

2024

Powerlink Queensland Transmission Network Forum



AEMO Update

Merryn York

Australian Energy Market Operator

November 2024






We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

'Journey of unity: AEMO's Reconciliation Path' by Lani Balzan

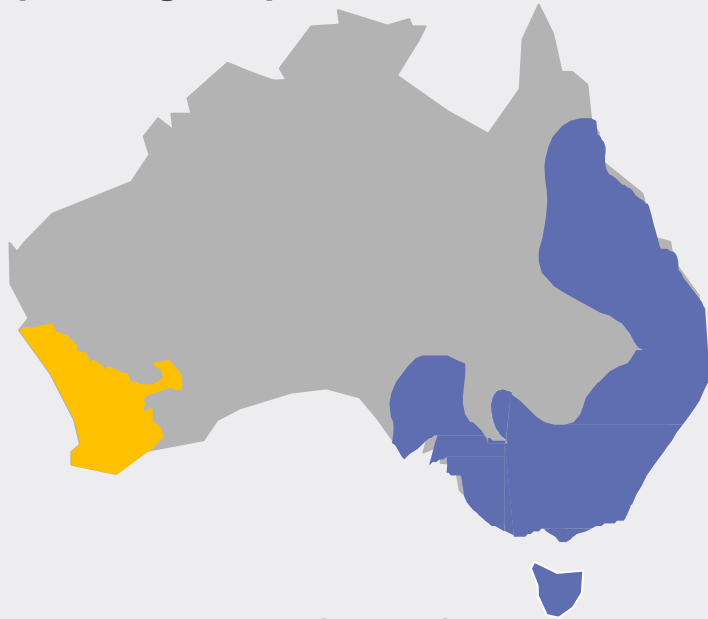
AEMO Group is proud to have delivered its first Reconciliation Action Plan in May 2024. *'Journey of unity: AEMO's Reconciliation Path'* was created by Wiradjuri artist Lani Balzan to visually narrate our ongoing journey towards reconciliation – a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

Read our
RAP 



AEMO at a glance

Our operating footprint



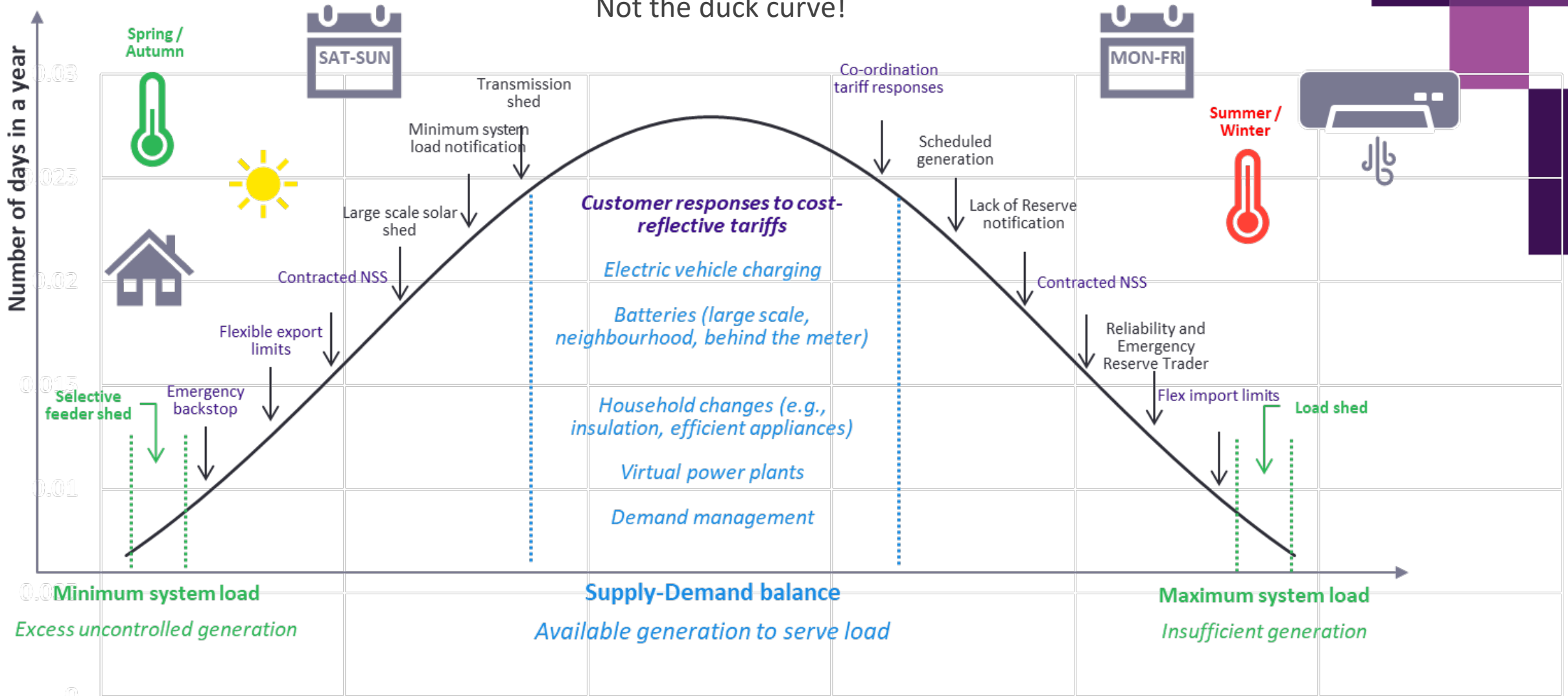
- Member-based, not-for-profit.
- 60% government, 40% industry members.
- Activities directed by National Electricity and Gas Law and Rules, jurisdictional laws and regulations.
- Funded primarily by participant fees, some funding from governments for specific activities.
- ~1500 people working around the country.



