SIMPSON GRIERSON

Energy Outlook

October 2024

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The New Zealand energy sector is dealing with rollercoaster wholesale market volatility and grappling with a security of supply crisis.

Electricity prices reached record highs in August, placing significant pressure on large electricity users who are considering whether their local operations are viable under these conditions. In this tight supply environment, the Tiwai smelter's new demand response capability was called upon under its new supply contract. In early September we saw prices reduce significantly as rainfall and wind generation increased supply.

Electricity generators are facing criticism and scrutiny from the Government and consumers over high prices, and the Government has announced measures aimed at protecting consumers, including the establishment of a new Energy Competition Task Force and a separate 'big picture' review. The Task Force's role is to bring together market regulators to find market solutions to soaring electricity prices, with details about its initial works package recently announced. The big-picture review will focus on whether New Zealand's electricity system is efficient, competitive and "fit for the future". The Government is still finalising details of the review, but it will include future structural options for the energy sector and whether the regulatory framework is fit for purpose.

The silver lining is that the "energy crisis" has forced both the Government and the electricity sector to consider that the energy transition requires not only a rapid increase in new renewable generation assets but also an increase in the levels of firm baseload to ensure system security and reliability. Unless New Zealand wants to burn more coal or import LNG, New Zealand's transition is increasingly reliant on baseload generation from gas-fired power plants. However, gas reserves from ageing fields have been depleting for years and gas shortfalls are likely to be a regular feature of the electricity market without significant investment in the domestic gas sector.

In this edition, we review the Government's latest offshore wind announcement, and what this means for the future of offshore wind in Aotearoa, and look at key insights from the Oceania Renewable Power Summit. This edition also launches our two-part investigation into the potentially transformative role of AI in renewable energy and what this could mean for New Zealand's energy sector in coming years. This is an exciting time for the energy sector in New Zealand and we are interested in hearing your views on what you think AI could mean for the energy sector or insights into how you are already using AI.

Ngā mihi,

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Empowering Offshore Energy

On 26 August, Minister for Energy, Simeon Brown, announced a new regulatory framework for offshore renewable energy developments as part of the wider unveiling of the Government's Electrify NZ plan.

The goal is to strike a balance between providing developers with certainty and ensuring efficient infrastructure, while also mitigating risks and environmental impacts.

The regime features a two-permit system

Feasibility Permits
Awarded on a comparative basis to grant exclusive rights to apply for commercial permits and cover a reasonable area for development, typically around 250 km^2 for 1 GW projects. Valid for up to seven years with possible extensions. 'Use it or lose it' provisions ensure active progress and transparency of feasibility data.

Commercial Permits
Enable construction and operation of infrastructure. Valid for up to 40 years, extendable for an additional 40 years. Issued following a non-comparative assessment (as feasibility permit holders already have site exclusivity) based on readiness and risk management.

Key parts of the regime

- A developer-led approach has been recommended, which means that offshore energy developers invest the time and resources to determine the best sites. This differs from the Australian approach that involves Government-led spatial planning.
- Feasibility permits are awarded through competitive rounds based on a comparative assessment of projects. The Government may select optimal sites and drive competition among developers. Applications are evaluated on energy system benefits, technical capability, economic impact, and other factors.
- Developers must identify Treaty rights and consult with iwi and hapū before applying for permits. Engaging with Māori groups from the outset is crucial for project approval and partnership opportunities.
- Permit holders must provide a decommissioning plan and financial security to cover decommissioning costs. Trailing liability provisions will ensure financial accountability, with terms to be determined by the Minister.
- A hybrid model will be used for offshore transmission infrastructure, with commercial permit-holders planning, building, and funding it, while Transpower will own, operate, and decommission it.

Our comments

Feasibility Permits First
The regime mandates that developers obtain a feasibility permit before applying for resource or marine consents. This requirement aims to mitigate the risk of 'land banking,' where valuable sites are held without development, thereby ensuring that only serious developers proceed. Implementing this measure will require amendments to the Resource Management Act (RMA), Exclusive Economic Zone (EEZ) Act, and Fast-track Approvals Bill.

Potential for Improving Certainty
Under the developer-led approach, the regime does not prevent other users, such as miners or aquaculture operators, from seeking environmental consents in the same areas as offshore renewable projects. This could result in competing users being granted consents (and some fast-tracked) that could block renewable energy initiatives, undermining the regime's intended certainty for developers. This uncertainty could complicate long-term planning and investment, and we consider it would be worthwhile exploring ways to protect the certainty that a feasibility permit is intended to provide (e.g. providing feasibility applicants or holders with a form of priority for having environmental permits considered). While strategic marine spatial planning might address these conflicts, it is unlikely the Government will commit to the cost and time it would take to complete marine spatial planning.

