Enough energy and can it get there?

Tim Sutton Network Planning – TasNetworks Pty Ltd

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About TasNetworks

We own, operate, and maintain the electricity transmission and distribution networks in Tasmania.

We have 300,000 residential, business, commercial, and industrial customers, and are committed to working with our community to make a meaningful difference to the lives of Tasmanians – through and beyond the delivery of electricity and telecommunication services.

As Tasmania's provider of electricity transmission and distribution services, we are committed to providing our customers with affordable and reliable electricity, while helping Australia transition to cleaner energy sources.





Transmission network

- Substations 49
- Switching stations 8
- Transmission line circuit 3,317 km
- Towers/poles 7,036
- Easement area 11,200 Ha





Distribution network

- HV feeders 247
- HV line 15,416 km
- HV cables 1,300 km
- Poles 231,643
- Distribution substations
 >30,000 Overhead
 - >2,000 Underground
- LV line 4,754 km
- LV cables 1,454 km



TasNetworks Network Planning

- Perform the requirements of the National Electricity Rules (The Rules) as the jurisdictional planning body for Tasmania
- Engage with stakeholders on network plans for long- and short-term planning horizons
- Identify network capacity and reliability limitations and seek alternate solutions to address (or defer) them
- Present opportunities for new network connections (load and generation)
- Connect new customers
- Develop the <u>Annual Planning Report</u> on a yearly basis



Electric vehicles in Tasmania - snapshot

- Battery Electric Buses (BEB) and Hydrogen Electric Buses (HEB) are currently being trialled in Launceston and Hobart respectively
- Approximately 4,000 (passenger) EVs registered in Tas
 - Mostly cars/wagons, with a small proportion of motorcycles
- TasNetworks knows of approximately 100 <u>public</u> charging stations across the state:
 - 3 x superfast chargers 350 kW
 - 31 x mid-range greater than 25 kW to less than 350 kW
 - 64 x 25 kW chargers
 - Mostly DC chargers (some AC chargers)
 - Many more new sites currently under proposal
- 80-90% charging completed at home, mostly 3.5 kW chargers
- 2-3 hours of charging @home meets most avg daily needs





- 52 charging stations for TN fleet
- 17 EVs (14 full, 3 hybrid, including hybrid truck)
- EV forklift and elevated work platform trials
- Older gen EV donated to not-for-profit business
- Energy Efficiency and Australian EV Association Expo 2024 sponsor

TasNetworks

TasNetworks EV action

Demand and Supply



Relative transmission network use in 2023



Collectively, transmission-connected customers dominated by four major industrial customers—used 51 per cent of the total energy flow delivered through the transmission network.

Tasmania currently maintains a state of "energy neutrality", whereby the on-island generation was sufficient to meet or exceed Tasmania's annual energy requirements.

In 2023, Tasmania continued to see some periods of constrained generation, with a proportion of Basslink imports required to supply the State's energy requirements – approximately 6%.



Energy forecast scenarios





Emerging 2050 2030 2040 challenges/opportunities Large-scale hydrogen integration ٠ Elec Bus Large-scale wind integration ٠ Data centre and large BESS developments ۲ New interconnector and associated transmission developments **EV Load** Pumped Hydro Energy Storage (PHES) schemes ٠ Distributed Energy Resources (DER) – rooftop solar, mini-۲ hydro, residential batteries etc. Electric Vehicle (EV) uptake ٠ Increased visibility of the LV network – more issues to fix ۲ Bi-directional energy flow in HV/LV models ٠ Demand forecasting changes (e.g. EV uptake) ٠ **Regulatory landscape** ٠ Source: 2024 NEM ESOO 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2050 2051 2052 2053

New and emerging opportunities

- New industry
 - Hydrogen hub up to 1,000 MW
 - Existing Major Industrial expansion/diversification
 - Data centres
 - De-gasification -> electrification
- Renewable Energy Zone developments
 - Central Highlands wind up to 1,500 MW by 2030 (among best wind resources in Australia)
- New technology
 - Network Innovation
 - Non-network solutions
 - Large-scale community batteries





Solar Challenges

- Network topology traditionally designed to deliver power in "one direction"
- Peak solar generation occurs at around midday, while maximum demand in occurs in mornings and evenings
- Number of solar applications increased by >25% from 2021-22 to 2022-23 FY to 6,000
- Saturation levels being reached in some areas
- Compliance to overarching planning requirements
- Disconnection of large amounts of solar can cause/exacerbate frequency excursions on the power system during low frequency disturbance event
- Larger embedded generation applications (~5 MVA) are increasing significantly year on year. Approx. 10 this year to date



Augmentation deferment methods

- Operational envelope improvements (voltage schemes)
- Load transfers
- Situational awareness (loggers, smart meters, network devices)
- Network interfacing ("joining" dissimilar networks together)
- Stand-by generation
- Ratings review
- Design optimisation
 - Asset clearances
 - Design philosophy changes
- Non-network solutions (peak shaving, education, tariff incentives, etc.)



Some potential developments being considered...

- 50 MVA load, Hobart
- 288 MW wind farm, west coast
- 288 MW solar farm, midlands
- 300 MW hydrogen, George Town
- 1.6 GW combined interest, north west
- 2.4 GW offshore wind, Bass Strait

The proposed generation developments and forecast large-scale hydrogen will more than double the energy transmitted through the network, with network maximum demand forecast to increase 250% over the next 20 years.





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