

# 2021 Electricity Statement of Opportunities

*We acknowledge the  
Traditional Owners of country  
throughout Australia and recognise  
their continuing connection to  
land, waters and culture.*

*We pay our respects to their  
Elders past, present and emerging.*

# Questions

- Please go to [slido.com](https://www.slido.com)
- The tag is #ESOO

# Dr Alex Wonhas, Chief System Design Officer

Opening remarks

# Focus for the 2021 ESOO



The ESOO forecasts reliability in the NEM over a 10-year period.



The 2021 ESOO compares forecast USE to the interim reliability measure (IRM) of 0.0006% until 2024-25 the reliability standard of 0.002% thereafter



A key focus of this year's ESOO is on managing an accelerated transition towards high instantaneous penetration of renewable generation, thermal generation withdrawal, and 'green' hydrogen consumption.

# Key insights

- No **forecast reliability gap is identified in any region** in the reliability forecast for the next 5 years. The development of 750 MW Kurri Kurri (and Tallawarra B once committed) are projected to close the T-3 reliability gap forecast in New South Wales last year.
- Absent additional investment, expected USE increases in the long-term due to deteriorating reliability and retirement of the coal generation fleet. Reliability standards are exceeded in **Victoria (by 2028-29)** and **New South Wales (by 2029-30)**.
- **Minimum operational demand is declining more rapidly than expected.** By 2025 (or earlier), minimum operational demand in mainland NEM is projected to fall below levels at which AEMO can operate the power system securely with its current operational toolkit.
- Development of renewable generation continues at pace. Based on existing, committed and anticipated projects and distributed PV forecasts, there will be **sufficient renewable resource potential to instantaneously supply 100% of NEM underlying demand** in some periods by 2025.
- A low, or zero, emissions electricity grid may support decarbonisation of transport, residential and industrial sectors through fuel switching to hydrogen, or electrification. This has potential to lead to **five-fold increases in NEM consumption by 2050**, and maximum demand becoming winter peaking in Victoria.

# Definitions

1. **Unserved energy (USE)** is the amount of energy that cannot be supplied to consumers, resulting in involuntary load shedding (loss of consumer supply)
2. The **reliability standard** specifies that *expected* USE should not exceed **0.002%** of total energy consumption in any region *in any financial year*.
3. The **interim reliability measure (IRM)** specifies that *expected* USE should not exceed **0.0006%** of total energy consumption in any region *in any financial year*.
4. A material **forecast reliability gap** exists in a region for any financial year where forecast expected USE exceeds the reliability standard/IRM.
5. The **reliability gap size** represents the quantity of firm capacity or equivalent, expressed in MW, that is needed within the reliability gap period to maintain reliability at levels below the reliability standard/IRM.

# Reliability is within standard in all regions until 2027-28

- Reductions in maximum demand and energy consumption forecast
- Large amounts of new generation and storage capacity now committed
- Transmission projects including Project EnergyConnect further improve outlook
- Other risks still remain

Key points of interest...