Financing
Since neither the energy source nor the marine area are Crown-owned, royalties are not justified as they are in the Crown minerals regime. This approach aligns with Australia's model, which avoids additional costs for consumers. However, the lack of government-backed price support, such as contracts for difference that are popular in the UK, could hinder developers by limiting financing options. While international projects often benefit from such support, New Zealand's preference for a market-based model may impact the sector's growth, as developers seek clarity on available financial support.

Industry Response
Developers are generally supportive of the regime but have expressed concerns about the lack of these financial support mechanisms. Given the higher costs and scale of offshore projects compared to onshore developments, and the associated costs with sending resources to New Zealand, many developers believe that a CFD mechanism could accelerate the growth of Aotearoa's renewable energy sector by mitigating risks and encouraging investment. The Government has remained firm that it will not provide financial support, and that offshore renewable energy must compete on the same commercial basis as other electricity generation.

Timing
The Bill is anticipated to be introduced by the end of 2024, with legislation expected to be passed by mid-2025. This timeline will enable the first feasibility permit round to occur by the end of 2025, with permits being granted in 2026.

Accelerating the Renewable Transition: AI, Data Centres, and Electricity Demand

Meeting the energy demands of data centres is becoming increasingly complex, as the number of centres and amount of energy required are both rapidly increasing. Data centre operators are also contending with the existing pressures on electricity grids transitioning to electrification from renewable sources, and their obligations and targets for decarbonisation, with Google, Meta, Microsoft, and Amazon Web Services all committed to achieving 100% renewable energy use and net-zero carbon.

The Rising Demand for Energy: Data Centres and AI

Data centres are already significant energy consumers, responsible for approximately 2-3% of global electricity usage and around 1% of energy-related greenhouse gas emissions. Energy consumption by data centres is expected to rise sharply, driven by the ever-increasing demand for digital services, including cloud computing, crypto mining, and the Internet of Things (IoT). According to recent estimates from Mordor Intelligence, the APAC region's data centre market is projected to expand from 14,000 MW in 2024 to 23,000 MW by 2029 to keep pace with demand.

Recent developments in generative AI and its application are expected to amplify the energy demands of data centres. AI workloads, particularly in deep learning and large-scale model training, require exponentially more computational power than traditional tasks. According to the International Energy Agency (IEA), a single Google search takes 0.3 watt-hours of electricity, while a ChatGPT request takes 2.9 watt-hours. If ChatGPT was used for the approximately 9 billion Google searches that occur each day, electricity demand would increase by 10 terawatt hours per year, approximately the same consumption as 1.5 million European Union residents. Even with slower uptake levels, the IEA is forecasting that global data centres could be consuming more than 1,000 terawatt-hours by 2026, more than double the consumption in 2022.

In September 2024, the world's largest money manager, BlackRock, announced it planned to launch a US$30 billion artificial intelligence fund to build data centres and energy projects to meet the huge projected power and digital infrastructure demands that will come with increased use of AI. Microsoft is one of the general partners in the fund and chipmaker, Nvidia, will advise on factory design and integration. Earlier this year, Microsoft also agreed to collaborate with NYSE-listed Brookfield Asset Management and Brookfield Renewable on the development of more than 10.5 gigawatts of new renewable energy capacity as part of its sustainability goals.

Supplying Renewable Energy to Support Data Centre Demand

This increase in energy intensity will require a significant growth in data centre capability but expanding data centre infrastructure poses several challenges. One of the most pressing issues is the availability of sufficient energy. In many regions, energy grids are already operating near capacity, and the addition of new, energy-intensive data centres is pushing these systems to their limits.

Some countries have responded by imposing restrictions on new data centres. Ireland and the Netherlands both imposed moratoriums on new data centre developments in certain areas, and Singapore imposed a moratorium on new data centres from 2019 to 2022, due to land and power constraints. Singapore has since lifted its moratorium and has instead introduced a pilot scheme allowing companies to bid for permission to build new facilities.

The environmental impact of data centres also complicates expansion efforts. Building new facilities, particularly those reliant on non-renewable energy sources, is increasingly seen as incompatible with global carbon reduction targets. In Ireland, data centres are described as a serious threat to carbon budgets, consuming 18% of Irish electricity in 2022. The Irish electricity sector is projected to exceed its 2030 emissions ceiling by 12 million tonnes of carbon dioxide, with the potential for another 7 million tonnes from increased electricity demand from existing data centres.

