

TasNetworks Annual Planning Report 2023 Summary

TasNetworks - our role and our network

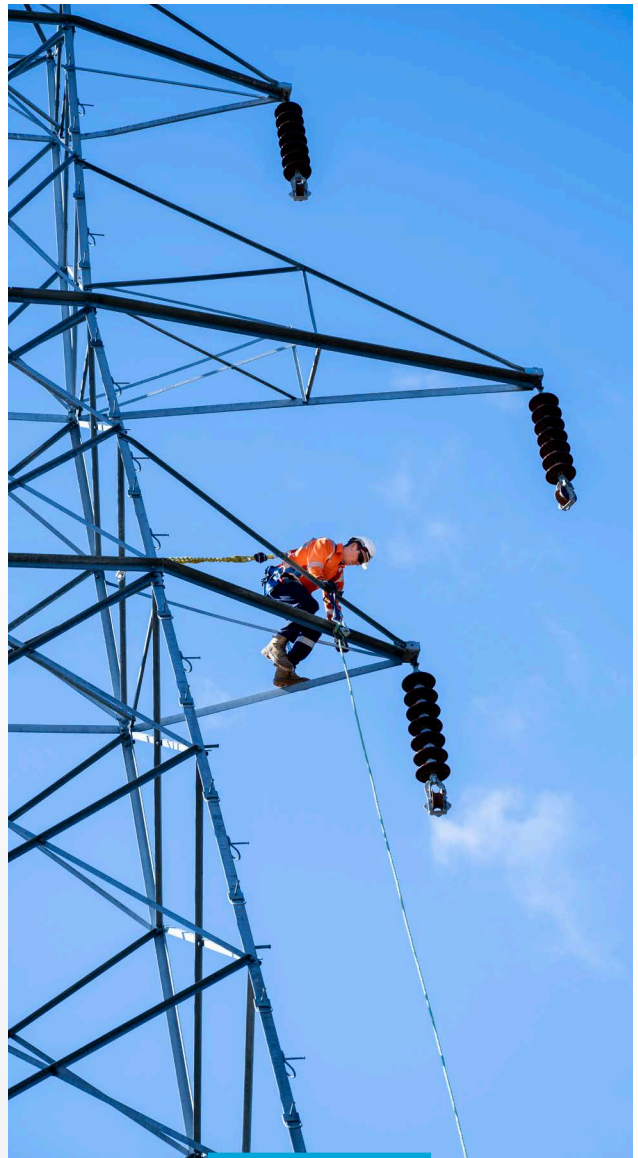
We are a State-owned company that owns, operates, and maintains the electricity transmission and distribution networks in Tasmania and also provides telecommunications and technology services.

Operating as a commercial business with assets of over \$3.5 billion we deliver monopoly and competitive electricity supply services to more than 295,000 residential, commercial, and industrial customers.

Over the next two decades, we will be tasked with managing a significant step change in the generation and transmission of electricity across Tasmania, and into the mainland. This brochure summarises the key assumptions and thinking that underpins our proposed approach to this challenge, as detailed in our 2023 Annual Planning Report.

Tasmania is part of the eastern Australian power system that extends from north Queensland to South Australia. Tasmanian large-scale electricity generation is provided by hydro, wind, and thermal (gas-fired) generators located throughout the network.

The transmission network connects 25 hydro-electric power stations, five wind farms, and one thermal (gas-fired) power station with a combined capacity of 3,891 MW. Our system also hosts distribution embedded generation (approximately 34 MW) along with 249 MW of roof-top solar photovoltaics. We also facilitate the transfer of electricity between Victoria and Tasmania via Basslink, a privately owned, sub-sea interconnector.



Introduction

As the Tasmanian Jurisdictional Planning Body, TasNetworks continuously reviews the adequacy of the Tasmanian electricity transmission and distribution networks for both current and future needs and optimises associated network development plans. Accordingly, we produce a combined transmission and distribution Annual Planning Report, prepared in accordance with the National Electricity Rules and jurisdictional requirements.

To build on Tasmania's 100% renewable energy sourced electricity self-sufficiency, the *Tasmanian, Energy Co-ordination and Planning Act 1995*, legislates the Tasmanian Renewable Energy Target¹ to deliver by 2040, 200% of Tasmania's 2020 baseline of 10,500 GWh of renewable generation per year.

Marinus Link Pty Ltd, on behalf of the State of Tasmania and the Commonwealth Government, continues to progress investigation into Marinus Link, a 1,500 MW capacity electricity interconnector between Tasmania and Victoria, comprising two 750 MW staged cables.

The State government has a vision to use Tasmania's existing and expandable renewable energy resources to become a leader in large-scale renewable hydrogen production as guided by the Tasmanian Renewable Hydrogen Action Plan². We continue to see interest from green hydrogen proponents, both in production and consumption.