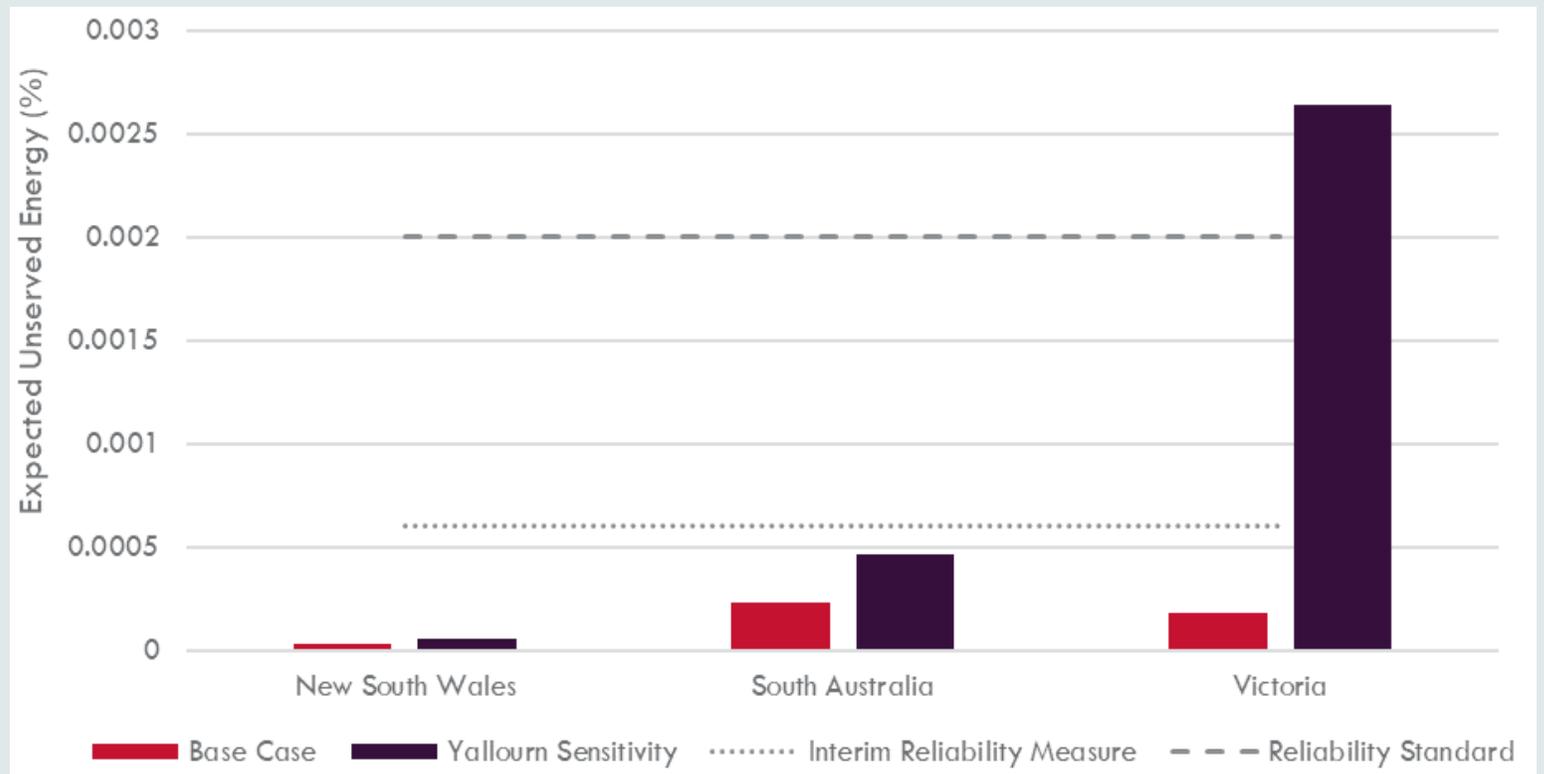
...this summer

Reliability risks do not exceed the IRM in any region, but are higher in South Australia compared to last summer.

Features of note include:

- Peak demand and energy consumption is forecast to reduce for New South Wales and Queensland, driven by lower growth from business mass market, and in some regions, less industrial load growth.
- Large amounts of new generation capacity continues to connect, with an additional 2.2 GW of new capacity, including 470 MW of dispatchable battery storage capacity.
- Callide C Unit 4 in Queensland remains on extended outage after the operating incident in May 2021.
- Torrens Island B 1 in South Australia is now unavailable for the coming summer following the announced mothballing.

# Risks of flooding at the Yallourn Power Station on USE this summer



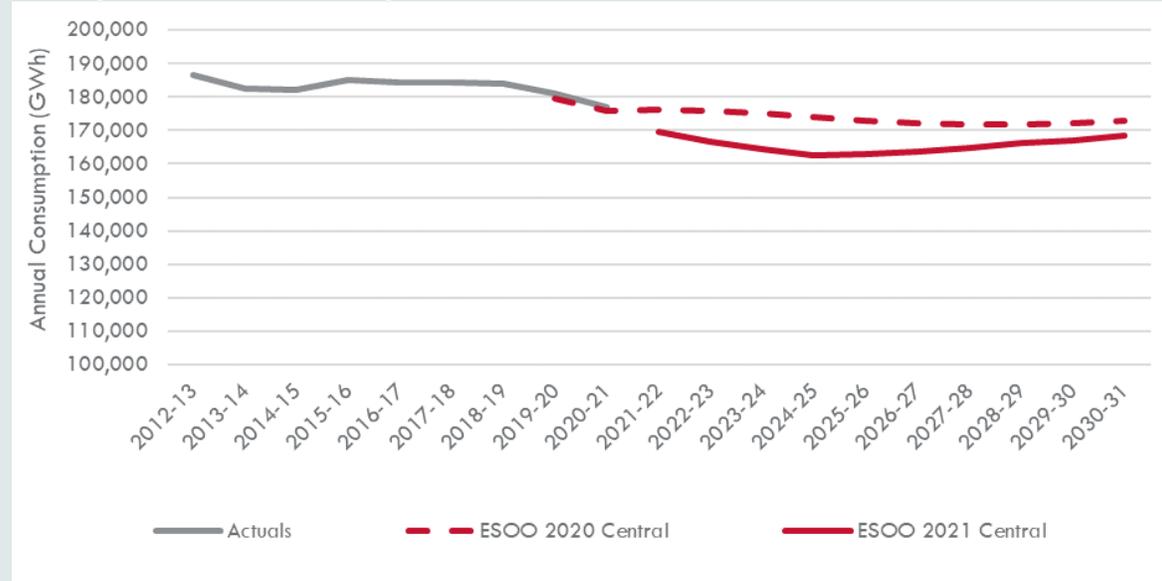
While the likelihood of an event is relatively low, the risk of flooding in the Morwell River diversion could have significant consequences.

Other events that result in prolonged generation or transmission unavailability, could also present a risk this summer.

# Demand forecasts have been revised downwards in the medium-term:

- Growth in the business mass market sector is forecast to recover in the later half of the outlook.
- Distributed PV continues to sustain rapid uptake.

NEM operational consumption, actual and forecast, 2012-13 to 2030-31, all ESOO scenarios



Regional summer (winter for Tasmania) actual and forecast 50% POE maximum operational demand (sent out)



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# The Reliability Forecast (First 5 Years)