This is before taking new data centres seeking grid connections into account, with data centres estimated to consume one third of Ireland's electricity by 2026. This environmental and energy impact has led to growing regulatory scrutiny of data centres and increased public opposition, especially in densely populated areas where grids are already under strain. In 2023, the European Union (EU) published a revised Energy Efficiency Directive which requires Member States to monitor the energy performance of data centres. Energy performance and water use information will be collated in an EU-level database.

The Role of Renewable Energy in Meeting Demand

Data centre energy demand can be entirely electrified, meaning it can be met with electricity supplied from renewable sources, provided the infrastructure can connect to a national or local electricity grid (or directly to a renewable energy generation asset). With many countries now having restrictions on adding major new loads to the grid, more data centre developers are looking to renewable energy to power data centres. Given their consistently high energy requirements, data centres are well placed to benefit from direct partnerships with renewable energy providers through Power Purchase Agreements (PPAs). The renewable energy generation can be co-located with the data centre and connected directly, or the data centre operator can enter into a virtual PPA under which the generator earns revenue based on the amount of electricity supplied to the grid during the PPA term. This means the additional demand can help accelerate the energy transition and support the development of new renewable generation assets.

Amazon Web Services

In 2021, Amazon Web Services (AWS) announced its intention to develop three separate Availability Zones in New Zealand, each with one or more data centres, to ensure sensitive Government and corporate data was kept in New Zealand.

In 2023, AWS signed a PPA with Mercury to procure around half the output from the 103MW Turitea South wind farm, allowing AWS to fulfil its commitment to powering its new data centres in New Zealand with 100% renewable energy.

Amazon has committed to reaching net zero carbon across all its business operations by 2040 and is expecting to achieve its goal to power Amazon's global infrastructure with 100% renewable energy by 2025, five years ahead of its initial target.

Datacom

Datacom's four hyper-scale data centre facilities in New Zealand are supplied by electricity from the national grid. As a data centre operator committed to net zero carbon emissions, Datacom entered into a 10-year virtual PPA with Mercury which included the purchase of certificates traded on the NZ Energy Certificate System (NZECS) from Mercury.

The NZECS registers Mercury's underlying generation as being from renewable sources, enabling Datacom to claim ownership of energy production from those renewable sources and assets (while not changing the actual electricity that is physically supplied to the data centre).

Innovations and Future Trends

To mitigate the growing energy demands and environmental concerns, energy efficiency is now an important consideration when designing and building new data centres. Data centre operators are investing in innovations to enhance energy efficiency and sustainability, including advanced cooling technologies, AI-driven energy management, and battery storage.

In addition, the trend towards hybrid and off-grid solutions is gaining traction. In remote locations, data centres powered by independent power producers (IPP) or islanded systems can operate sustainably without relying on overstretched public grids. IPPs can generate electricity, often renewable, for sale directly to utilities and end-users by direct connection and independently of the central grid.

Opportunities for Aotearoa

Data centres have traditionally been located in or near major cities, but the growing restrictions on new data centres in densely populated areas, due to grid and land constraints, are encouraging data centre developers and operators to explore alternative locations where land is cheaper, and development consents are easier to obtain.

In Europe, this has led to the migration of data centres to regions with cheaper power and a higher proportion of renewable energy. The Nordics are a growing destination for data centres, due to cheaper power prices, high proportions of renewable energy and low average annual temperatures that reduce cooling costs.

Special Counsel, Rob Macredie, points out that New Zealand shares many of these advantages, positioning it as a potential GPU hub for the Asia-Pacific region. Like the Nordics, New Zealand has a high proportion of energy generated from renewable sources, a low average annual temperature, and high political stability. Additionally, New Zealand's wholesale electricity prices are generally comparatively low and there is generally high security of energy supply.

Rob says: "These factors make New Zealand a compelling location for data centre development, creating opportunities for renewable energy developers.

"By partnering with data centre operators through PPAs, developers may be able to secure long-term revenue streams, increasing the financial viability of renewable energy developments and making it easier to obtain financing.

"This may be dependent on gentailer sleeving to match supply and demand shaping, or the development of a risk management products market in New Zealand."

In the meantime, Rob expects that gentailers will continue to offer PPAs to data centre operators as part of their overall portfolio management.