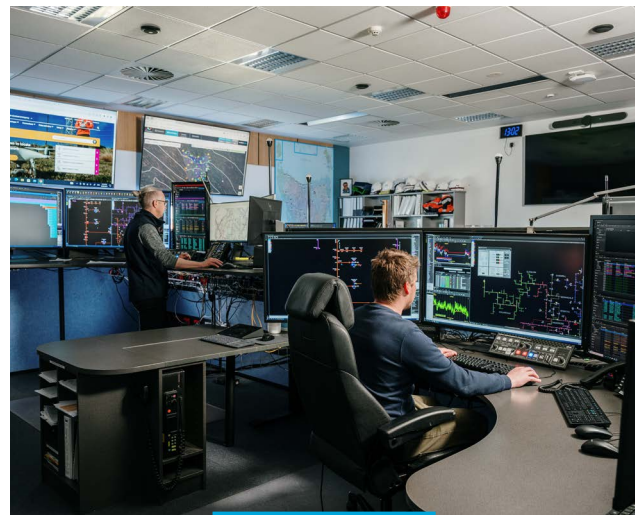
Hydro Tasmania is progressing its Battery of the Nation³ clean energy initiative. This initiative includes a number of proposals to repurpose existing hydropower assets and establish pumped hydro energy storage stations.

An important input to our planning is the Australian Energy Market Operator's most recent Integrated System Plan being a whole-of-system plan that provides a roadmap for the efficient development of the National Electricity Market over the next 20 years and beyond.

Changes to the National Electricity Rules framework for managing system strength imposed significant new obligations on TasNetworks as the Tasmanian Region, System Strength Service Provider. The new framework introduced new approaches for the procurement and payment of system strength services, including proactive planning obligations.

This strategic environment guides our planning for the Tasmanian electricity networks. Key items presented in the Annual Planning Report of these plans are:

- the optimal transmission development for the North West Tasmania Renewable Energy Zone and fully developed Marinus Link is a new 220 kV transmission 'rectangle' in north-west Tasmania;
- Palmerston–Sheffield 220 kV transmission corridor augmentation that is required under the majority of future scenarios; and
- system strength and inertia requirements as increasing inverter-based resources (for example, wind farms) displace synchronous generators.



1 Part 1A – Renewable Energy, Energy Co-ordination and Planning Act 1995, Tasmania
2 https://www.stategrowth.tas.gov.au/__data/assets/pdf_file/0013/313042/Tasmanian_Renewable_Hydrogen_Action_Plan_web_27_March_2020.pdf
3 <https://www.hydro.com.au/clean-energy/battery-of-the-nation>

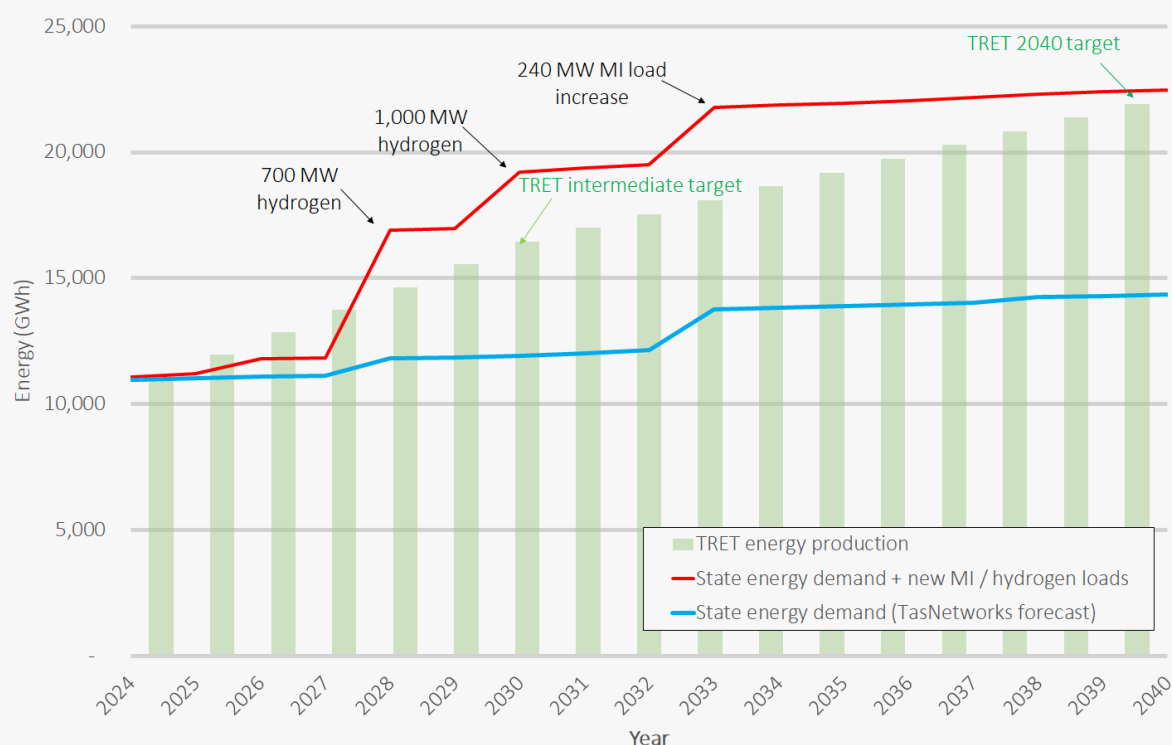
Tasmanian renewable energy transformation

The Tasmanian Government, guided by the Tasmanian Renewable Energy Action Plan⁴, has continued to progress “the State’s strategic direction on climate change, renewable energy growth and emissions reduction while maintaining a secure, sustainable, and affordable energy system”.