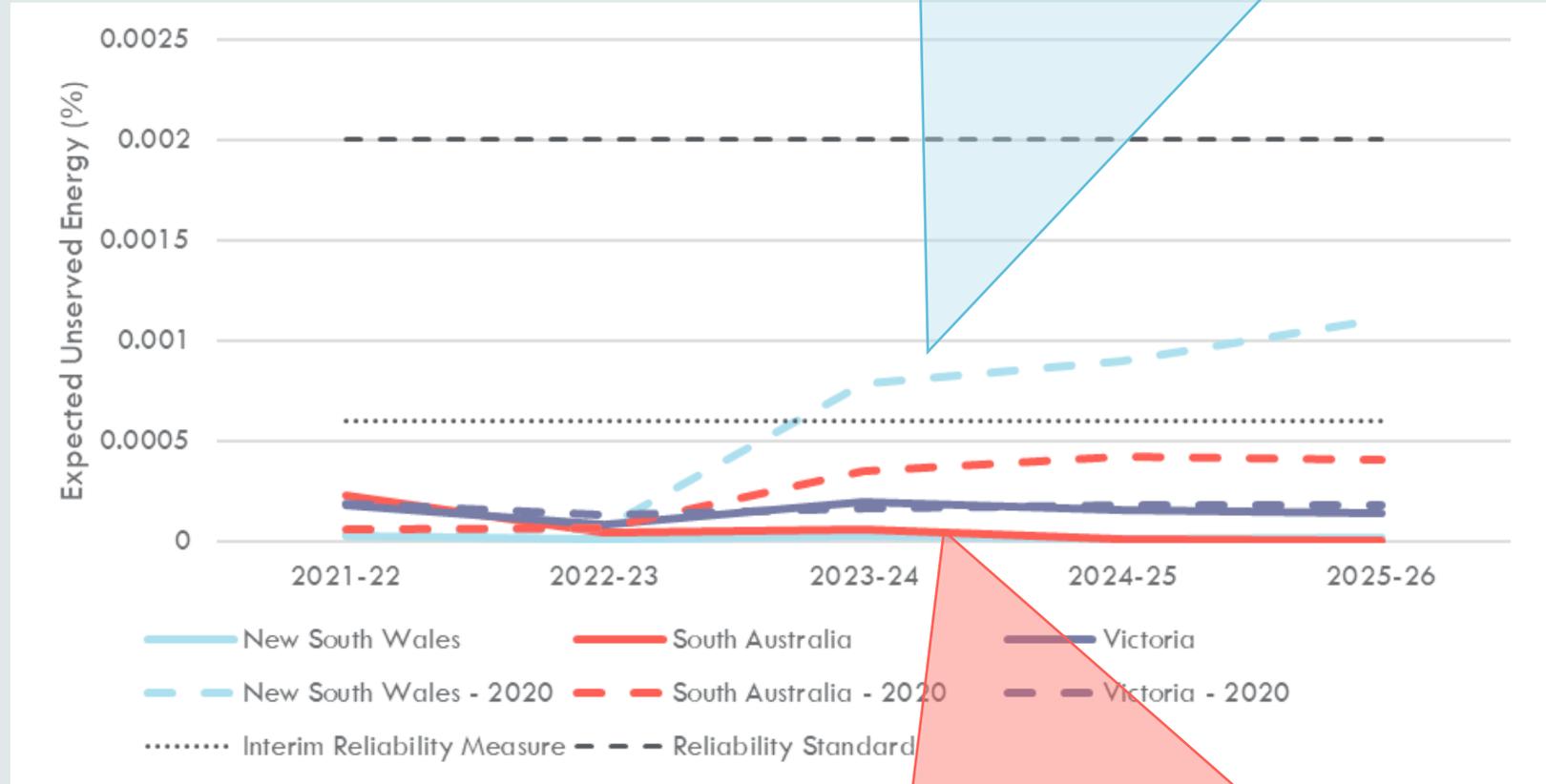
2024-25 is the "T-3" year.

In the 2020 ESOO, AEMO reported a reliability gap for New South Wales in 2023-24, which resulted in the Australian Energy Regulator (AER) creating a T-3 reliability instrument.

No reliability gap is forecast in the 2021 ESOO.



Forecast USE no longer increases following the retirement of Liddell Power Station partially due to the commitment of new generation capacity, including Kurri Kurri Power Station.

