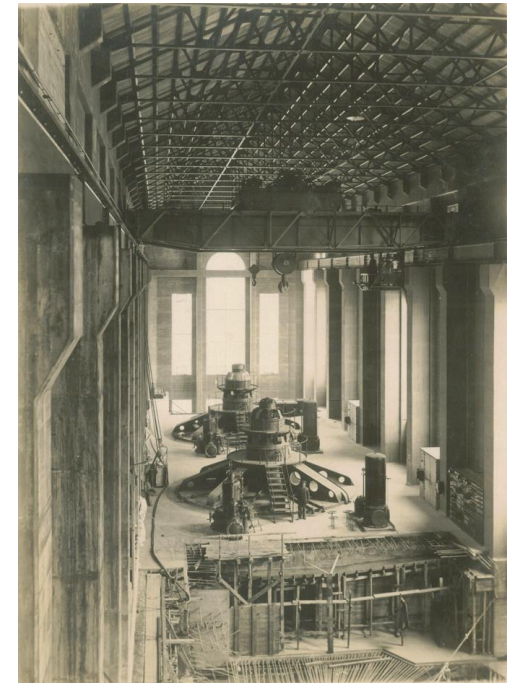
- Reduced availability or compromised capacity exacerbates issues
- There is nothing less flexible than a generator in bits spread all over the floor

## Sophisticated Outage Planning and Scheduling

- Significant changes to minimize the impact of plant outages
- Investments in plant and process improvements to enhance maintenance delivery

## Enhancing Existing Plant

- Fastest and lowest cost solution to near-term capacity issues
- Refurbishment: Adds 10-15 years of reliable performance, defers capital costs
- Replacement: Higher capital cost but provides certainty on outage length and long-term performance and new equipment reduces scope, schedule, and performance risks
- **Short-Term (This Year):** Increase peaking capacity at Aviemore by 8 MW and Ohau B & C by 8-12 MW (applications with Transpower)
- **Next Few Years:** Continue capacity increases at Manapouri, aiming for 131.5 MW per unit and 900 MW total peaking capacity and investigate further increases at Benmore
- **Next Few Decades:** Potential 30% capacity uplift at Waitaki and other hydro assets with significant investments in turbines, generators, and ancillary equipment to enhance intra-day, intra-season, and inter-season capacity



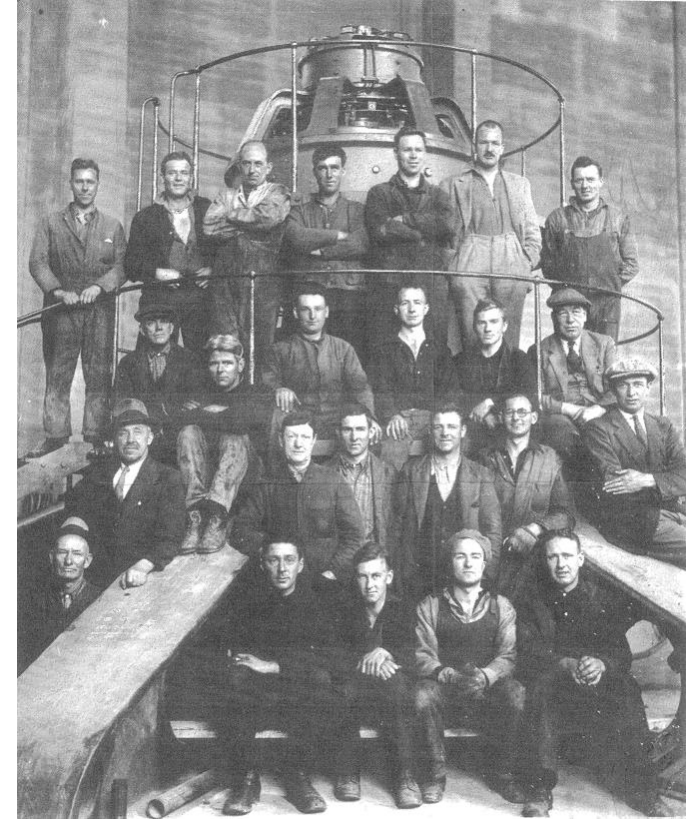
# Generation Asset Management

## Meridian has a long history of significant spend on existing assets

- Manapouri Second Tailrace Tunnel (2MTT)
- Manapouri Half Life Refurbishment Project – new generators and turbines
- Benmore Half Life Refurbishment – new turbines
- Aviemore Half life Refurbishment – new turbines
- Ohau A Unit Refurbishment
- Aviemore Dam Seismic Upgrade
- Waitaki Dam Upgrade Works

## And has significant plans going forward

- Waitaki Unit Upgrade – scope boundary is headgate to draft tube – open scope to give the OEMs a blank canvas, expected to be +\$250m
- Ohau Chain refurbishment or replacement – depending on upgrade study outcomes
- Te Apiti repowering
- Benmore penstock seismic resilience upgrade
- Pukaki and Benmore spillway upgrades, as an outcome of Structural Safety Evaluations



# Generation plan on a page

*Our why* With nature's power, iconic assets and our smarts we deliver flexible renewable energy for a better New Zealand.

