



Consumer Forum

September 2022



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

We pay respect to their Elders past, present and emerging.

Agenda

Time	Duration	Item	Speaker/s
9am	5 mins	Welcome & opening remarks	Jane McNamara
9:05am	20 mins	Update from EGM	Nevenka Codevelle
9:25am	40 mins	ISP 2024 scenarios development	Daniel Collins Magnus Hindsberger
10:05am	25 mins	NEM 2025 update	Peter Carruthers
10:30am	25 mins	Electricity Statement of Opportunities report	Ben Jones
10:55am	5 mins	Other business & close	Marteena McKenzie



Welcome & opening remarks

Jane McNamara

Update from EGM

Nevenka Codevelle

AEMO Corporate Plan FY2023

Corporate Plan

FY2023

This corporate plan represents AEMO's Statement of Corporate Intent under AEMO's Constitution.



Corporate Priorities



Priority 1

Operating today's systems and markets

Delivering electricity, gas and other statutory responsibilities that are fundamental to AEMO's role.

AEMO is committed to maintaining secure and reliable operation of energy systems and markets while maximising benefits in the interest of consumers.



Priority 2

Navigating the energy future

Collaborating with our members and stakeholders to identify emerging issues, provide technical and economic expertise and support new and ongoing reforms.

AEMO works to meet the physical and commercial challenges associated with the energy transition by collaborating with regulatory bodies, participants and consumers to develop and deliver the least-cost and lowest-risk outcomes for consumers.



Priority 3

Engaging our stakeholders

Being transparent, collaborative and stakeholder-focused. AEMO is committed to engaging with stakeholders for improved decision-making and outcomes.

We continue to strengthen our external engagement across all functions to enhance the stakeholder experience, deliver better value to our members – ultimately to support better outcomes for energy consumers.



Priority 4

Evolving the way we work

Being a transparent, efficient, stakeholder and customer-focused business with clear accountabilities, and a sustainable financial footing for the future.

This includes ongoing organisational efficiency, talent capability work, renewing our technology architecture, and embedding a consumer and stakeholder mindset in our culture and governance.



Priority 3 – Engaging our stakeholders

Be a trusted partner working with our members and stakeholders, to deliver better outcomes for energy consumers.

Harnessing the power of collaboration among industry and other stakeholders is the key to delivering the future energy system Australia needs and deserves. The task ahead is so large and complex that AEMO could not possibly act alone.

To deliver the infrastructure required for Australia's immediate and long-term energy future, it is vital to build social and community licence. AEMO will work with stakeholders, listening and engaging in a high-quality and meaningful way to support social licence.

In addition, as Australian governments shape and realise their own energy policies and plans, we will endeavour to be a trusted source of energy expertise on policy matters and work to capture synergies for the benefit of energy consumers.

How we will achieve this priority:

Meet and exceed stakeholder expectations

We actively engage, listen and respond to feedback from our members and stakeholders, motivated by a strong energy consumer focus and continually improve the stakeholder experience.

- **Clearly and consistently consider stakeholder feedback** and demonstrate feedback has been considered
- **Co-design the ISP Engagement Strategy** with the ISP Consumer Panel and other stakeholders.
- **Develop capabilities** to assist our members and stakeholders in **building the social licence** necessary to enable the future energy system.
- **Actively engage and collaborate in solving industry participant needs** via staff rotations and cross-industry project teams.
- **Embed a stakeholder management system** throughout AEMO and **deliver consistent high-quality engagement experiences.**

Accessibility and communications

We make AEMO's analysis and information accessible to a broader audience.

- **Simplify communication** to broaden the audience.
- **Deliver a simple and clear access point to the AEMO website** and ensure availability of and easy access to content that is value to stakeholders.

Government engagement and support models

Our engagement and support models appropriately service individual Governments and help to advance their energy objectives.

- **Ensure our operating model and cost recovery mechanisms** are appropriate.
- **Support ASL** with NEM jurisdictions to ensure efficient and economic outcomes.
- **Provide tailored advice and insights to Governments** to better inform and enable policy objectives.
- **Embed in a consumer focus stakeholder-centric service mindset.**

AEMO Community Advisory Council



AEMO is had called for Expressions of Interest to join a new CAC. The purpose of the CAC is to:

- 1. ISP development** - To provide input on community sentiment, social licence, and the issues/risks and opportunities/pathways forward on the ISP
- 2. Community sentiment & social licence strategic advisor** – To provide social licence insight and advice to assist AEMO more generally in carrying out its other non-ISP functions including as Victorian Planner
- 3. Stakeholder network conduit** – To engage relevant diverse community networks to provide AEMO with greater insight, understanding and potential action regarding social licence and the energy transition

Council Membership

Council to be made up of representatives from the following groups:

- First Nations
- energy consumers – residential (including low-income and vulnerable households), small business, commercial and industrial
- rural and regional communities
- agricultural groups and landholders, and
- environmental groups - biodiversity.