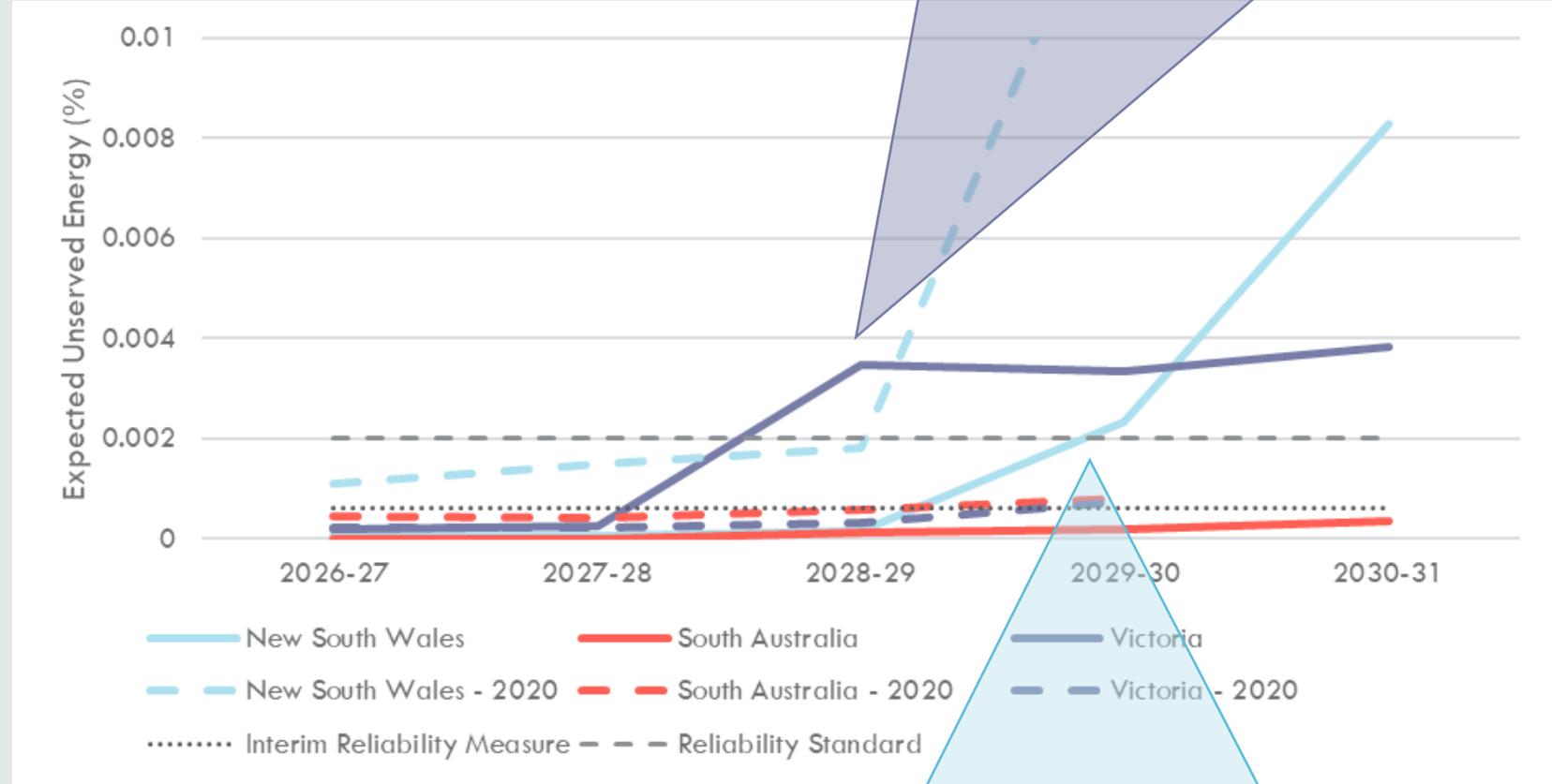


Forecast USE no longer increases following the retirement of Osborne Power Station partially due to the commitment of Project Energy Connect, Snapper Point and the reported return to service of Torrens Island B 1

# The Indicative Reliability Forecast (second 5 years)

There are generation, storage and transmission projects well progressed but not yet formally committed that will help maintain reliability below the reliability standard in all regions throughout this period.

Forecast USE now exceeds the reliability standard following the announced retirement of Yallourn Power Station



Newly committed generation and transmission projects have reduced the impact of the Vales Point Power Station retirement, however Eraring Power Station now begins to retire within the 10 year horizon.

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# The energy transition is accelerating with increasing complexity.

- Proposed transmission to unlock Snowy 2.0 capacity can help mitigate risk of earlier than expected coal closures
- Minimum demand forecast to fall below identified security thresholds by 2025
- Hydrogen and electrification has the potential to reshape the power system

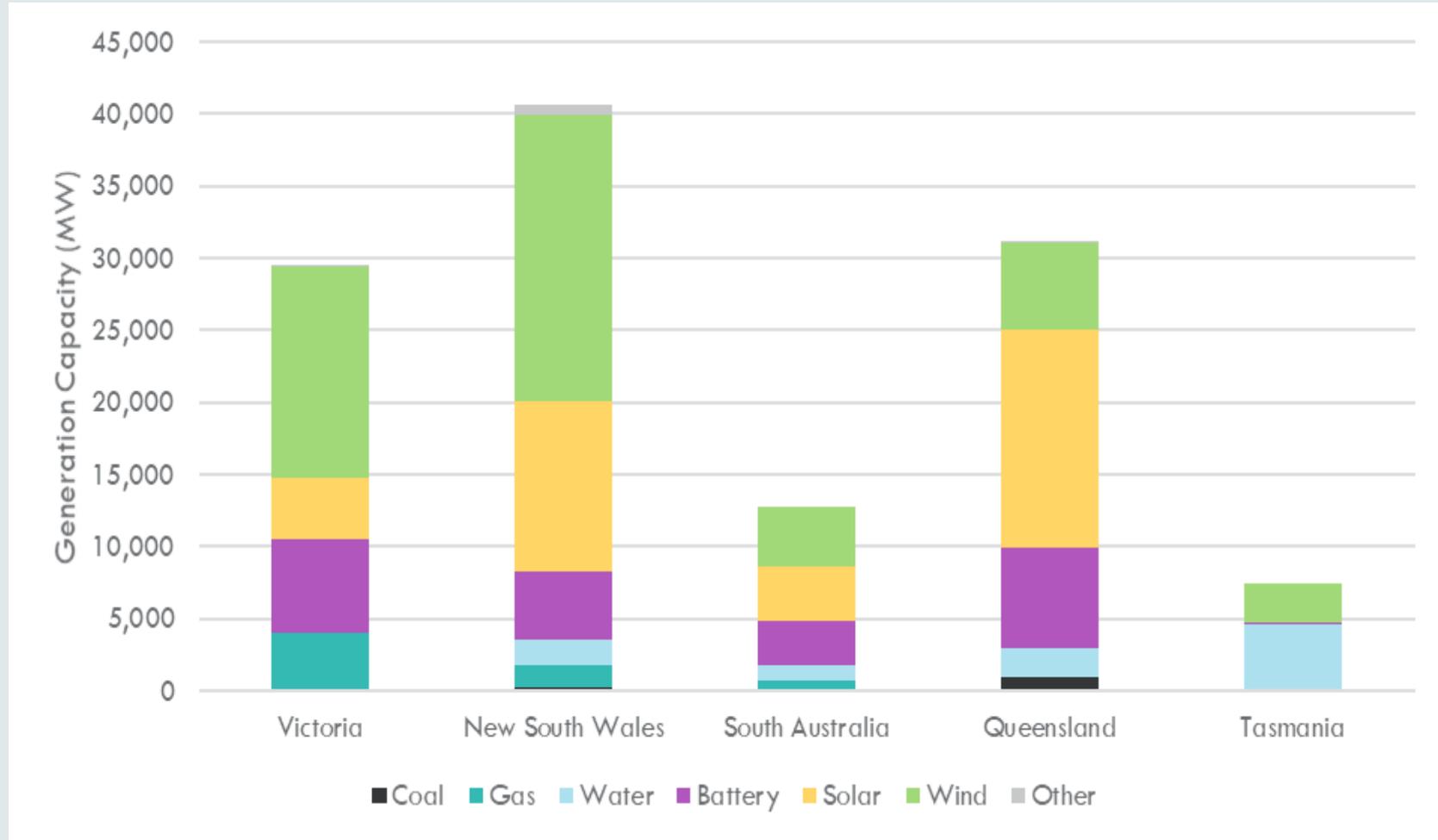
# Reliability is forecast to exceed the reliability standard in some regions, primarily driven by coal retirements

Further thermal generators are expected to retire, potentially earlier than currently forecast

- The Central scenario is based on current best estimates of closure year, that are provided by industry participants
- The accelerated rate of change in the energy industry has implications for the ongoing financial viability of existing thermal generation.
- These conditions are highlighted by announcements since the 2020 ESOO that owners were bringing forward the closures of Yallourn Power Station, two units at Eraring Power Station and the near term mothballing of Torrens Island B 1.
- An ESOO sensitivity shows potential impact should retirements be brought forward just two years.
- The sensitivity shows need for 2,500 MW of new capacity in New South Wales to restore reliability below the reliability standard by 2030-31.