Under the Tasmanian Renewable Energy Target, Tasmania’s challenge is to generate an additional 10,500 GWh per year through renewable sources while continuing to be a major contributor of firming services to the National Electricity Market.

To achieve the Tasmanian Renewable Energy Target, using Tasmania’s world leading wind resources, will require up to 3,000 MW of new installed wind capacity. This may be accompanied by 1,000 MW of hydrogen production capacity as this emerging industry begins to expand. The development of Marinus Link, major

industrial load increases, Hydro Tasmania’s Battery of the Nation project, large-scale hydrogen production, and electric vehicle uptake will see a significant increase in the energy transfer through the network. By 2033, the combined throughput on the Tasmanian network due to the State demand, new hydrogen loads, and increased interconnector flows is forecast to exceed 17,000 GWh per year. By 2040, the energy throughput is forecast to exceed 20,000 GWh per year. As such, over the next two decades, TasNetworks will be managing a significant step change in the generation and transmission of electricity through the Tasmanian network.

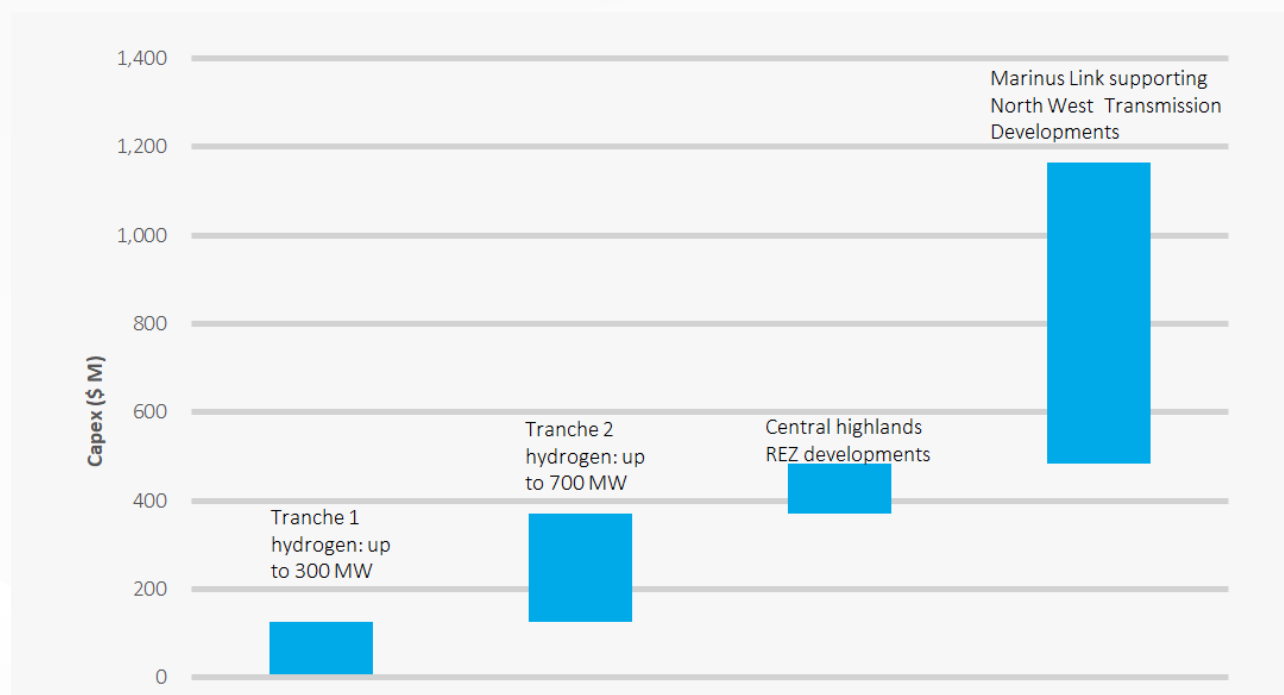


Forecast Tasmanian energy consumption and TRET energy production

⁴ https://recfit.tas.gov.au/renewables/tasmanian_renewable_energy_action_plan

Network transformation forecast expenditure profile

Significant regulated investment will be required to upgrade the transmission network to facilitate the national energy transition. We remain committed to a conscientious and prudent approach in our appraisal of all investments through mechanisms that define and validate project needs and triggers. An indication of the expected scale of regulated investments, should they eventuate, is illustrated below.