ISP 2024 scenarios development

Daniel Collins & Magnus Hindsberger

Scenarios for the 2023 IASR

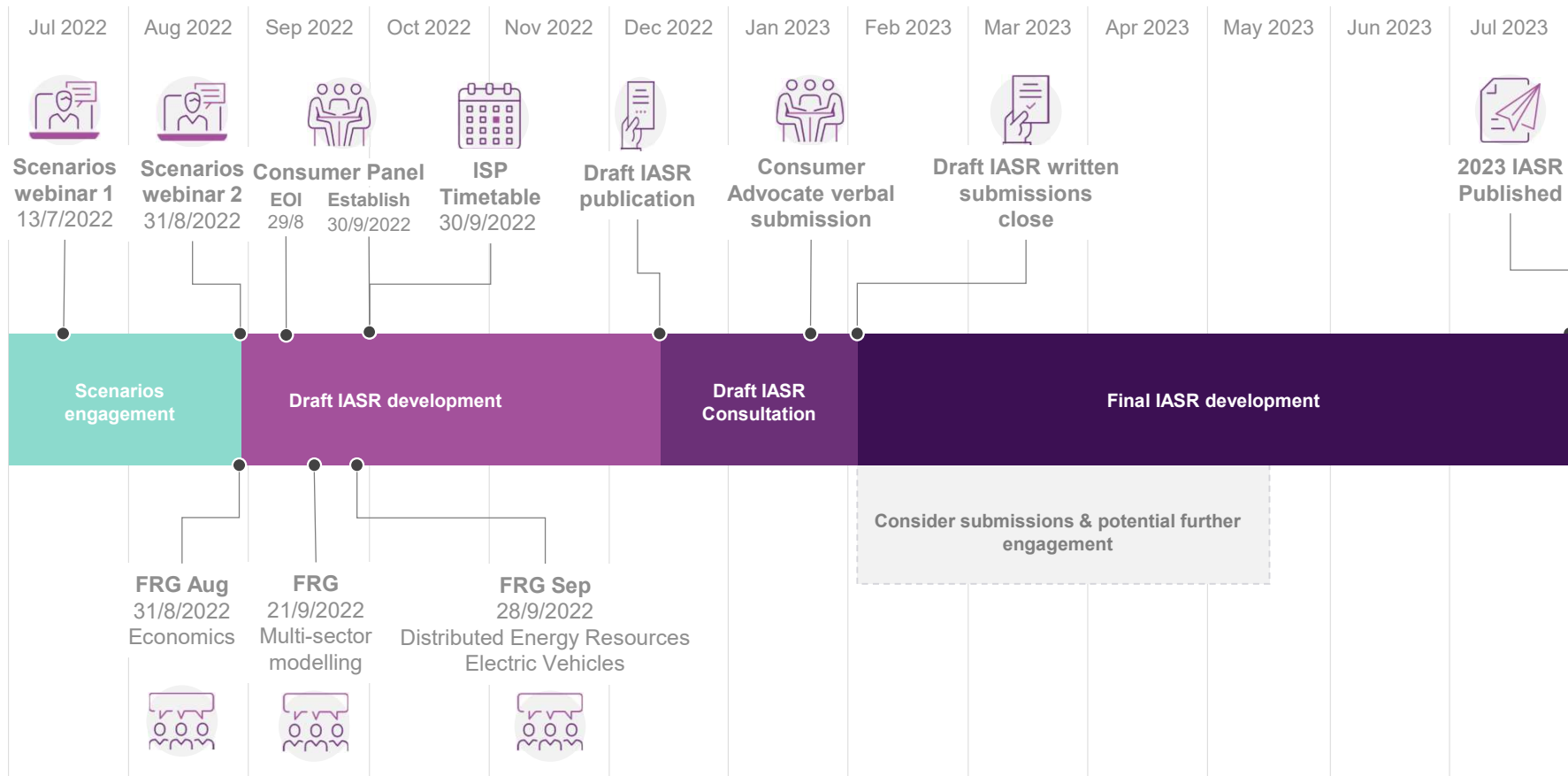


Agenda

- Timeline recap
- What AEMO heard
- Updated scenario narratives
- Next steps
 - Development of the draft IASR
 - Draft IASR Consultation




2023 IASR development timeline



What AEMO heard (1/2)

- Scenario breadth:
 - Needed for sufficient wide bookends
 - Downside risk exists – economic drivers (inflation) and supply chain risks
- Need more clarity on scenario settings:
 - What is meant by 43% emissions reduction by 2030?
 - Why is Hydrogen Export not resulting in net zero emissions before 2050?
 - Isn't green gas already part of Hydrogen Export?
- DER:
 - Use scenarios and sensitivities to explore different DER levels
 - Increased need to understand impacts on the distribution system, such as costs and constraints
- Hydrogen export:
 - Grid connected or not?
 - Do not use any other hydrogen than green
- Social licence:
 - A constraint that needs to be considered across all scenarios
 - Is it meaningful to differentiate?




Topic	Mention
Scenario naming	5
Slow change	3
Carbon / Emissions	12
Social licence	4
Supply chain	1
Demand	1
Recession	1
DER	9
DSM/DSP	3
Hydrogen	5
Green gas	7
Generation costs	3
Other	40

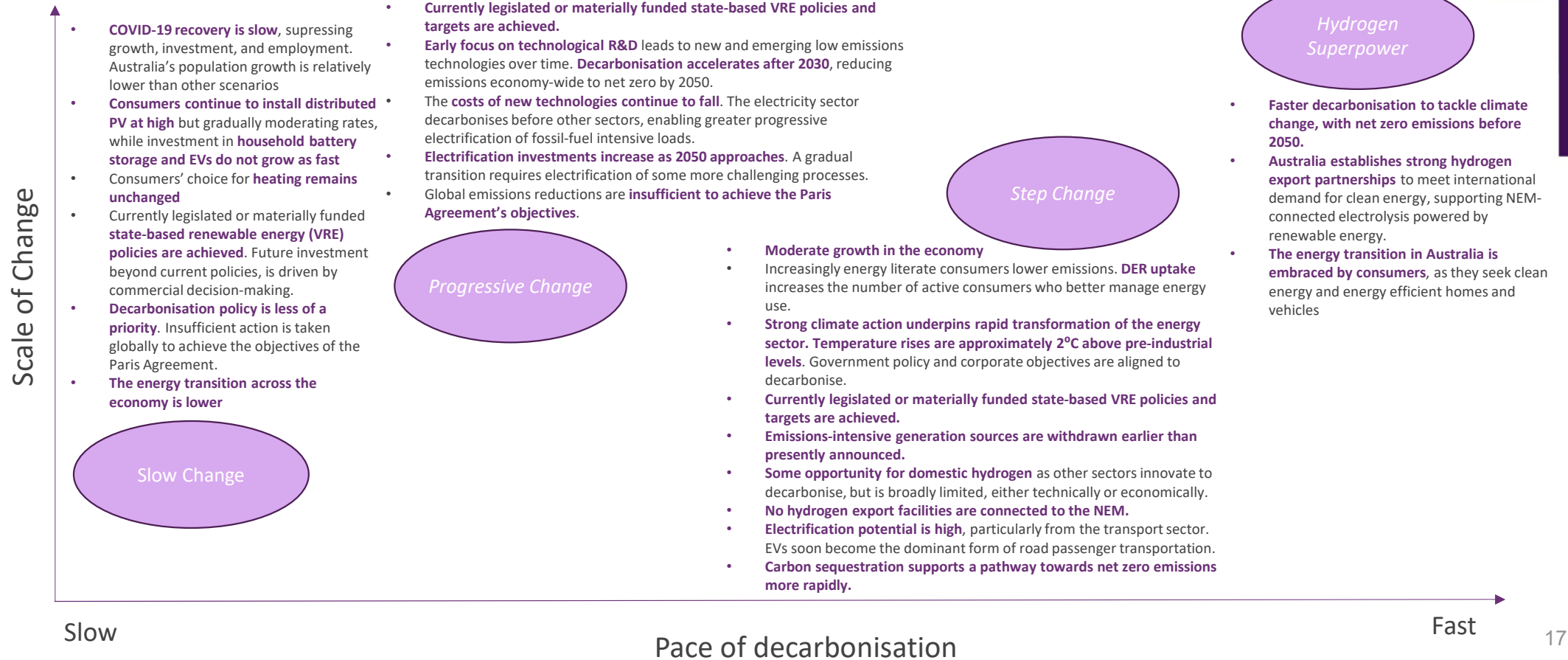
Question, answer or comment made in first scenario webinar

2021 IASR scenarios

As used in the 2022 ISP

Legend:

 2021 scenario

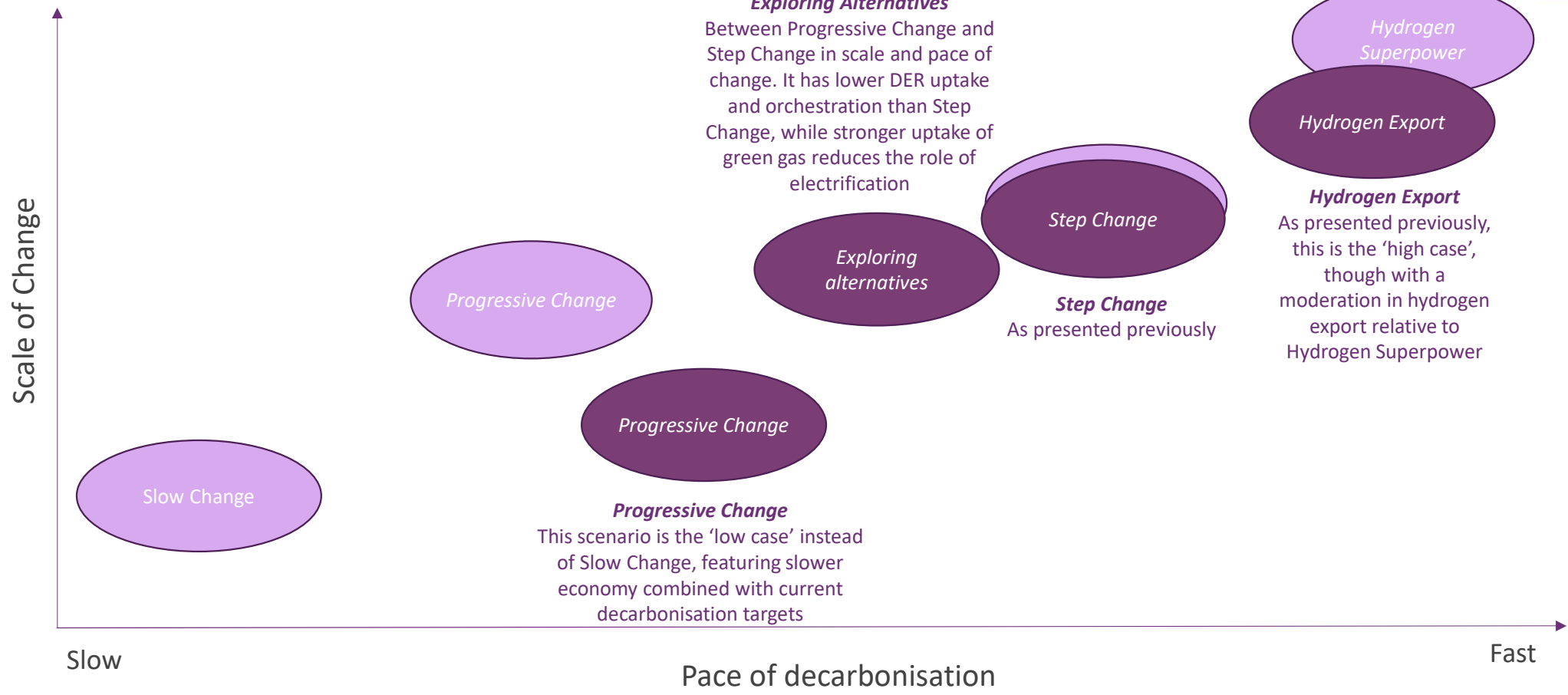


Updated draft scenarios

The Draft 2023 IASR will consult on:

Legend:

- 2021 scenario
- 2023 scenario



Draft Scenario: Progressive Change



- Assumes lower economic growth and ongoing disruptions affecting international energy markets and supply chains. Includes the greatest relative risk of industrial load closures.



- DER uptake is dampened due to supply chain issues. Renewable energy development continues to be driven by current market and policy settings, and coal capacity is relatively more likely to remain operational until announced closure timings.



- Global decarbonisation progresses in line with currently announced policies and ambitions, including Australia's updated commitment to a 43% reduction of economy-wide emissions by 2030 and net zero emissions by 2050.



- Technology cost reductions are slower than in the other scenarios.



Draft Scenario: Exploring Alternatives



- This scenario reflects a strong commitment by state and federal governments to deliver not only net zero emissions by 2050, but also to limit global temperature rise to well below 2°C compared to pre-industrial levels (i.e. the Paris Agreement). Similar strong commitments are seen globally, but not all countries delivers on promises in the end.



- Population and economic growth adopt best estimate forecasts.
- Technology cost reductions reflects best estimates meeting net zero emissions globally post 2050, though with a faster cost reduction assumed for green gasses (e.g. biomethane), which uptake is limiting the scale and pace of electrification relative to Step Change.



- Overall, this scenario has a higher proportion of utility-scale investments relative to the decentralised focussed Step Change, using moderate forecasts of DER, electric vehicles and energy efficiency.



Draft Scenario: Step Change



- This scenario reflects a strong commitment by state and federal governments to deliver not only net zero emissions by 2050, but also to limit global temperature rise to well below 2°C compared to pre-industrial levels (ie. the Paris Agreement). Similar strong commitments and actions to deliver are seen globally.



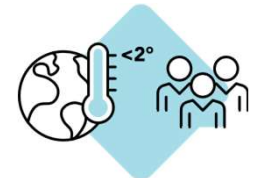
- Population and economic growth adopt best estimate forecasts.
- Technology cost reductions reflects best estimates meeting net zero emissions globally post 2050, though with a faster cost reduction assumed for distributed energy resources (DER), such as rooftop PV and battery storage. Digital technologies expedite consumers' ability to use their DER assets efficiently and a large proportion is actively participating in the energy system.



- The transport sector rapidly transforms via zero emissions technology cost reductions, and withdrawal of internal combustion engine vehicles from production lines.



- Technology breakthroughs in energy efficiency and fuel switching increase energy productivity, and high electrification occurs.



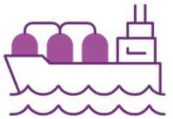
Draft Scenario: Hydrogen Export



- Very strong international decarbonisation objectives limit global temperature rises to 1.5°C by 2100. Domestically, economy-wide net zero emissions is achieved before 2050.



- Australia’s economic growth is higher than the other scenarios, supported by exports of “green commodities” to global consumers at scale, including hydrogen and other energy-intensive products such as green steel. This stronger economy also drives a larger net migration.



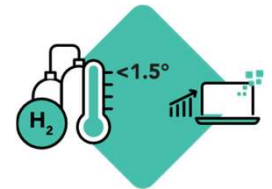
- The strong decarbonisation targets drive significant electrification and hydrogen production (for both export and domestic consumption).



- Technology cost reductions reflects best estimates meeting net zero emissions globally by 2050 and with rapid technology cost improvements for the hydrogen supply chain. Cheap local hydrogen drives competition between hydrogen fuel-cell vehicles and EV’s.