	WA	SA	VIC	NSW & ACT	QLD	TAS	NT
OPERATE ENERGY SYSTEMS AND MARKETS							
ELECTRICITY							
NATIONAL ELECTRICITY MARKET		●	●	●	●	●	
WHOLESALE ELECTRICITY MARKET	●						
GAS							
DAY AHEAD AUCTION		●		●	●		
DECLARED WHOLESALE GAS MARKET				●			
GAS SUPPLY HUB		●			●		
GAS BULLETIN BOARDS	●	●	●	●	●	●	●
GAS RETAIL MARKETS	●	●	●	●	●		
SHORT-TERM TRADING MARKET		●		●	●		
PLAN AND ENABLE FUTURE ENERGY SYSTEMS	●	●	●	●	●	●	
SUPPORT NEW INVESTMENT	●	●	●	●	●	●	

Managing varying system load conditions

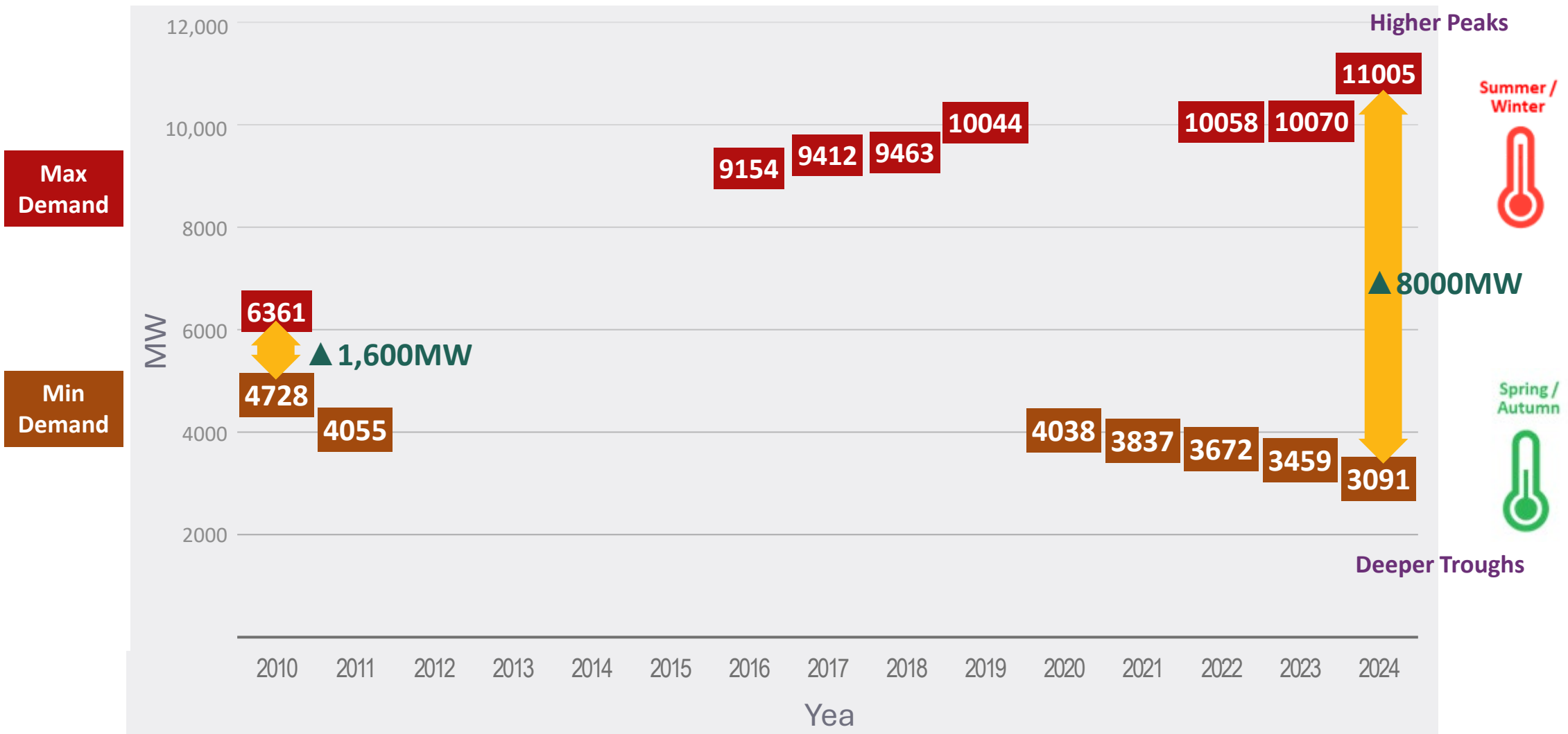
Not the duck curve!