Forecast transmission expenditure profile: regulated investments

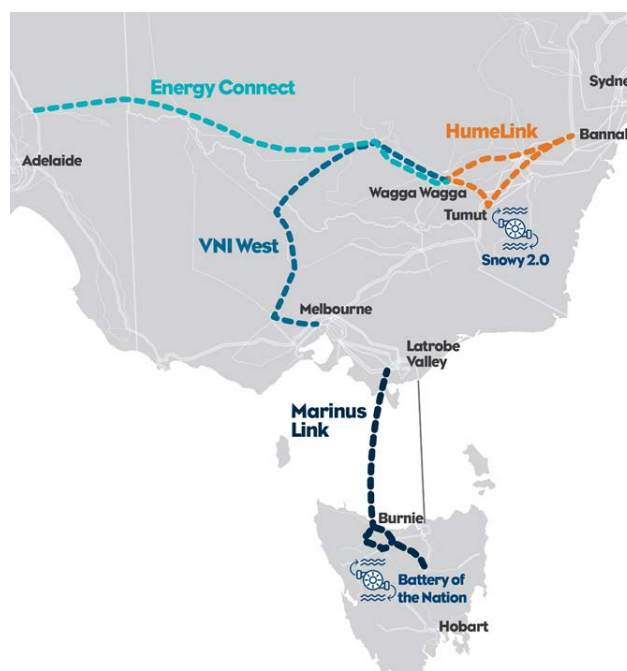
Marinus Link

The Marinus Link project continues to progress through the Design and Approvals phase under Marinus Link Pty Ltd (MLPL), working towards a Final Investment Decision (FID) targeted for December 2024. The Commonwealth, Tasmanian and Victorian Governments entered into an agreement for joint ownership of Marinus Link through the Commonwealth Government's Rewiring the Nation Plan.

In September 2023, MLPL announced the following updates to the Marinus Link project:

1. the project will focus on one cable in the first instance, working towards a delivery timeframe of 2028, or earlier if possible;
2. the Commonwealth's equity share in a joint venture will increase to 49%, with Tasmania's share at 17.7% and Victoria at 33.3%; and
3. assessments for the second cable will continue for consideration at FID in 2024

As part of the Marinus Link development program, TasNetworks continues to progress the North West Transmission Developments (NWTd) through landowner, community, and other stakeholder consultation activities as well as field surveys to support the planning, heritage and environmental approvals processes and final technical design.



The Tasmanian power system

Since 2018, Tasmania has come close to maintaining a state of “energy neutrality”, whereby the on-island generation was sufficient to meet or exceed Tasmania’s annual energy requirements.

Transmission system

The Tasmanian transmission system comprises:

- a 220 kV, and some parallel 110 kV, bulk transmission network;
- a peripheral 110 kV transmission network that provides connections to the bulk transmission network; and
- substations that form interconnections within the 110 kV and 220 kV transmission network and provide transmission connection points.

Distribution system

Our distribution system provides supply to more than 295,000 customers and comprises:

- a sub-transmission network that, in addition to transmission-distribution connection points, provides supply to the high voltage distribution network;
- a high voltage network that distributes electricity to the low voltage network and a small number of customers connected directly to the high voltage network; and
- distribution substations and low voltage circuits.

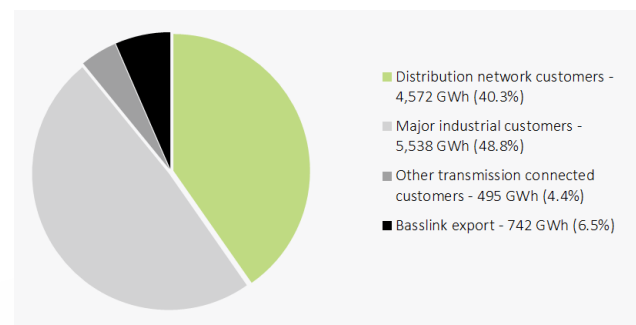
Demand and supply

Demand and Annual Energy Consumption Characteristics

The maximum demand on the transmission network during 2022 to supply Tasmanian customers only was 1,775 MW. The network maximum demand including power transfers across Basslink was 2,208 MW.

A relatively high proportion of the energy flow through the Tasmanian network is used to supply 12 customers directly connected to our transmission network.