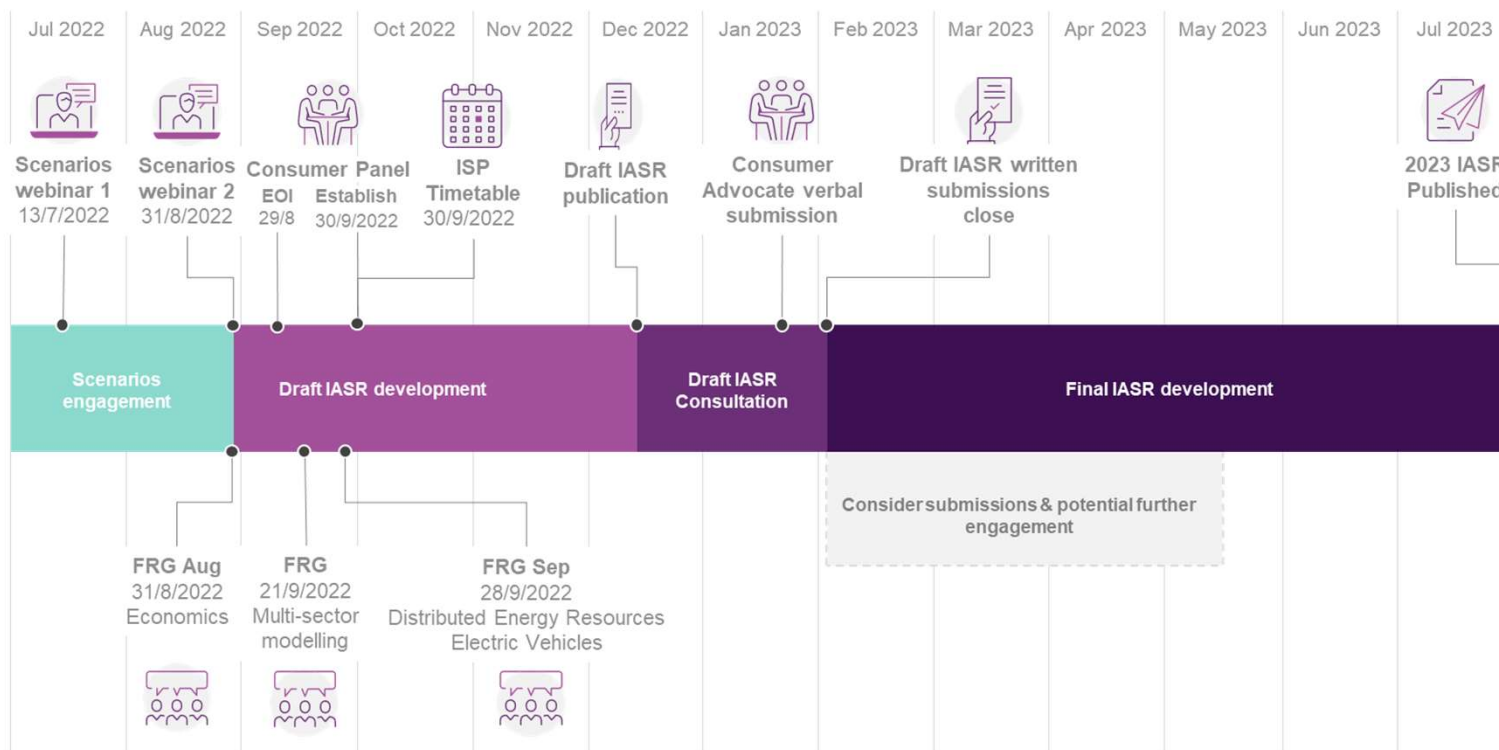


- High electrification and energy efficiency investments occur across many sectors.



Next steps

- The scenarios will be subject to formal consultation as part of the consultation on the draft 2023 Inputs, Assumptions and Scenarios Report, due for publication in December 2022.
- For more details, and to stay involved in the 2023 IASR and 2024 ISP processes, visit <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>



NEM Reform Implementation Roadmap



Peter Carruthers



Introduction



- The purpose of this session is to provide a briefing on:
 - Scope and implementation of the reforms
 - The outcomes of the NEM2025 Implementation Roadmap consultation
 - How uncertainty will be managed and how investments will be governed
 - Integration of NEM2025 initiatives into a single roadmap with other electricity and gas market reforms
 - Plans to stand-up the NEM2025 engagement structure and integrate with existing implementation forums

NEM2025 Program scope Reforms

Pathway	Description	Initiatives
Resource Adequacy Mechanisms	Investment in the right mix of resources (generation, storage and demand response) in place prior to anticipated plant closures, and that plant exit does not cause significant price or reliability shocks to consumers through the transition	<ul style="list-style-type: none"> • Increased MT PASA Information • <i>Capacity Mechanism</i>^[2]
Essential System Services	The resources and services are available to manage the complexity of dispatch and to deliver a secure supply to customers	<ul style="list-style-type: none"> • Fast Frequency Response • Mandatory Primary Frequency Response • Operating Reserve Market • System Strength (Planning)^[1] • Operational Security Mechanism
Transmission & Access	The network meets future needs, renewable energy zones, and there is a targeted set of investments that can deliver the energy transition at lower cost	<ul style="list-style-type: none"> • <i>Congestion Management Model</i>^[2]
Integrating DER & Flexible Demand	New opportunities are created for consumers to receive and use energy, and are rewarded for doing so flexibly	<ul style="list-style-type: none"> • Integrating Energy Storage • Flexible Trading Arrangements (Model 2) • Scheduled Lite • Dynamic Operating Envelopes • Distribution Local Network Services • Turn-up Services • DER Data Hub & Registry Services • DER Operational Tools
Data Strategy	A framework is established with new guiding policy principles, build capability, forward planning and adaptability and address priority data gaps	<ul style="list-style-type: none"> • Data Services • EV Charging Standing Data Register • Bill Transparency • Network Transparency

^[1]TNSP led initiative ^[2] Not in version 1 of Roadmap

Implementing the reforms

*The **NEM Reform Implementation Roadmap** establishes a basis upon which AEMO, and stakeholders may navigate the breadth of ESB and other energy market reforms over the coming few years, de-risking delivery, and informing implementation timing.*

The Roadmap integrates the Regulatory implementation roadmap (version 7) and NEM2025 implementation roadmap (version 2) to provide a holistic view of regulatory reforms and IT uplift initiatives.

Why is it required?

- The reform program is significant
- Piecemeal implementation of initiatives may cause resource and mobilisation challenges for AEMO and market participants
- Industry wide reform requires industry wide knowledge and collaboration
- Opportunity to identify where strategic investments can deliver efficient outcomes for AEMO, market participants and consumers
- Informs implementation timing decisions by market bodies.

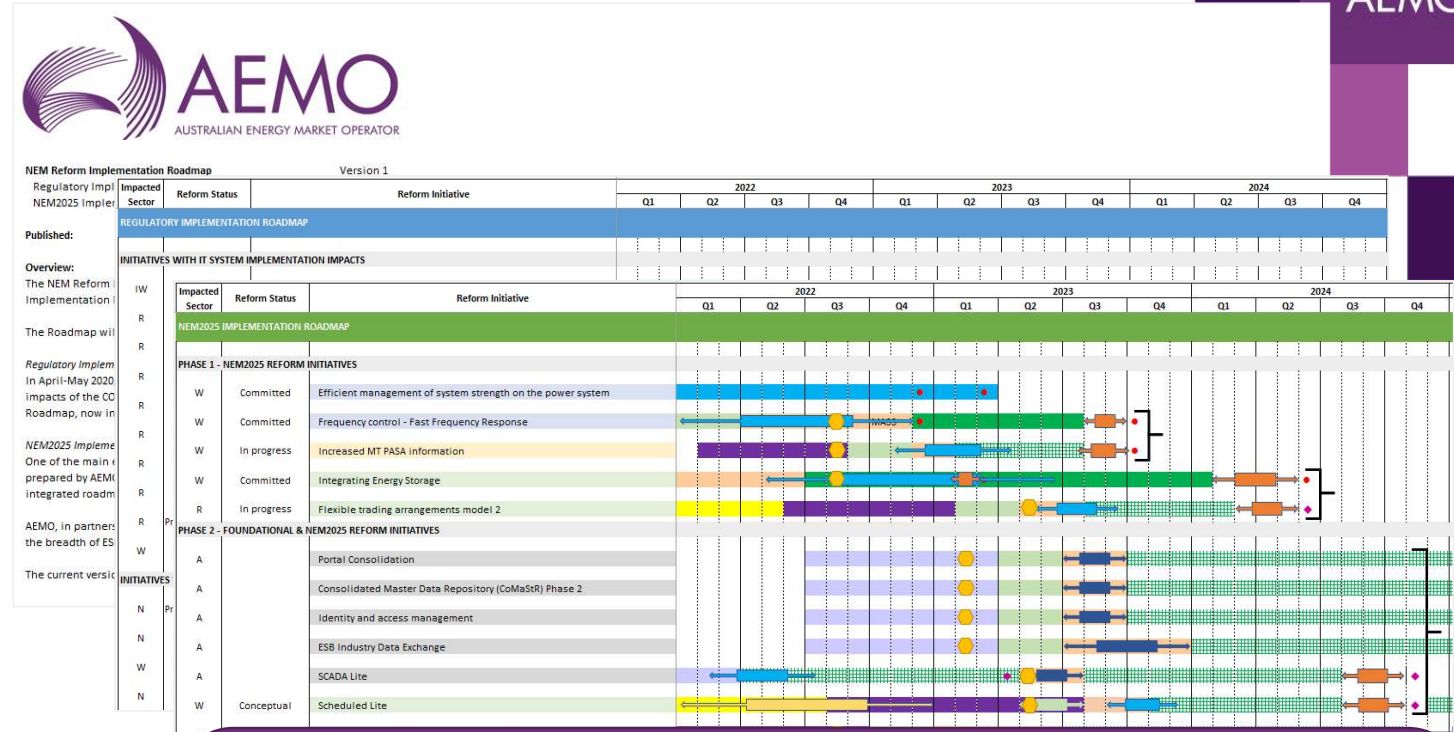
Roadmap Objectives

- The objectives of the NEM2025 Implementation Roadmap is to set out a program that:
 - Implements reforms in a timely and efficient manner;
 - Co-ordinates regulatory and IT change;
 - Aims to remove costs associated with implementation of individual initiatives; and
 - Provides transparency to stakeholders on the implementation program.