Source: Adapted from a Victorian Government figure in the consultation paper for Victoria's emergency backstop mechanism for rooftop solar. Victorian Government. 2023, Victoria's Emergency Backstop Mechanism: Consultation paper, p 10. <https://engage.vic.gov.au/victorias-emergency-backstopmechanism-for-rooftop-solar>

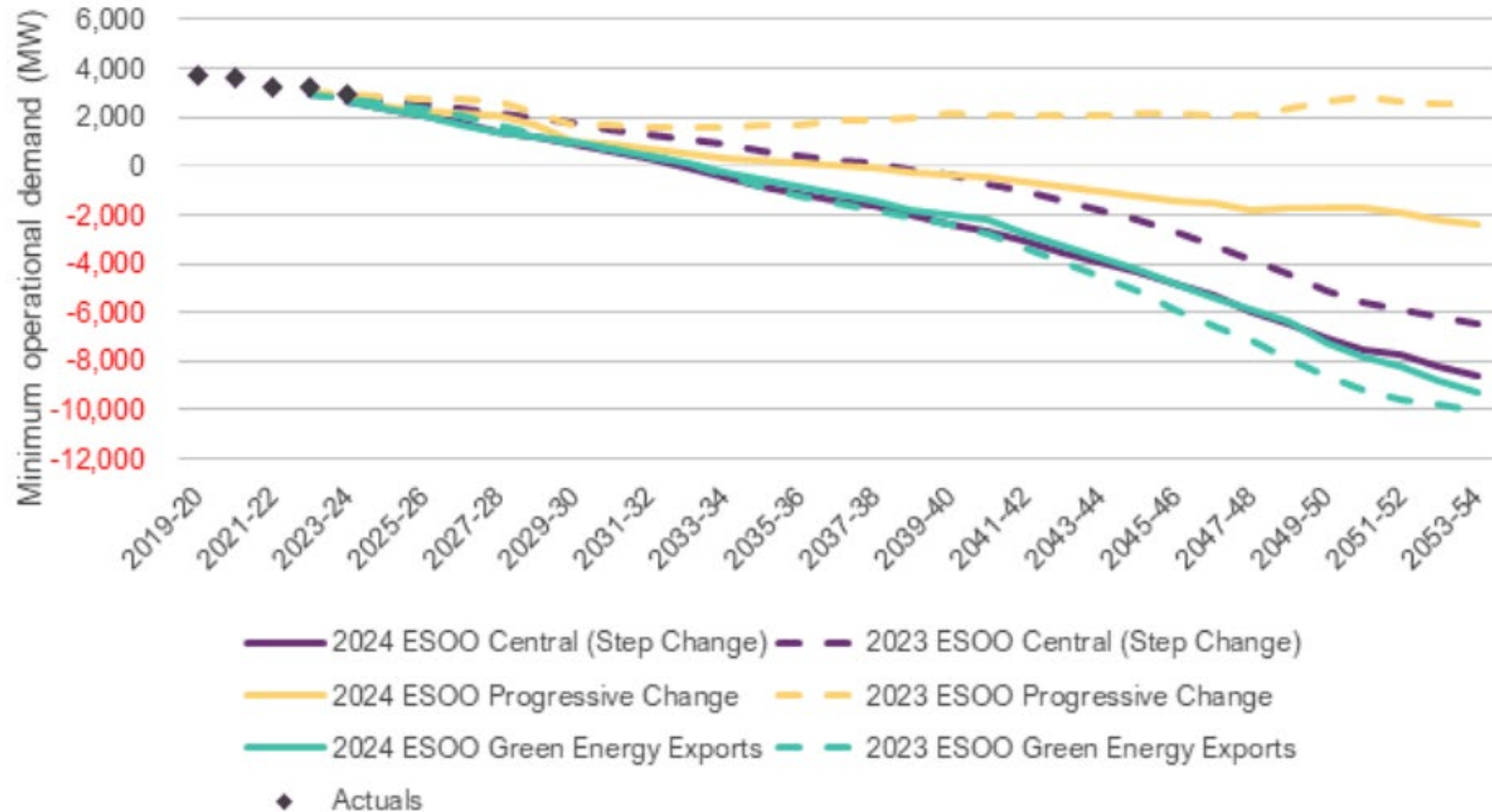
Consumer energy demands are changing

Queensland's Maximum and Minimum Electricity Operational Demand Records

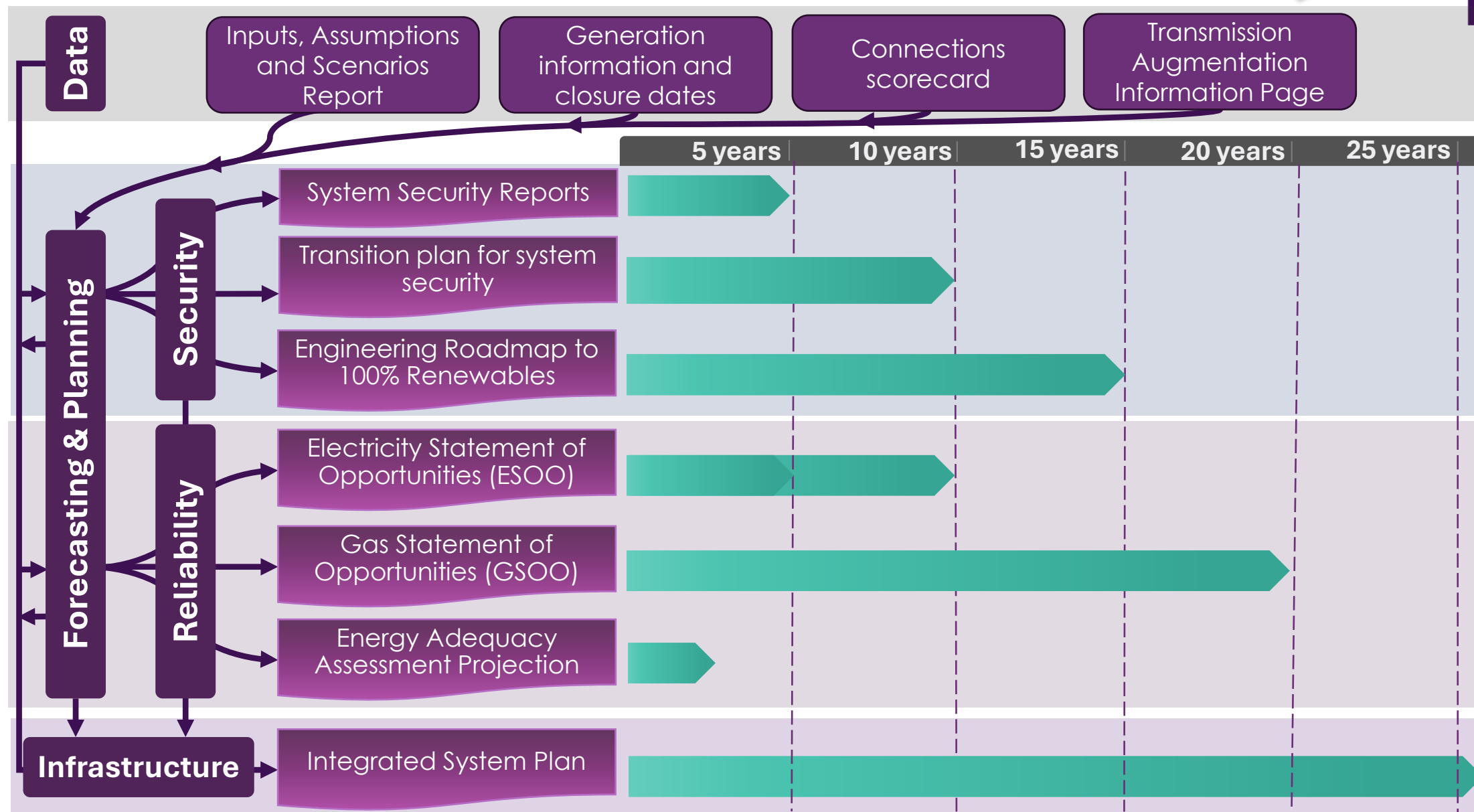


Qld minimum demand forecast

Actual and forecast Queensland 50% POE minimum operational (sent-out) demand, 2024 ESOO