Conference Report: Oceania Renewable Power Summit

Date: 17-18 September 2024
Location: Auckland, New Zealand
Organisers: Freeman & Brightstar

The Oceania Renewable Power Summit, held in Auckland, brought together industry leaders, policymakers, financiers, and technical experts from New Zealand, Australia, and the Pacific. The Summit focused on four central themes: construction, market integration, financing, and asset management in renewable energy.

Some of the key organisations in attendance included:

- **New Zealand**: Genesis Energy, Transpower, Mercury, BNZ, Fonterra, New Zealand Green Investment Finance, Auckland University of Technology, Infratec, and BlackRock.
- **Australia:** Australian Energy Market Commission (AEMC), Australian Energy Market Operator (AEMO), Clean Energy Council, Ausgrid, Dexus, Herbert Smith Freehills, Queensland Government, Tilt Renewables, and Trina Solar.
- **Pacific:** AM Consultants Fiji, Electric Power Corporation Samoa, Energy Fiji, Nauru Utilities Corporation, Tonga Power, Pacific Centre for Renewable Energy, and additional government and private sector stakeholders from the Pacific Islands.

Key themes

- **Construction and Development of Renewable Projects:**
  Construction challenges across the varied landscapes of Oceania, including land-use issues, environmental approvals, and remote project management. There were offshore wind and solar case studies for both coastal and remote island settings.

- **Market Integration:**
  Renewable energy grid integration, including grid stability, energy storage solutions, and smart grid technologies. New Zealand and Australia shared advanced integration experiences, while Pacific nations like Fiji and Samoa discussed managing intermittent supply in isolated grids.

- **Financing and Investment in Renewable Energy:**
  Funding mechanisms for large-scale projects, including public-private partnerships, de-risking mechanisms, and international investments. New Zealand's green investment initiatives were highlighted, with a focus on attracting capital.

- **Asset Management:**
  Renewable asset lifecycles, including management operational optimisation, predictive maintenance using data analytics, and decommissioning strategies for aging assets, with case studies on using advanced technology to maximise efficiency and longevity.

Some key highlights

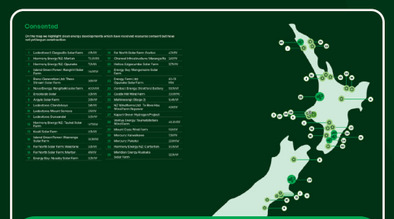
- Ashish Singh from Wood Mackenzie: APAC is projected to account for at least 50% of global renewable capacity additions through 2050, with fossil fuels declining from 66% to 18% by 2050. Demand for corporate Power Purchase Agreements (PPAs) is surging in Australia and gaining traction in New Zealand. New Zealand is expecting US$3.2 billion of new renewable investment over the next decade, with hydro, solar and wind critical to achieving 100% renewables by 2030. Batteries are expected to play a marginal role in New Zealand compared to Australia.
- Minister Stuart Smith (on behalf of Simeon Brown, Minister for Energy): The Government is committed to Electrify New Zealand, doubling renewable energy generation and increasing transmission capacity. By late 2024, the Government will pass the Fast-track Consents Bill, with over 70 renewable projects ready for the process, overhaul the Resource Management Act (RMA), with a goal of making most consent decisions within one year, and introduce a new offshore wind regime.
- Sarah Gilles and Mark Herring from the Electricity Authority (EA): New Zealand's energy sector is at a crucial turning point, with accelerating change. To foster innovation, the EA is introducing the Innovation Pathway, with initial applications for innovators to engage with EA open until 18 October.
- Many speakers emphasised that the energy transition is happening right now, driven by unprecedented capital deployment into renewable energy, storage, and transmission, despite some media reports which imply that transition is happening slowly or barely begun. There is a global race for the technology, resources, expertise and capability to undertake transition.
- Transmission, Integration & Infrastructure Panel Discussion:
  - John McKay from AEMC: Australia's retiring generation fleet will be replaced by 80GW of new wind and solar over the next decade.
  - Nicola Falcon from AEMO: Victoria faces a shortage of spare transmission capacity for renewables, highlighting the need for social license to upgrade infrastructure.
  - John Clarke from Transpower: New Zealand needs 5GW of new generation capacity every decade until 2050 to decarbonise 70% of its energy use. This will place enormous challenges on the transmission grid.
- Funding: The market for corporate PPAs is expanding in Australasia, providing greater certainty for long-term investments. Firming services are needed for PPAs, and there was discussion on gentailers' ability to provide this, as well as possible moves by the new EA Task Force to increase this.
- Marc England, CEO of Ausgrid: Electrification, decentralisation, and cost reduction are key focus areas. There are some innovative solutions available, such as pole-top chargers to support the roll-out of electric vehicle (EV) infrastructure and tolled community batteries to encourage residential solar uptake by reducing capital outlay.
- Rethinking the Supply Chain Panel: Mercury Energy pointed out the shift to collaborative contracting and building long-term supplier relationships has proven beneficial in project delivery (compared to a purely cost-based procurement model). Lodestone Energy discussed its procurement strategy of developing five sites simultaneously to attract those seeking an entire portfolio.
- NZ Steel's Steve Duggan highlighted the importance of decarbonisation in heavy industry and outlined NZ Steel's decarbonisation efforts.