NEM Reform Implementation Roadmap



- The Roadmap, provides AEMO and stakeholders with a holistic view of the reform program impacting National Electricity and Gas Markets
- Adopts a reform pathway that:
 - commits to undertake mandatory and no regrets initiatives in a timely way
 - includes those initiatives with greater uncertainty in policy, design, scope or timing
 - is complemented by governance, change and stage gate processes.
- The Roadmap is now available on AEMO's website [here](#)
- The Gate 1 business case, which updated cost estimates of individual initiatives and a whole of life cycle comparison of two alternative implementation pathways is also now available on AEMO's website [here](#).



AEMO has developed the 'NEM Reform Implementation Roadmap', together with the Reform Delivery Committee, which includes members from market bodies, peak industry bodies and consumer groups.

Stakeholder feedback on sequencing, batching and prioritisation also informed final recommendations for this integrated version of the Roadmap.

NEM2025 Roadmap Governance

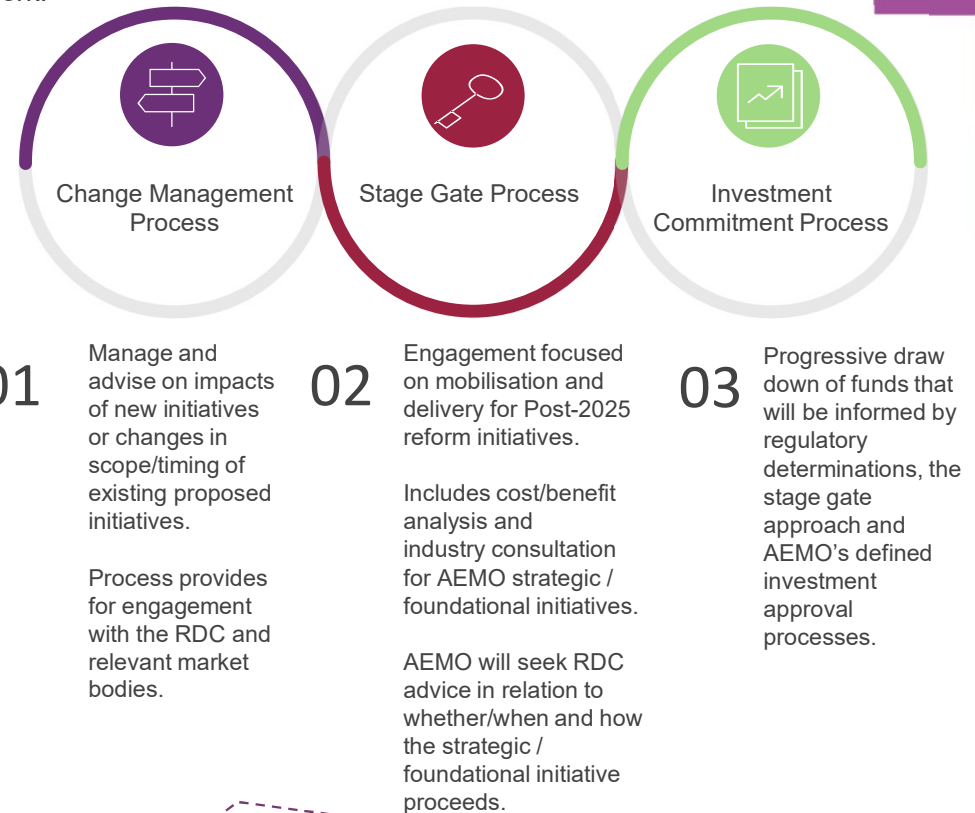


In developing the Roadmap, AEMO and RDC members noted the significant challenges and risks associated with delivery of the NEM2025 Program and the importance of an appropriate management and governance framework.

Challenges include but are not limited to:

- Managing uncertainty in scope, timing and cost of initiatives
- Establishing the basis for, and timing of AEMO strategic and foundation enabling initiatives
- Setting funding commitments over a multi-year Program given the uncertainty surrounding policy and regulatory outcomes and scope of certain initiatives.

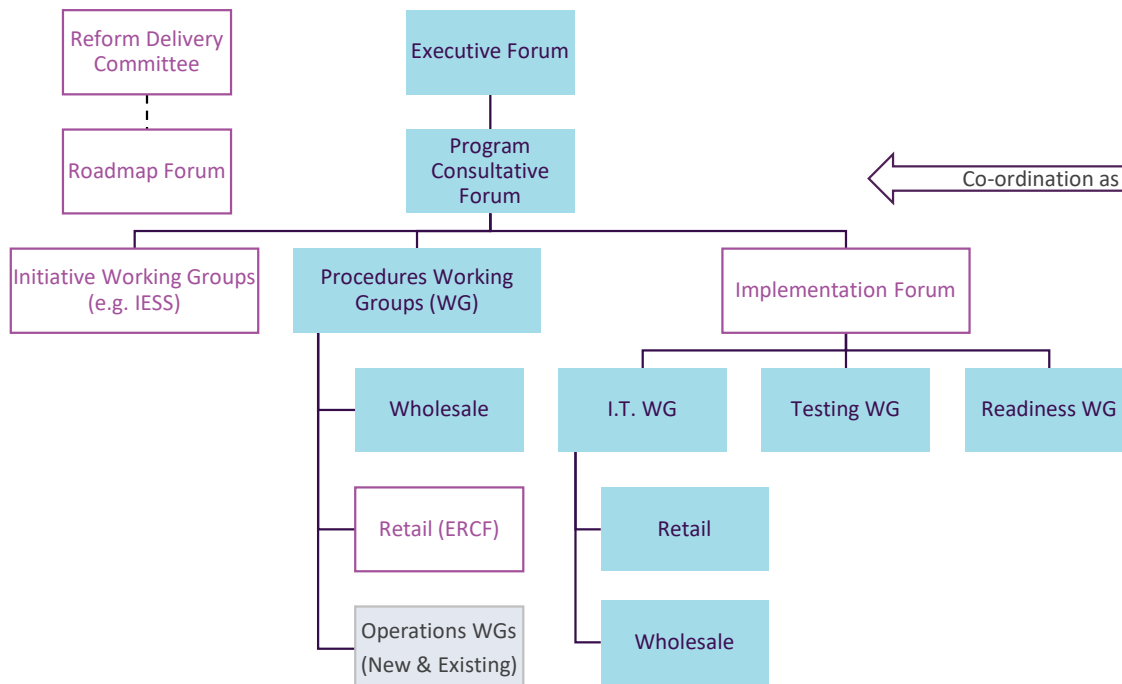
The Roadmap commits to delivery of mandatory and no regrets initiatives in a timely way. It also sets a pathway and progressive commitment process for delivery of those initiatives with greater uncertainty in policy, design, scope or timing



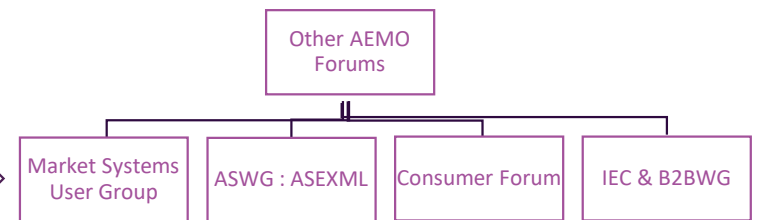
See "NEM Reform Implementation Roadmap Governance – Statement of Approach" for further information on each process.