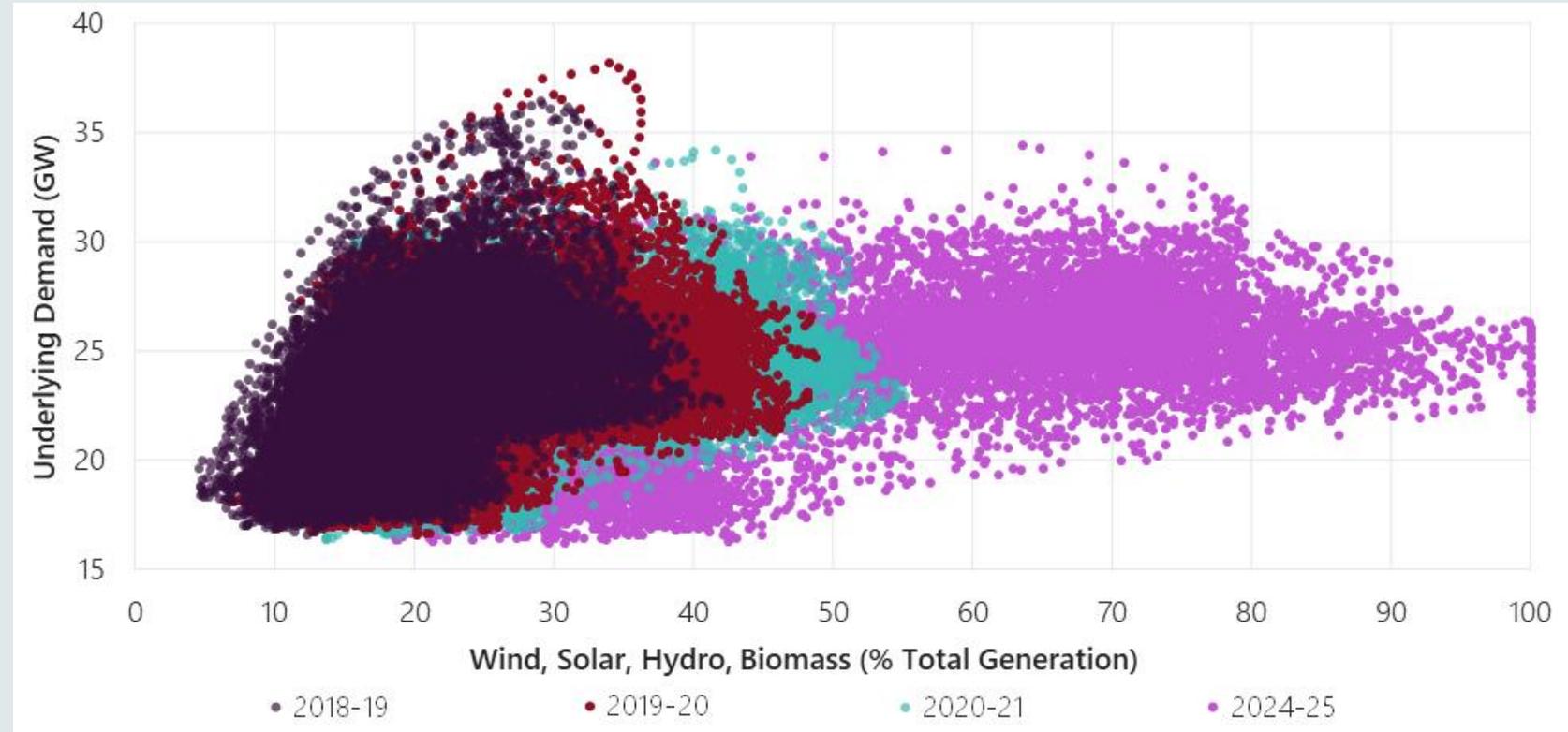
The pipeline of proposed projects now includes approximately 23GW of additional dispatchable capacity.

Proposed projects by type of generation and NEM region, beyond those already committed



Resource potential from existing, committed and anticipated renewable energy projects