*Our goal* In partnership with our community and with safety front of mind our goal is to deliver: **500MW in 5 years**

	Purpose & Strategy			
	Meridian strategy	Meridian Strategy Priority Areas		
	Generation contribute to	Generation are accountable to		Generation contribute to
	<b>An all encompassing focus on climate change</b>	<b>Grow renewable generation</b> Grow system flexibility – grow our dispatchable MW capacity.	<b>Deliver operational excellence</b> Build operational flex and agility whilst sustaining excellent asset productivity.	<b>Grow capability &amp; culture</b> Because how we do the mahi is what will make the real difference.
Our pillars	 <b>Climate Action</b> Empowering a cleaner future	 <b>Growth &amp; Flexibility</b> More MW when NZ needs it	 <b>Operational Excellence</b> Our core business done well	 <b>People</b> Growing capability, culture & collaboration
Our initiatives (5 year horizon)	<ul style="list-style-type: none"> <li>• Air Travel</li> <li>• Waste</li> <li>• Ferry and barge</li> <li>• Farm emissions</li> <li>• Fugitive emissions</li> <li>• Land transport</li> <li>• Balance emissions</li> </ul>	<ul style="list-style-type: none"> <li>• The Waitaki Upgrade</li> <li>• Manapouri Growth</li> <li>• Project WOLSNO</li> <li>• Maintenance Transformation</li> </ul>	<ul style="list-style-type: none"> <li>• Accelerating Digitisation</li> <li>• Compliance &amp; Safety to Health, Safety, Environment Quality and Compliance</li> <li>• Asset health:                             <ul style="list-style-type: none"> <li>– The Manapouri Programme</li> <li>– Ohau Electrical Programme</li> <li>– Ohau A Unit 6 Bypass Valve</li> <li>– Wind Maintenance Strategies</li> <li>– Benmore Penstocks</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Culture and engagement</li> <li>• Leadership capability</li> <li>• Resource forecasting</li> <li>• IP loss</li> <li>• Data and digital</li> <li>• Partnering/stakeholder capability</li> </ul>
Our measures	TCO <sub>2e</sub>	New MW & restored MW MW options	Project milestones achieved Availability & routine outage days	Improved collaboration & engagement



APRIL 2025

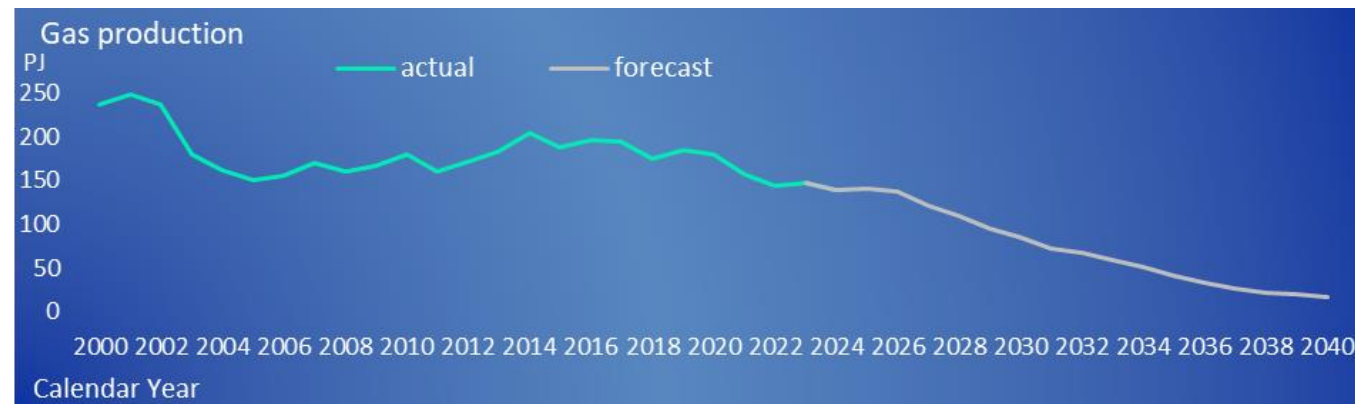
# Transition from Gas to Renewables

## Challenges in the Gas Industry

- Gas is too expensive for power production; baseload contribution will decline
- Gas industry needs fixing but is likely too late; gas as an energy source is on the way out
- New gas in the system is unlikely; exploration attempts unsuccessful
- Even if found, new gas would be years away from availability
- Gas peakers are unlikely due to learned issues in the gas industry and energy sector uncertainty

## Confidence in Alternatives

- Growing confidence in gas alternatives like wind and solar
- Burning more coal is disappointing but more tangible than resolving gas issues
- LCOE from wind and solar is more stable; these can replace gas and solve firming challenges



Source: Ministry of Business, Innovation and Employment, Hikina Whakatutuki

# Summary

- The electricity market is effectively driving more renewable generation, primarily wind and solar
- Gas is on its way out
- Existing hydro assets are crucial for firming capacity and offer the best investment value
- Meridian has made significant investments in existing assets and plans to continue this strategy
- The focus should be on better utilising current assets rather than worrying about aging plant
- Enhancing hydro storage and accessing contingent storage are key solutions to address gas scarcity
- Augmenting existing assets is how we keep the lights on, with support from the Grid Owner/Operator and Regulators