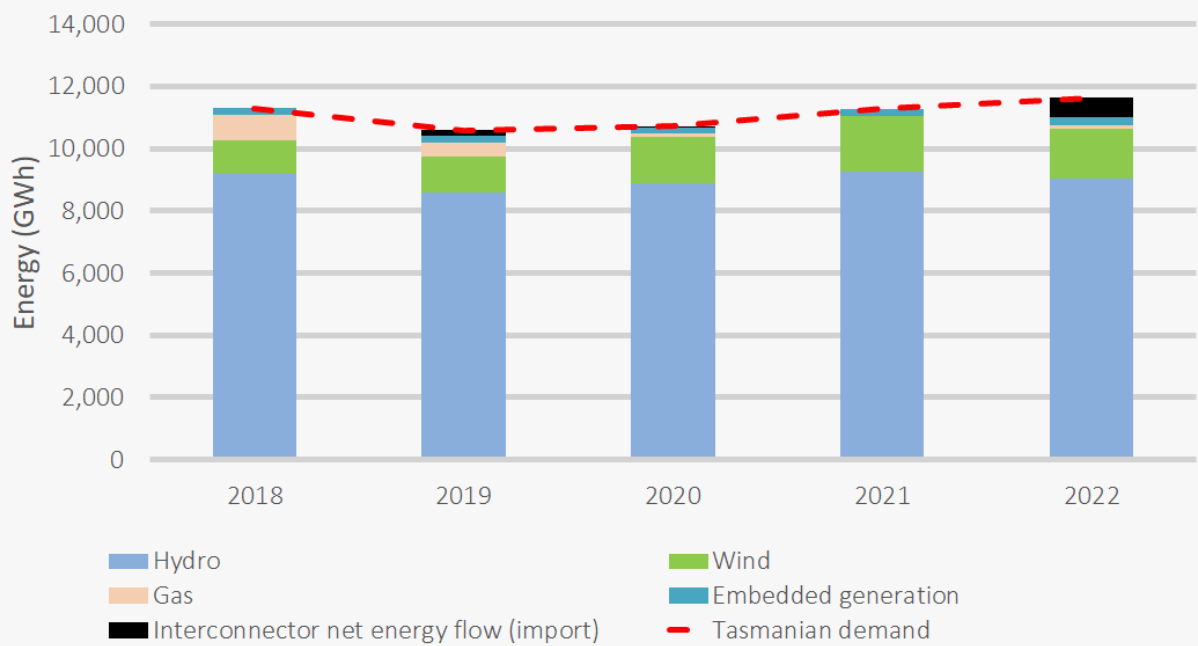
Collectively, transmission-connected customers - dominated by four major industrial customers - used 52% of the total energy flow delivered through the transmission network and contributed to 32% of the total network maximum demand in 2022.



Relative transmission network use in 2021

Supply characteristics

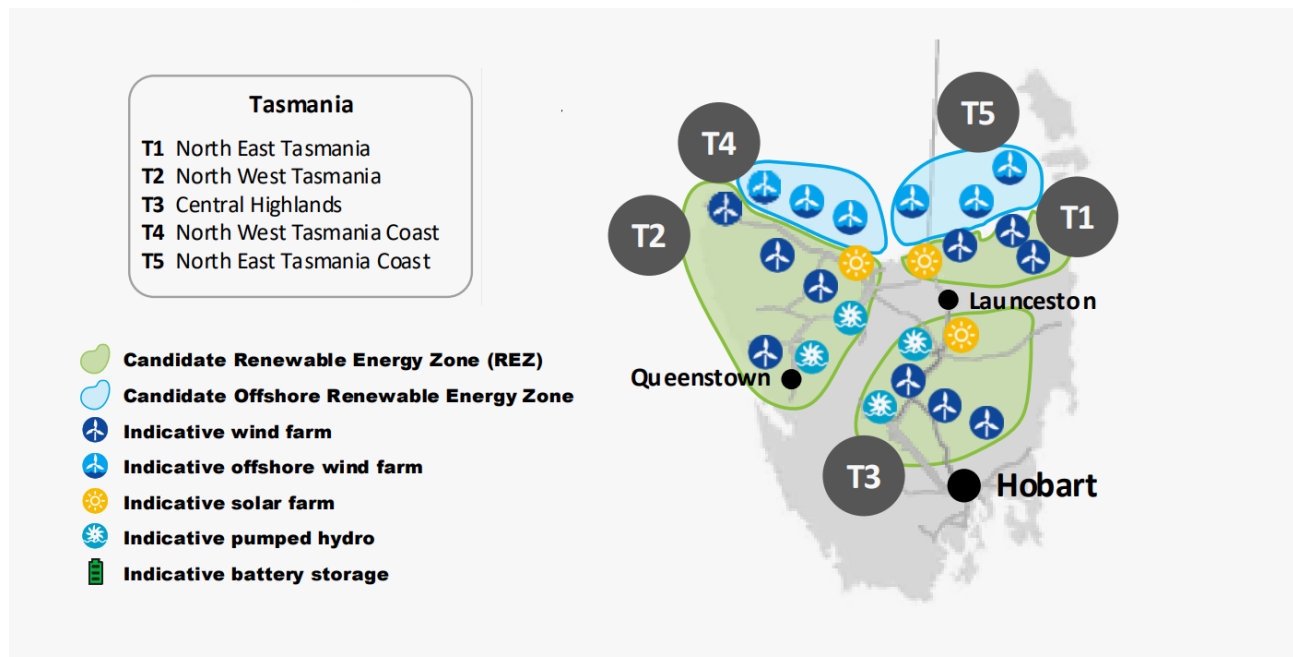
In 2022, Tasmania experienced periods of constrained generation coupled with an increase in annual energy consumption resulting in an increased proportion of Basslink imports to supply the State’s energy requirements—approximately 5.4%.