all scenarios and 2023 ESOO all scenarios, 2019-20 to 2053-54 (MW)

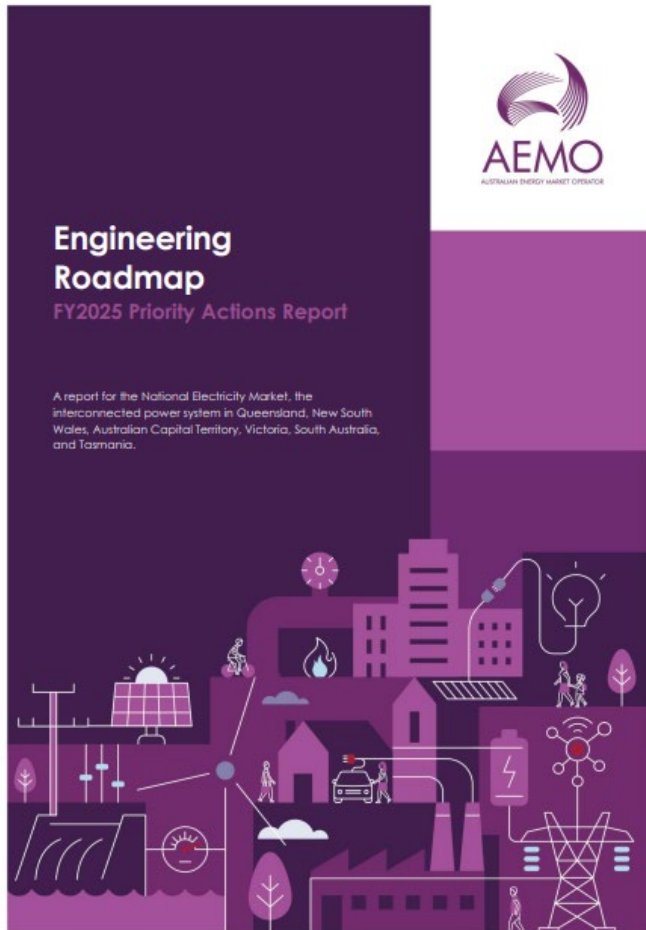


AEMO is planning on many fronts across varying time horizons.



Engineering Roadmap – FY25 priorities

FY25 Priority Actions fall broadly in three focus areas and build on previous actions from FY2024