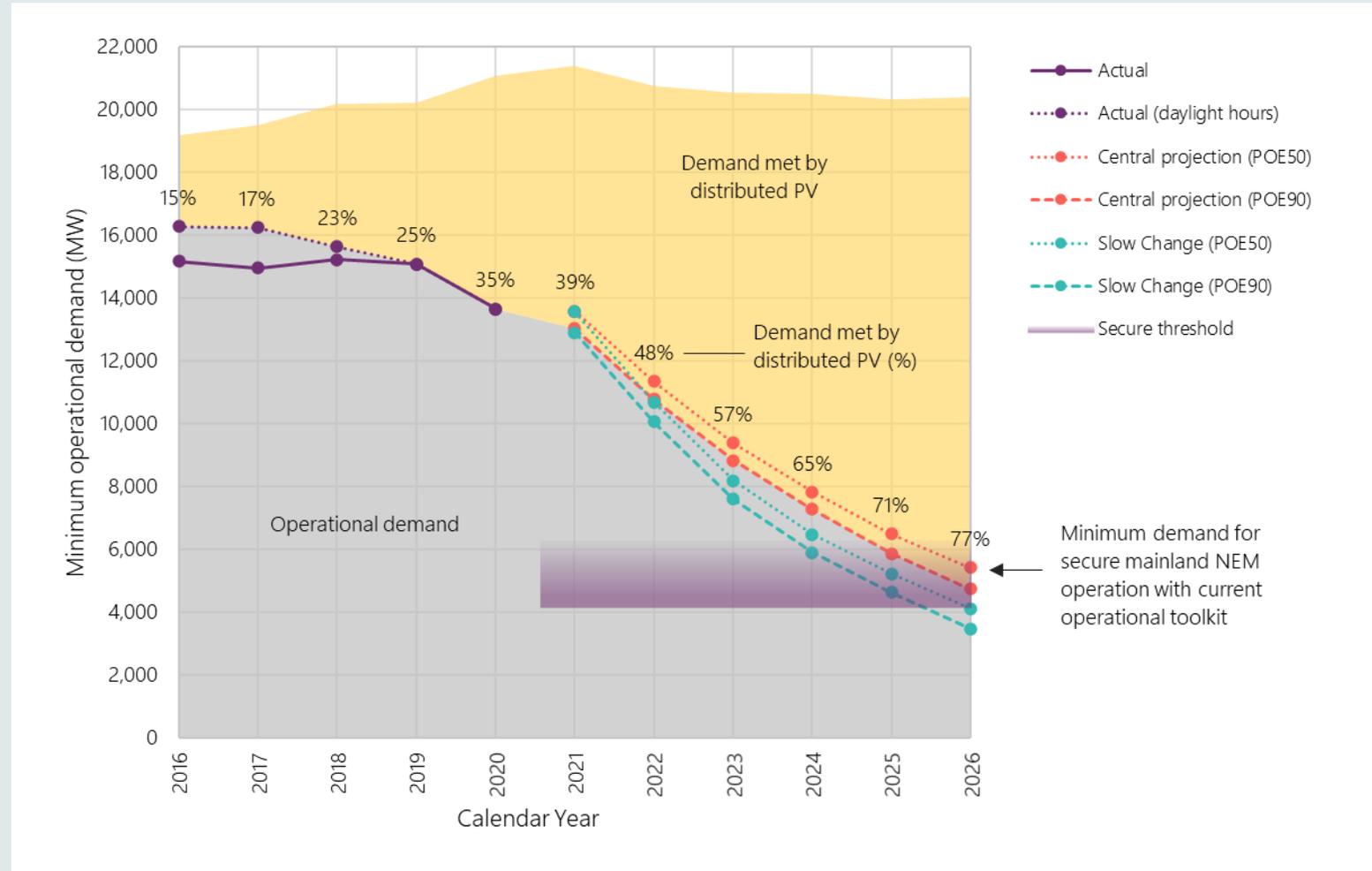
...100% instantaneous renewable penetration in some periods by 2025



AEMO has the goal to engineer the power system to be capable of operating securely through these periods of high instantaneous penetration

# Challenges at time of minimum demand – rising distributed PV penetration

Minimum operational demand on the NEM mainland (excluding Tasmania)