Supply contribution by type: 2018 to 2022

Renewable energy Zones

Renewable Energy Zones are “high renewable resource areas” identified by the Australian Energy Market Operator as best suited to renewable energy production to support the transition away from fossil fuel-fired generation. The Integrated System Plan identifies three Renewable Energy Zones and two offshore wind zones in Tasmania. We also foresee the broader Bass Strait area as having potential for offshore wind development.



Tasmanian Renewable Energy Zones

In line with the Renewable Energy Coordination Framework, in December 2022 the north-west of Tasmania was announced to be the first region to be explored for the development of Tasmania’s first priority Renewable Energy Zone.

Transmission developments

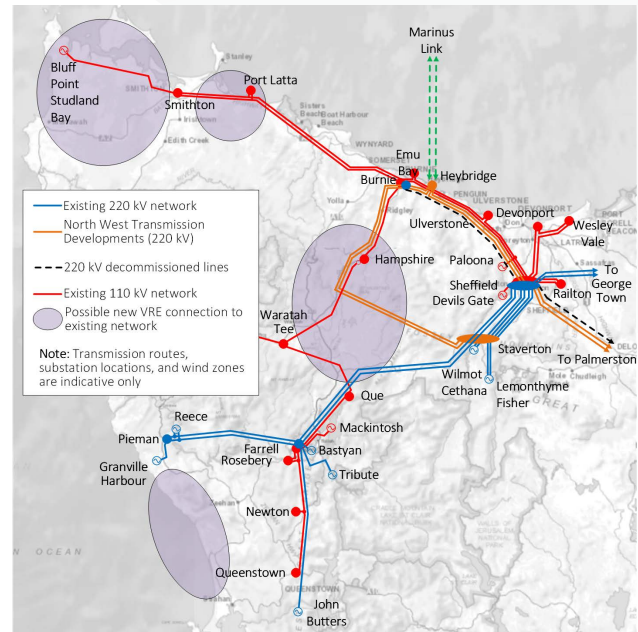
Renewable Energy Zones

The Annual Planning Report describes each Tasmanian Renewable Energy Zone its capability to host new variable renewable energy with the existing network, and the potential augmentations required to support further variable renewable energy developments.

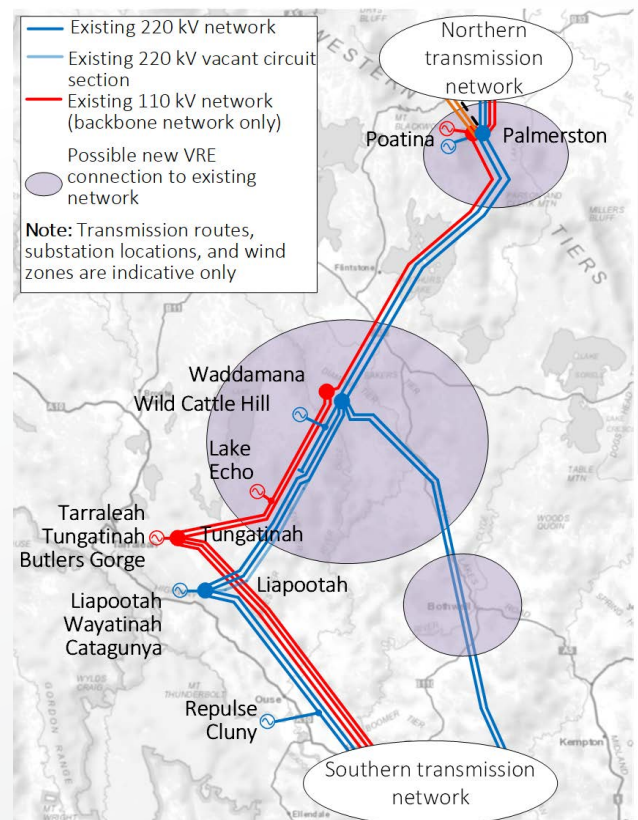
The North West Tasmania Renewable Energy Zone has strong potential for new wind generation. The proposed connection location for Marinus Link is within this zone at Heybridge (near Burnie). There is significant interest in locating new generators in the area, as well as the first tranche of pumped hydro energy storage.

The capacity factor for new wind generation in the Central Highlands has been identified as the highest in the National Electricity Market. Coupled with the existing transmission network capacity there is significant opportunity for new wind generation to be developed immediately. Augmentation of the Palmerston to Sheffield 220 kV and Waddamana to Palmerston 220 kV transmission lines enables significant additional generation.