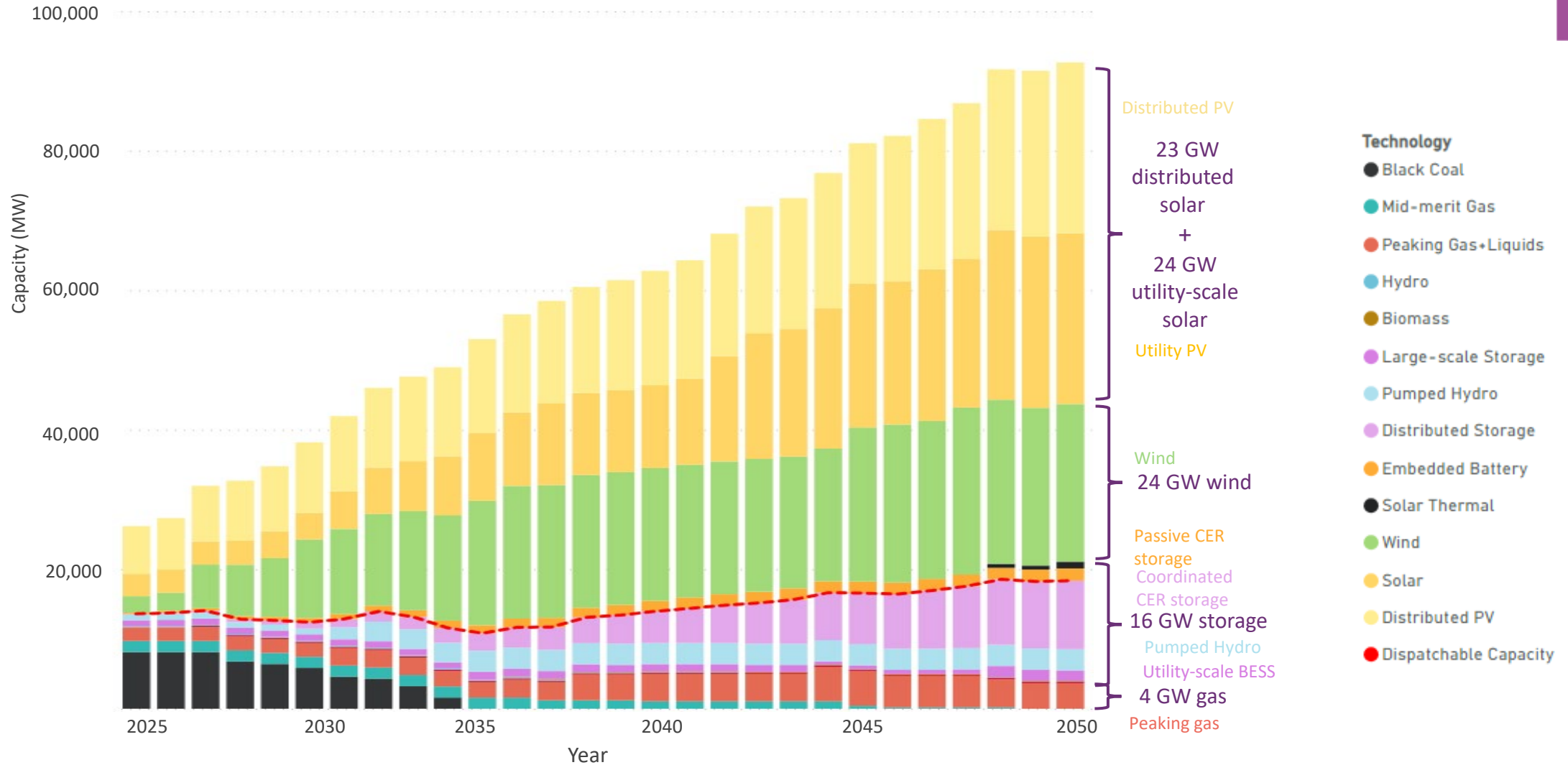


Priority focus area	Workstreams
<p>Delivering foundational transition enablers</p> <p><i>Collaborating closely with stakeholders to establish critical foundations for the future power system, defining roles and responsibilities for new technical matters, and establishing effective systems and processes for future system operation.</i></p>	<p>DER governance </p> <p><i>Ensuring appropriate enduring accountability across industry to meet ongoing technical requirements as DER capacity growth continues rapidly with increasing penetration of DPV, small-scale batteries, and EVs.</i></p> <p>Operational DER integration </p> <p><i>Actively managing and monitoring issues emerging in operational timeframes (now – 2 years ahead) as the NEM experiences world leading levels of DER.</i></p>
<p>Providing long-range investment visibility</p> <p><i>Identifying future power system needs that may require investment from one or more parties and providing clarity on the capability of different technologies to meet these needs.</i></p>	<p>Future power system phenomena </p> <p><i>Exploring new behaviours and system phenomena as the configuration of the power system changes, with inverter-based resources as an increasingly prevalent portion of the generation mix.</i></p> <p>New technology capabilities </p> <p><i>Enabling new technologies to be integrated into the power system, by completing required desktop investigations and real-world demonstrations.</i></p>
<p>Progressing operational readiness</p> <p><i>Maintaining power system security in real-time operation under unprecedented penetration of variable, inverter-based, and distributed resources.</i></p>	<p>Real Time Operations (RTO) and operations support </p> <p><i>Uplifting the capability of AEMO's real-time operations (RTO) and supporting functions to adapt to the needs of a high renewables power system.</i></p> <p>Operational transition planning </p> <p><i>Delivering proactive study, sequencing, and governance to critical system configurations known as 'operational transition points' to ensure secure system operation can be maintained in the long-term interest of consumers.</i></p>