Proposed NEM Reform Implementation Forum and working group structure

Proposed NEM2025 forums



Existing forums



Co-ordination as required

Legend



Q&A

Electricity Statement of Opportunities

Ben Jones



Today's presentation

Purpose: inform stakeholders of the ESOO's Reliability Forecast outcomes and answer stakeholder questions

Agenda

- Introduction
- Demand Outlook
- Supply Outlook
- ESOO Central scenario
- ESOO Anticipated and actionable sensitivity
- Question and answer session

Urgent need for investment to support the energy transition

- **Urgent development is needed** of anticipated generation and storage projects, as well as actionable transmission investments, to support the energy transition and maintain reliability amidst a cluster of coal retirements this decade.
- A strong pipeline of announced projects currently exists, however **insufficient capacity response has become committed** to address emerging shortfalls, while programs to increase investments are progressing.
- The coming summer (2022-23) is forecast to remain within the Interim Reliability Measure in all regions, however reliability risks are emerging in many regions across the 10yr horizon due to:
 - Scheduled generator retirements
 - Growing energy consumption and peak demands
 - Project commissioning risks
 - Deteriorating reliability of ageing generators

Definitions

Unserviced energy (USE) is energy that cannot be supplied to consumers, resulting in involuntary load shedding (loss of customer supply). For example, this may be caused by insufficient levels of generation capacity or demand response.

The **Interim Reliability Measure (IRM)** was introduced to reduce the risk of load shedding across the NEM providing a trigger for the Retailer Reliability Obligation (RRO) of 0.0006% of energy demanded in a region in any year. It applies until 30 June 2025.

The **reliability standard** is a measure of USE in each region of no more than 0.002% of energy demanded in any year. For the purposes of the RRO, it applies after 30 June 2025.

Any **forecast reliability gap** is based on forecast USE in excess of the IRM or reliability standard in a region in a year.

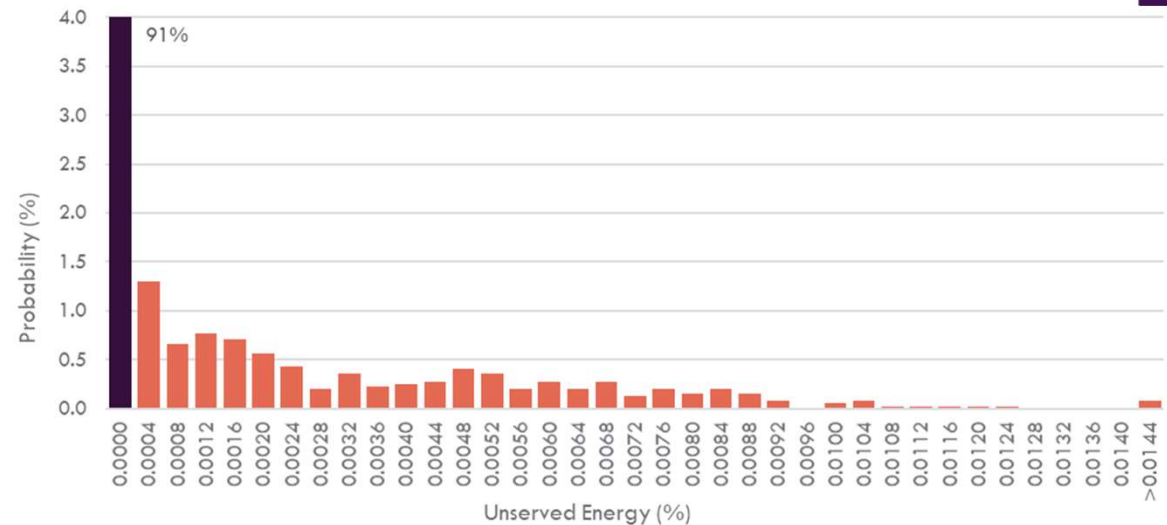
If AEMO reports a forecast reliability gap, this may trigger a reliability instrument request under the **RRO**.

The IRM is forecast to be met in all NEM regions this summer, however risks to supply remain.

Risks include:

- Prolonged periods of unavailability of generation or transmission, including forced outages, planned maintenance and/or potential mothballing.
- Delays to the commissioning of new renewable generation, dispatchable capacity and/or transmission.
- Extreme temperatures affecting the output from all generation sources.
- The ongoing potential for gas and coal fuel shortfalls, particularly if generators need to operate more frequently to cover prolonged outages of major power stations.

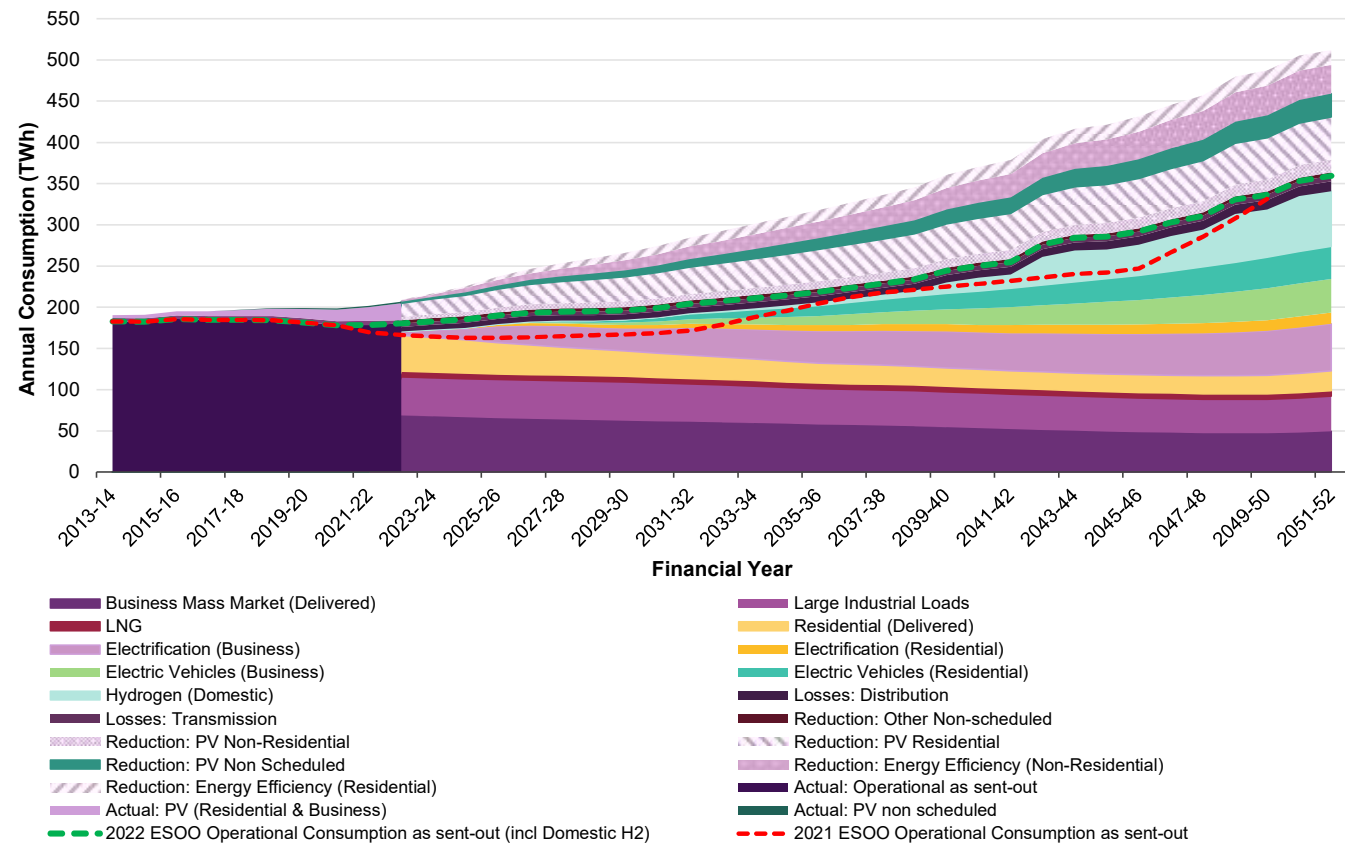
Probability density of forecast USE in South Australia 2022-23, Central scenario