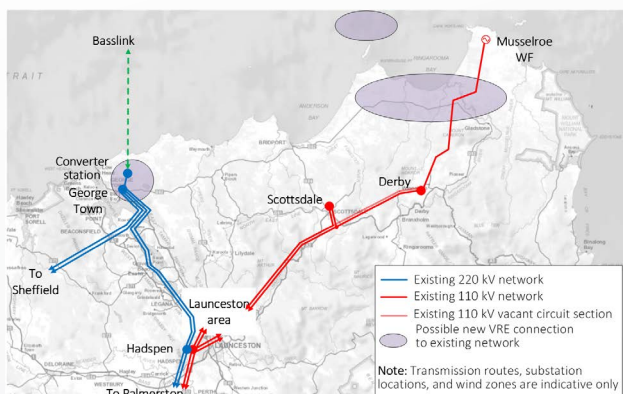
The North East Tasmania Renewable Energy Zone has excellent wind resources. The existing transmission network from George Town Substation to the rest of the network has strong capability and George Town itself being a large load centre. New generation from far north-eastern Tasmania and north-east offshore area must connect to the 220 kV network requiring long connection assets as the 110 kV network does not have sufficient capability to support them.



North West Tasmania Renewable Energy Zone transmission network



Central Highlands Renewable Energy Zone transmission network



North East Tasmania Renewable Energy Zone transmission network

Hydrogen Development

The Tasmanian Government is highly supportive of a green hydrogen industry in Tasmania. The Tasmanian Renewable Hydrogen Action Plan⁵ identifies two locations for large-scale renewable hydrogen production and potential export facilities; the Bell Bay Advanced Manufacturing Zone and industrial precincts in north-west Tasmania (such as Port Latta or Burnie).

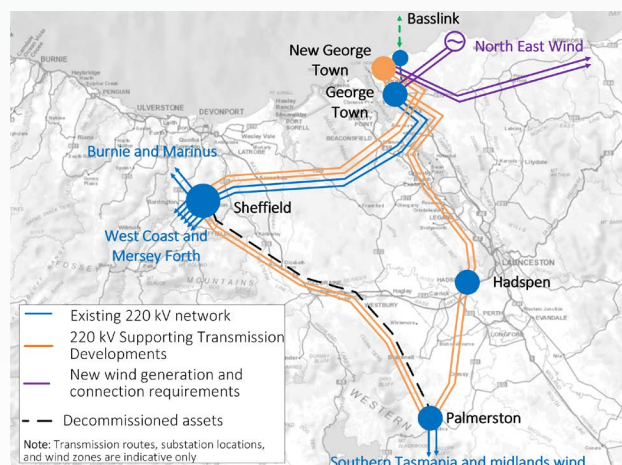
The network requirements to facilitate hydrogen development will depend on the size, location, and technology of the loads. It is assumed that the connection of hydrogen projects is likely to occur broadly in three tranches:

- Tranche 1, up to 300 MW;
- Tranche 2, up to 700 MW; and
- Tranche 3, up to 1,000 MW

Augmentation of the northern transmission network between Sheffield, George Town, Palmerston, and Hadspen will be required to support the future proposed tranches of hydrogen and future renewable energy developments.

Palmerston-Sheffield 220 kV transmission corridor

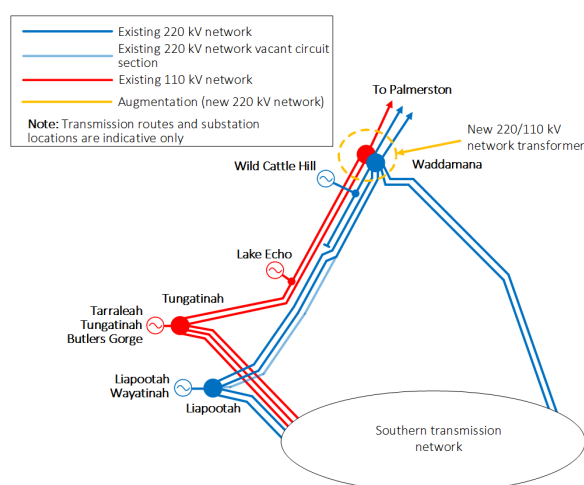
The augmentation of the Palmerston–Sheffield 220 kV transmission corridor is required under each scenario of Marinus Link, North West Tasmania Renewable Energy Zone development, and hydrogen development. Given its criticality for almost all future scenarios, we are exploring strategies to complete an augmentation ahead of the Marinus Link requirements.



Northern transmission network developments supporting hydrogen load connections

Upper Derwent 110 kV transmission network

We have identified an opportunity to significantly reduce transmission losses in the Upper Derwent 110 kV transmission network. There is 250 MW of generation capacity from power stations connected to Tungatinah Substation, which is transmitted via the 110 kV network to Palmerston Substation and the southern transmission network. Providing a local interconnection between the 110 kV and 220 kV networks will allow for more efficient transfer of the power through the 220 kV network, reducing network losses.