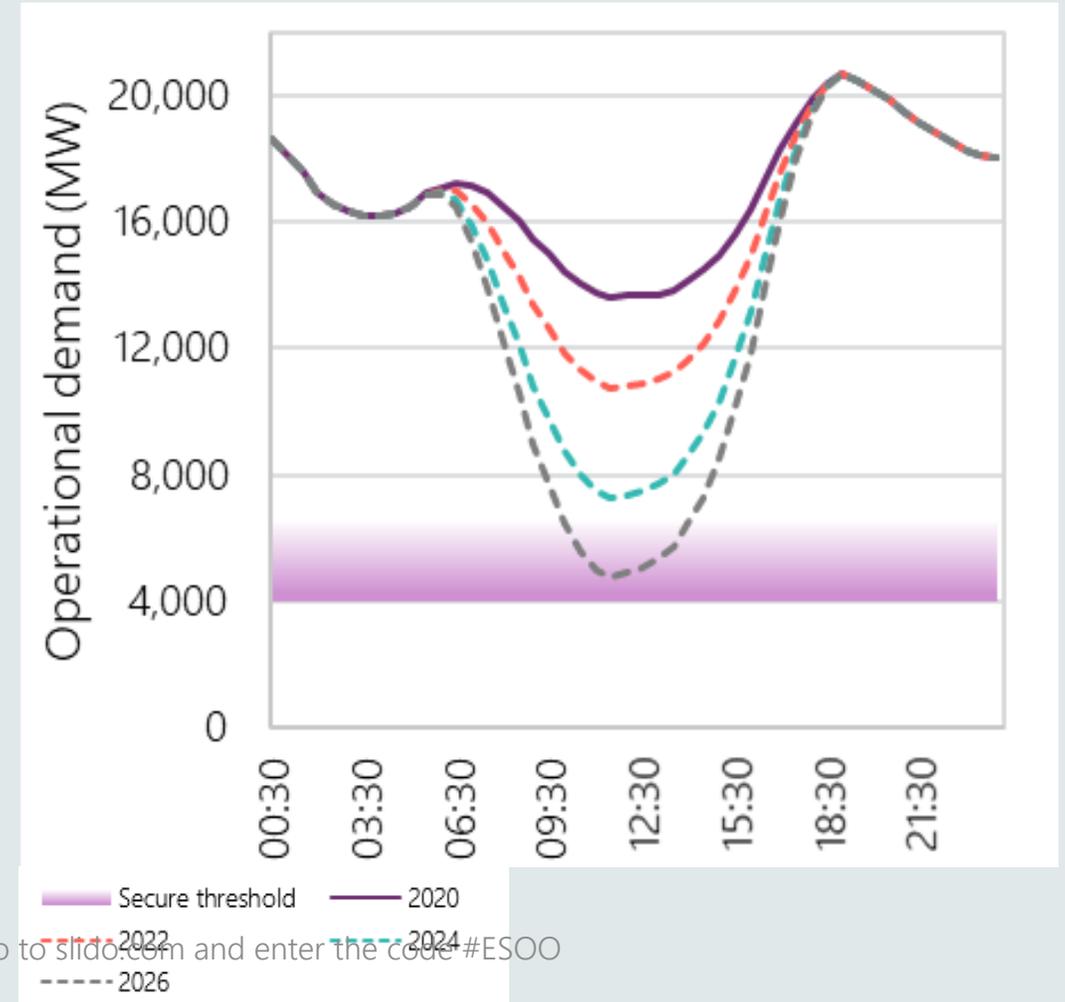
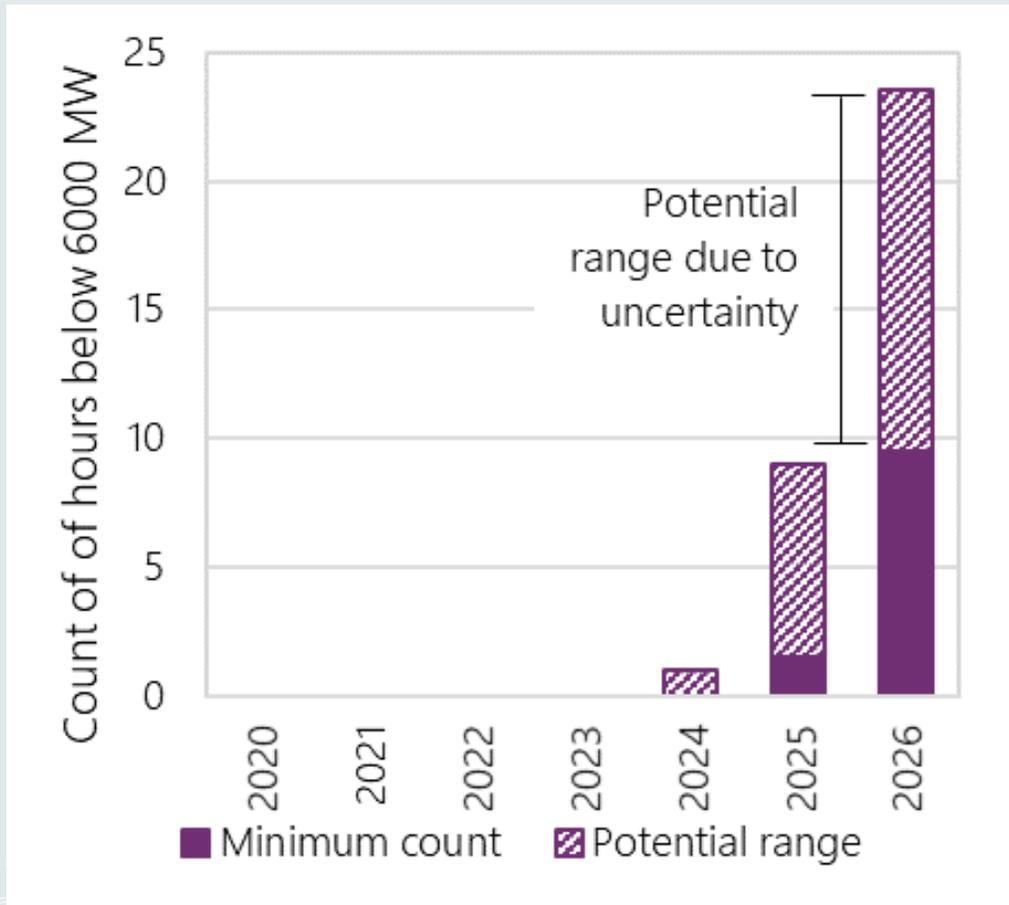
- Distributed PV uptake exceeded expectations
- AEMO now forecasts an additional 8.9 GW of distributed PV capacity to be installed by 2025
- AEMO now forecasts earlier tipping points for secure operation of the NEM

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# Forecast incidence and duration of operational demand below secure thresholds (NEM mainland)

Indicative range of operational demand below 6000MW across central scenario

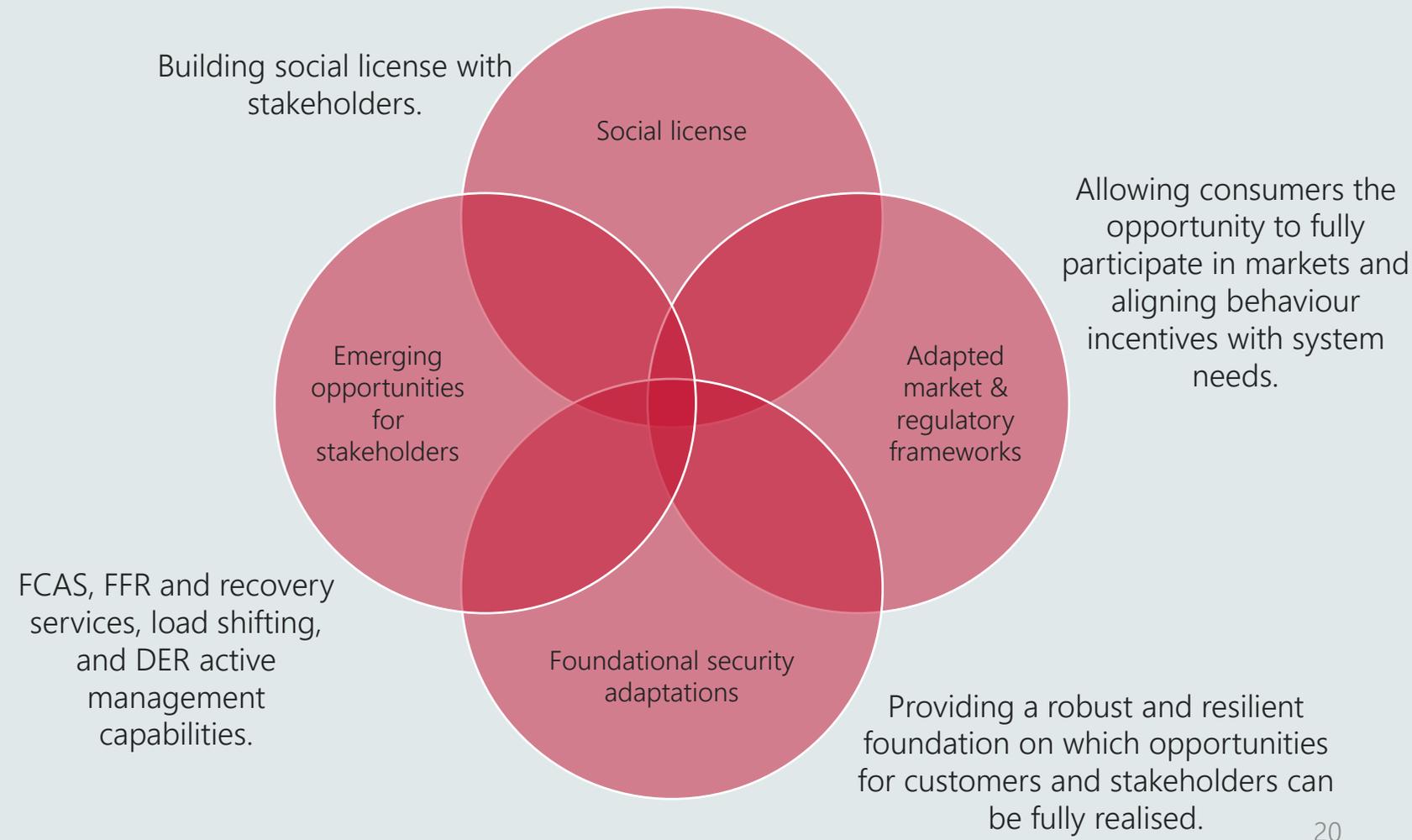
Example minimum demand day, Central Projection POE90