The figure shows a 91% probability that no USE will occur in the coming year, but there is a 9% probability of an incident. It shows a 'long-tail' of possible outcomes that may be infrequent but impactful. For example there is a 1% probability of an outage greater than four hours for 100,000 households.

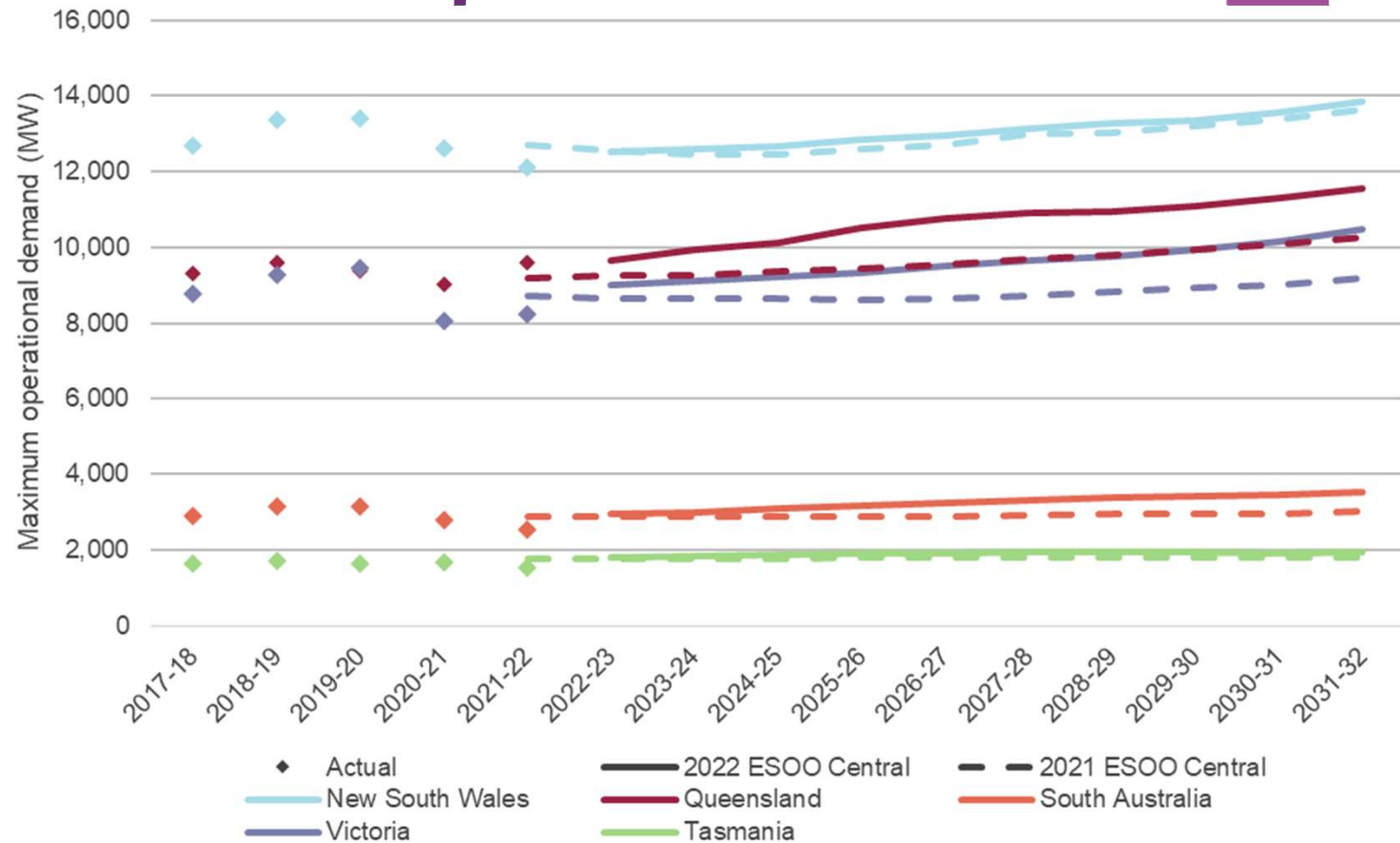
Electricity consumption forecasts are higher than the 2021 ESOO

- AEMO now considers the Step Change scenario most likely.
- The Step Change scenario incorporates expectations regarding electrification including electric vehicles and rapid DER uptake.
- The 2022 ES00 operational consumption forecast is higher than the 2021 ES00.
- A small upward revision is noted against previous Step Change forecasts, including those used in the Update to the 2021 ES00.



Maximum demand forecasts follow the similar trends to consumption

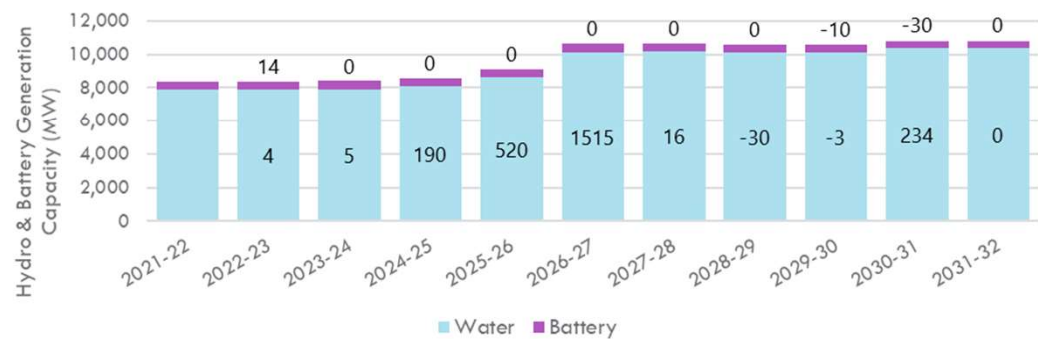
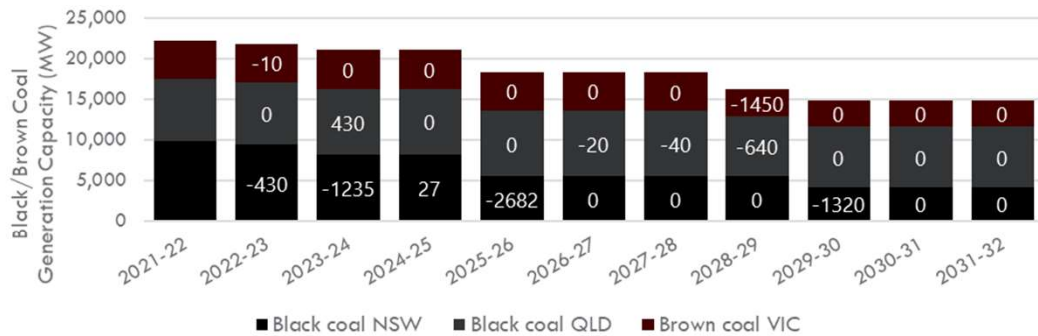
- Similarly, maximum demand forecasts have been revised upwards since previously issued.
- The change of scenario is the primary driver for the increase, however revisions on large industrial loads, and base load (non-temperature sensitive load) have resulted in a 2022 forecast that is higher than the 2021 Step Change forecast.
- While the Step Change scenario results in higher demand, the additional DER forecast somewhat offsets the additional impact on the reliability forecast.