Status report: renewable energy projects

New Zealand's renewable energy sector is growing fast. On the map we highlight current and future clean energy projects. More detail is available in the maps below.

View full map for announced →

View full map for planning or consenting stage →



View full map for consented →

View full map for under construction →

View full map for operational →

Twenty-two energy projects on fast-track list

On 6 October, the Government released the list of 149 projects that will be included in the Fast-Track Approvals Bill. Sixty-nine renewable energy projects were put forward, and the independent panel recommended that twenty-two projects be included (representing over [amount] MW of potential new renewable generation). These projects will be listed in Schedule 2 of the Bill once it is reported back from the Environment Select Committee.

Once the Bill is passed, applicants will be able to apply to the Environmental Protection Authority to have an expert panel assess the project and apply relevant conditions.

The Select Committee report is due on 18 October 2024 and the Government plans to pass the Bill before the end of 2024. The full list of renewable energy projects is set out below.

Applicant	Project Name	Capacity	Region	Sub Sector
Far North Solar Farm Ltd	The Point Solar Farm	420MW	Canterbury	Solar
Tauhara North No.2 Trust	Rotokawa Solar Farm	105MW	Waikato	Solar
Manawa Energy Ltd	Wheao Hydro-Electric Power Scheme Reconsenting	N / A	Bay of Plenty	Hydro
Harmony Energy NZ #5 Ltd	Bunnythorpe Solar Farm	400MW	Manawatū-Whanganui	Solar
Manawa Energy Ltd	Huriwaka Wind Farm	300MW	Manawatū-Whanganui	Wind
Manawa Energy Ltd	Kaimai Hydro-Electric Power Scheme Reconsenting	N / A	Bay of Plenty	Hydro
Lochindorb Wind Ltd Partnership	Kaihiku Wind Farm	300MW	Otago	Wind
Harmony Energy NZ #8 Ltd	Huirangi Solar Farm	100MW	Taranaki	Solar
Harmony Energy NZ #6 Ltd	Hinuera Solar Farm	110MW	Waikato	Solar
Black Point Solar Ltwd	Black Point Solar Farm	270GWh	Canterbury	Solar
AW and KF Simpson	Balmoral Station Solar Array	88MW	Canterbury	Solar
Tararua Wind Power Ltd (wholly-owned subsidiary of Mercury Wind Ltd)	Mahinerangi Wind Farm	164MW	Otago	Wind
Westpower Ltd	Waitaha Hydro Project	20MW	West Coast	Hydro
Genesis Energy Ltd	Tekapo Power Scheme-Replacement resource consents	190MW	Canterbury	Hydro
Tararua Wind Power Ltd	Waikokowai Wind Farm	650 GWh	Waikato	Wind
Eastland Generation Ltd	Waihi Hydro-Electric Power Scheme Reconsenting	5MW	Hawke's Bay	Hydro
Mercury NZ Ltd	Tararua Wind Farm Repowering Project	N / A	Manawatū-Whanganui	Wind
Transpower	Central Park Resilience Project	N / A	Wellington	Infrastructure
Lodestone Energy Ltd	Haldon Station Ltd	180MW	Canterbury	Solar
Transpower	High Voltage Direct Current Cable Replacement and Capacity Project	N / A	Multi-region	Infrastructure
Kaimai Wind Farm Ltd	Kaimai Wind Farm	100MW	Waikato	Wind
Mercury NZ Ltd	Puketoi Wind Farm	228MW	Manawatū-Whanganui	Wind
SolarGen Joint Venture	Foxton Solar Farm	304GWh	Manawatū-Whanganui	Solar
Energy Farms Ltd	Wellsford Solar Farm	162GWh	Auckland	Solar

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