Changing supply mix – QLD capacity

2024 ISP - Step Change

Eight times today's utility-scale wind and solar, and five times today's consumer energy resources, by 2050



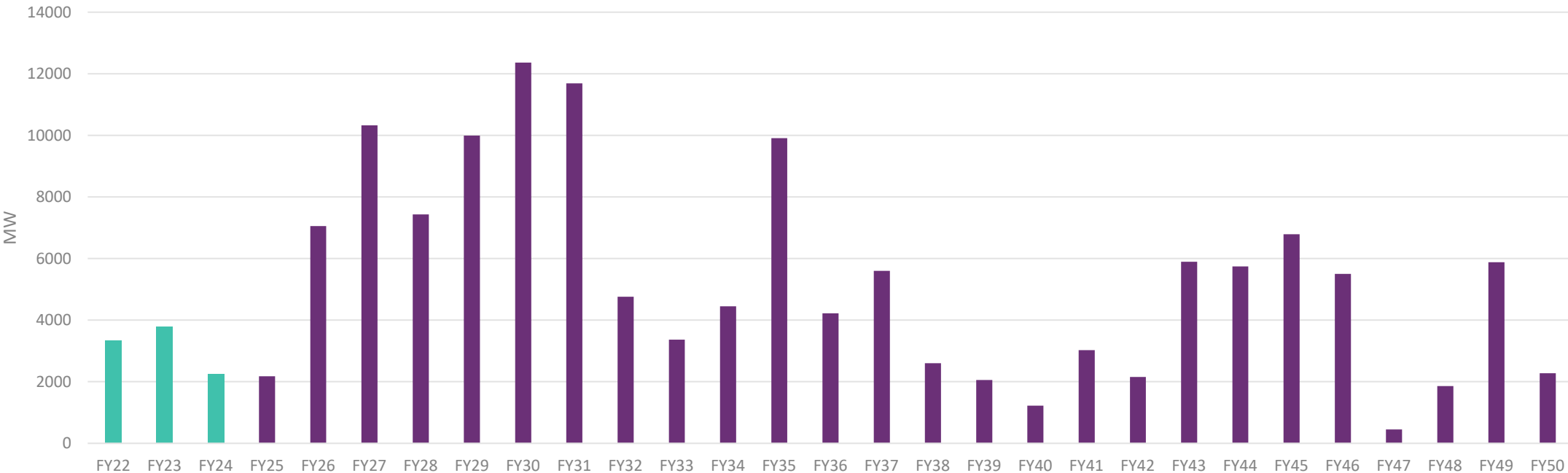
Focus on large scale connections



New Connections Applications for Generator Performance Standards Approval	FY22	FY23	FY24	△ FY22-FY24
National Energy Market	11.7 GW	14.1 GW	19.0 GW	62%
Queensland	1.3 GW	3.5 GW	6.2 GW	377%

- Significant levels of connection required across the NEM: 6-7 GW p.a. for next 15 years c.f. 3-4 GW per annum currently

New Grid Connections - Step Change Scenario (2024 ISP)



Small scale - Operating with high-CER

Draft functional requirements

AEMO's responsibilities as the bulk power system operator

- Maintaining power system security
 - Managing technical envelope
 - Frequency management
 - Voltage management
 - System strength
 - System restart
- Centralised dispatch process
 - Operational forecasting
 - Scheduling and dispatch