Upper Derwent 110 kV transmission network

⁵ https://recfit.tas.gov.au/__data/assets/pdf_file/0013/313042/Tasmanian_Renewable_Hydrogen_Action_Plan_web_27_March_2020.pdf

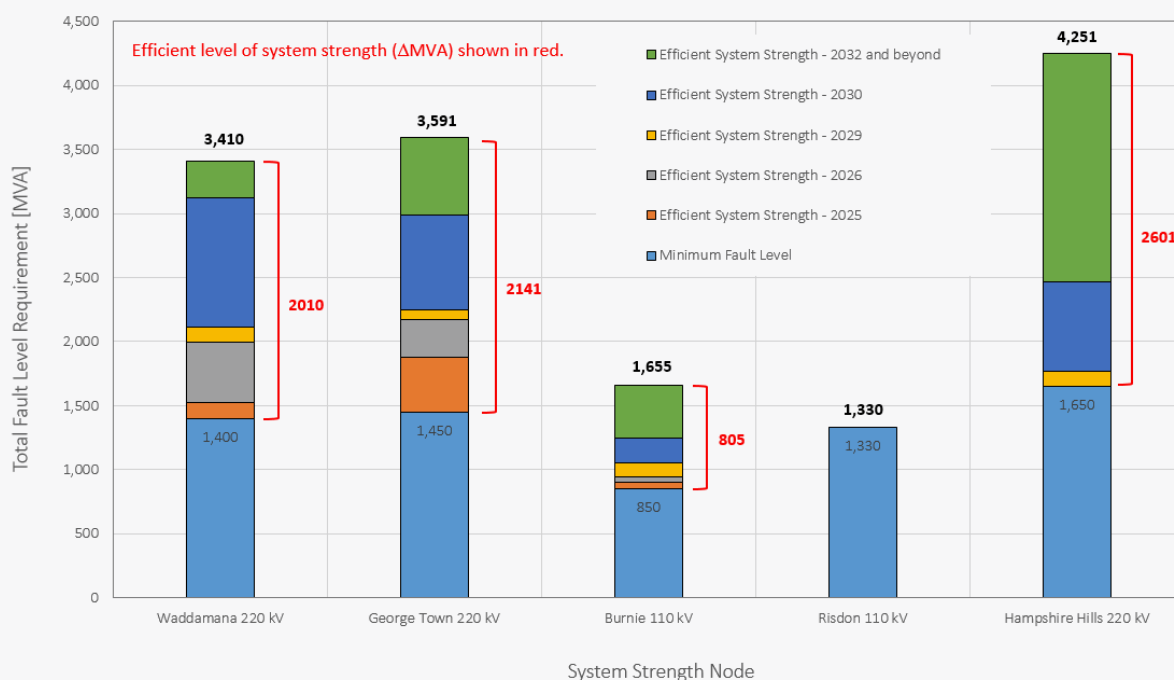
System Strength Rules changes

Careful management of power system security continues to be a high priority to enable forecast levels of inverter-based resources to connect to the power system and consequent operation without the need for local synchronous generation. As the Tasmanian Transmission Network Service Provider, we are responsible for the provision of Tasmanian region *Inertia Services* and *System Strength Services*.

Through the 'Efficient Management of System Strength on the Power System' initiative, the Rules' framework for managing system strength changed, with significant new obligations for System Strength Service Providers commencing on 2 December 2025. The new framework introduces a completely new approach for the procurement and payment of system strength services, including proactive planning obligations on System Strength Service Providers that now form part of the System Standards within the Rules.

Contractual arrangements to address existing shortfalls in system strength and inertia are in place until April 2024, with commercial negotiations commenced to allow extension of the agreement until 1 December 2025.

We are in the process of considering investments required to meet, on a forward-looking basis, the *system strength standard specification* published by the Australian Energy Market Operator.



Forecast system strength requirements for Tasmania

Network security and reliability

Major incidents and network reliability

On 14 October 2022, a major outage of the 220 kV transmission line connecting the north and south of the State occurred due to a landslide that destroyed a transmission tower resulting in the disconnection of both Palmerston–Waddamana–Liapootah 220 kV circuits. The associated severe electrical faults were felt across the State resulting in the loss of 424 MW of import from Basslink, the disconnection of approximately 530 MW of Tasmanian load, and the loss of near 234 MW of generation. Permanent line repairs were completed on 2 December 2022.



Transmission tower damage to the Palmerston-Waddamana-Liapootah lines

The Annual Planning Report provides information about the network reliability targets applying to TasNetworks, our performance against those targets, the issues that impact on network reliability, and our plans to ensure compliance. Transmission system performance during 2022 was better than target for all circuit fault outage rate metrics. However transmission Loss of Supply event counts and average duration did not achieve target. Distribution network performance during 2022–23 generally met the Tasmanian Electricity Code reliability standards and Service Target Performance Incentive Scheme targets set by the Australian Energy Regulator.

We continue to undertake reliability improvement projects to address issues experienced by specific communities, where performance is consistently below target. During restoration efforts we collaborate with key stakeholder and sector agencies to understand their requirements to triage restoration efforts wherever possible and prioritise supply restoration to highest sensitivity customers.

TasNetworks welcomes feedback and enquiries on our Annual Planning Report, particularly from anyone interested in discussing opportunities for alternate network solutions to those identified.

Please send feedback and enquiries to:
planning.enquiries@tasnetworks.com.au

Potential demand management solution providers can also register with us via our Industry Engagement register on our website at:
www.tasnetworks.com.au/forms/Industry-Engagement-Register/Industry-Engagement