# Facilitating secure operation at times of minimum system load

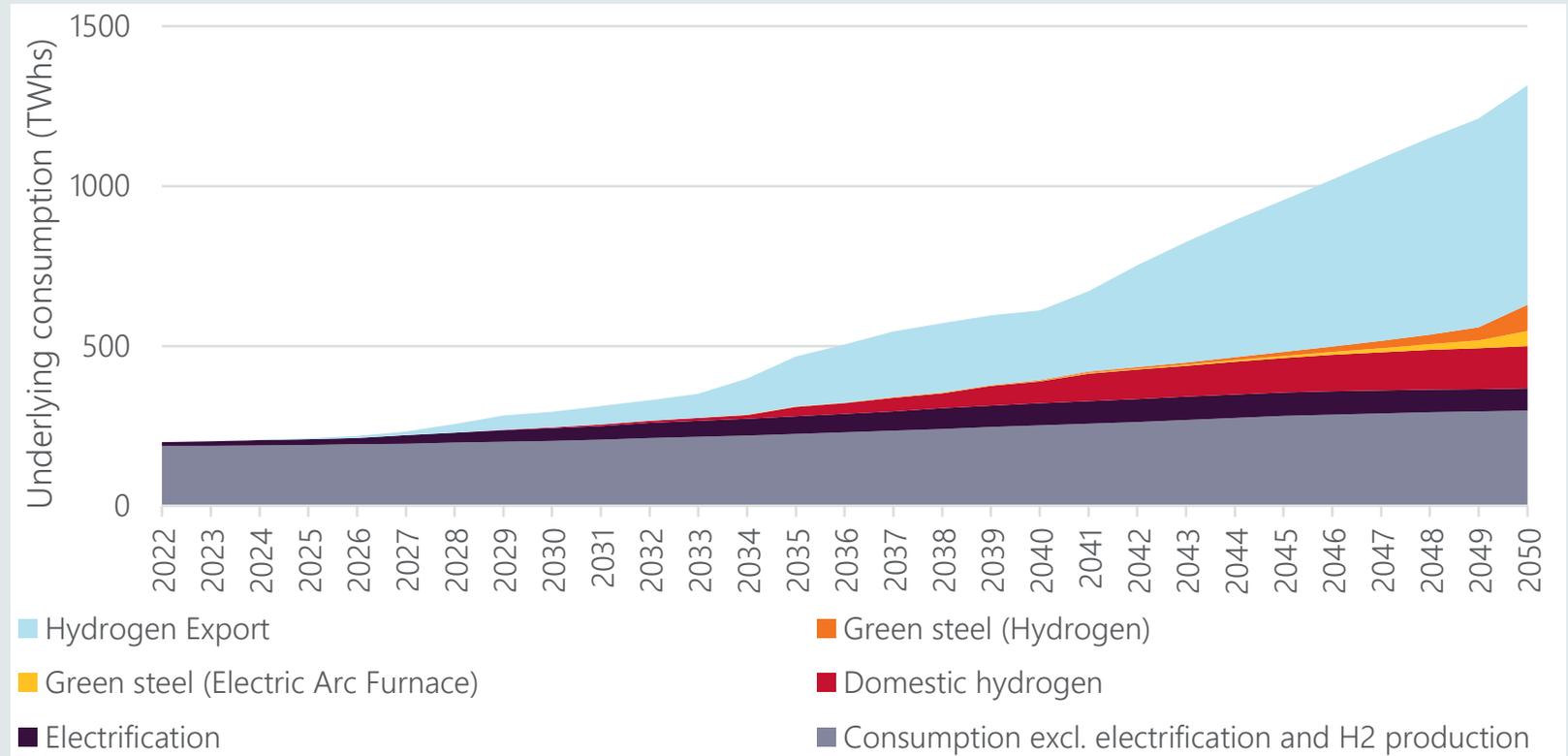
The transition to a power system supplied almost entirely by renewable and distributed resources in some periods represents a major change in power system and electricity market operation

Adaptations are required:



Hydrogen and electrification has the potential to grow consumption significantly, driven by the transport and industrial sectors.

Relativity of new electricity demand in the Hydrogen Superpower scenario, 2021-22 to 2050-51



Beyond the ES00 planning horizon, the potential growth due to electrification and hydrogen is forecast to be more significant, with the NEM consumption potentially doubling or even increasing five-fold by 2050 .

# Thank you