Assess current and emerging challenges with increasing CER

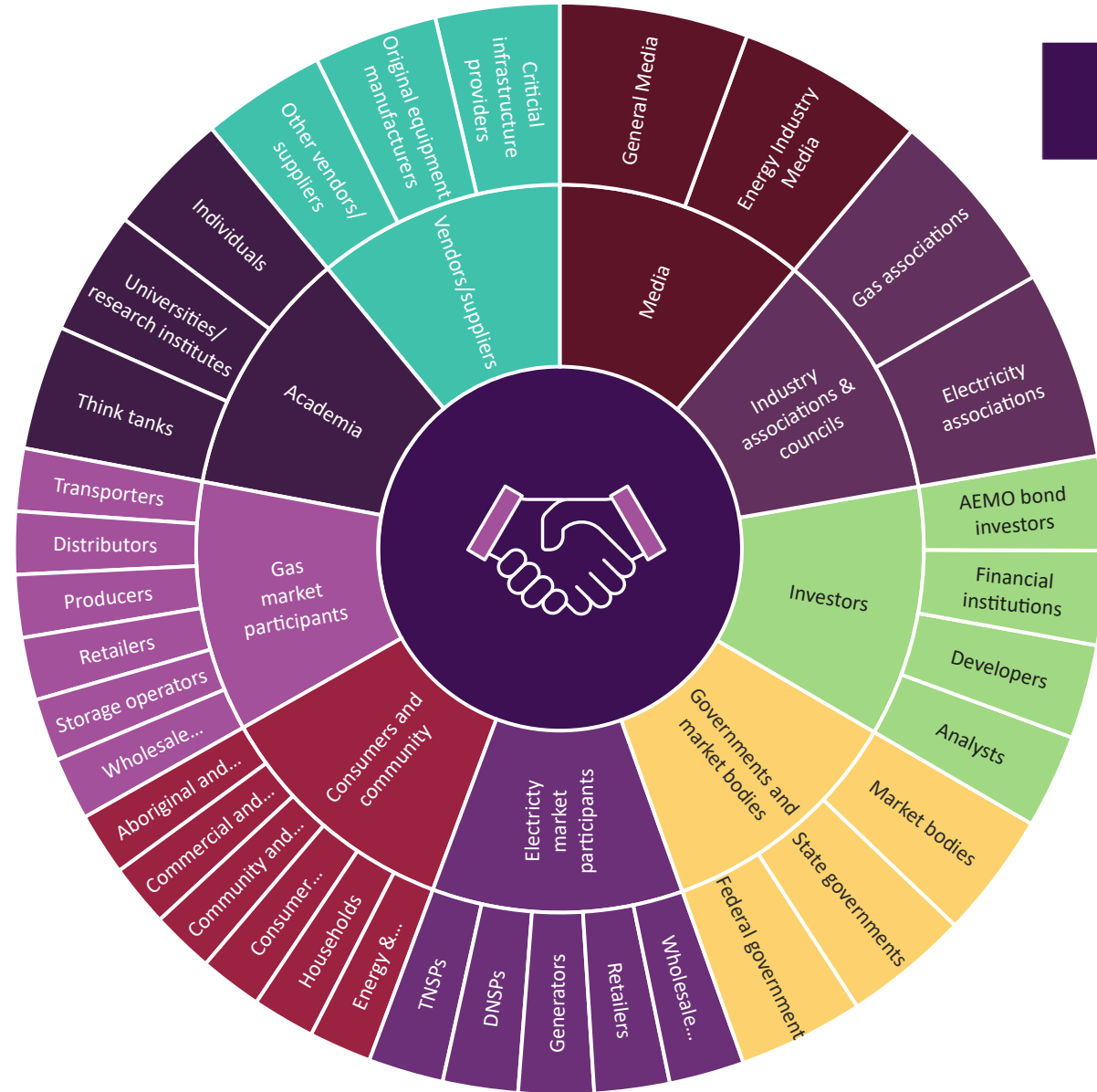
- How CER uptake impacts AEMO's operational responsibilities:
- Device-level
 - Visibility & predictability
 - Controllability
 - Performance
 - System management
 - Activity within Dx network operating zone
 - AEMO-T-D coordination

Use Cases & Requirements that need to be reviewed due to these impacts

1. CER visibility and predictability
2. CER performance during disturbances
3. Emergency DPV curtailment
4. Voltage Management
5. CER scheduling and operational coordination
6. Manage CER cyber security compromise
7. System restart with increasing DER
8. Underfrequency management with increasing DER

The challenge that lies ahead is too big for any one organisation to tackle alone.

It requires robust collaboration encompassing the diverse organisations across the energy sector, our broader community, industry and governments.



Thank you