Expected changes to existing and committed supply

The 'reliability forecast' or ESOO Central scenario considers only existing generators which are assumed to retire at the expected date provided by the owner, and developments that meet AEMO's commitment criteria.

Assumed capability during typical summer conditions, by generation type, 2021-22 to 2031-32



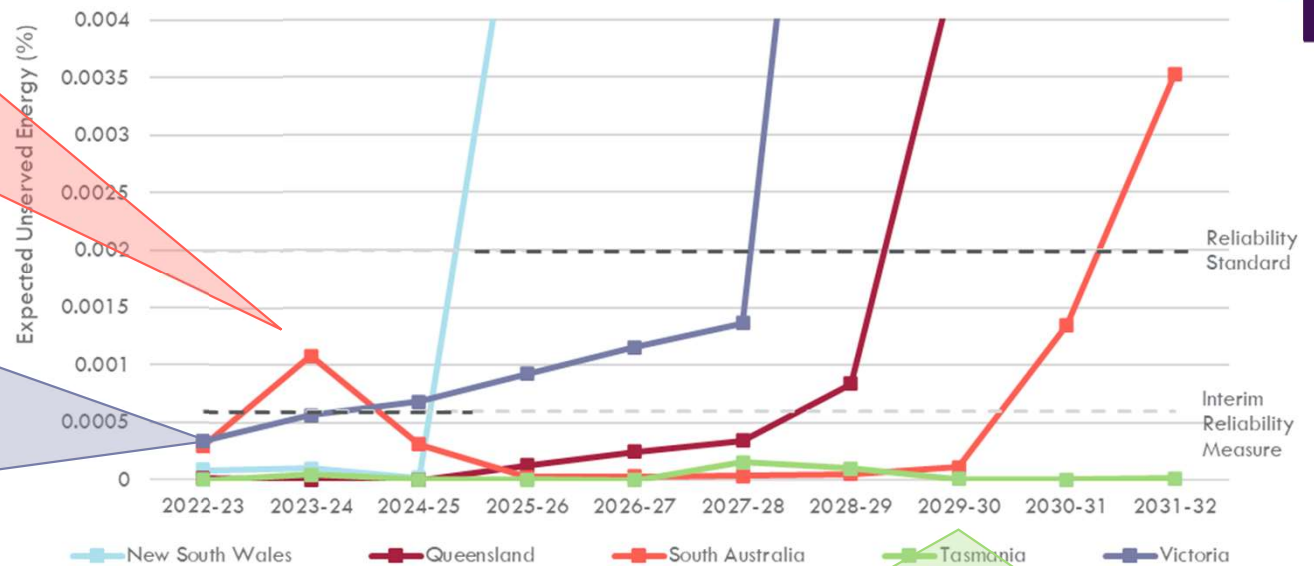
Reliability gaps are forecast in all mainland NEM regions without more committed developments.

Reliability gaps are forecast in South Australia in 2023-24, against the IRM of 0.0006% USE. This gap is emerging due to delayed commissioning of committed generation and transmission developments, including a later release of the first stage of the Project EnergyConnect transmission project, and also expected expansions of industrial loads.

Reliability gaps are forecast in Victoria from 2024-25, against the Interim Reliability Measure of 0.0006% USE. This gap is attributed to forecast expansions of industrial loads, and updated projected outage rates and ratings on the inter-regional transmission flow paths that supply Victoria during times of high demand.

* Since modelling was undertaken, the Mortlake South Wind Farm become committed, and would improve outcomes in Victoria if considered.

Expected unserved energy, 2022-23 to 2031-32, Central outlook



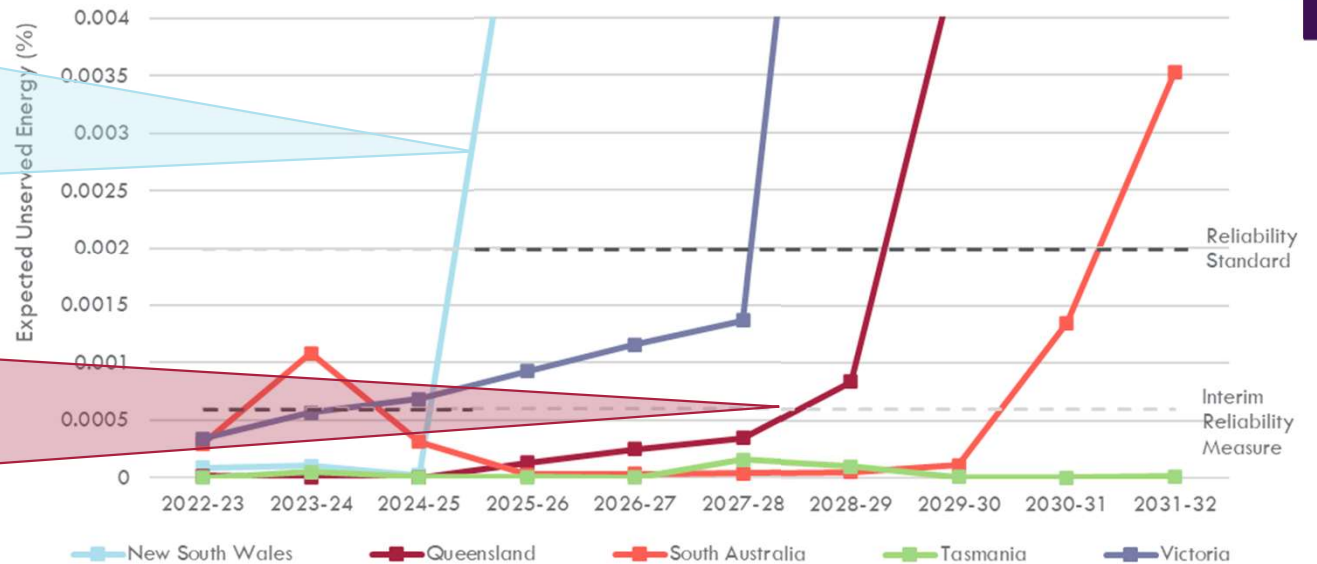
Reliability risks remain with the IRM in **Tasmania** over the ESOO horizon

Reliability gaps are forecast in all mainland NEM regions without more committed developments.

Reliability gaps are forecast in New South Wales from 2025-26, against the reliability standard of 0.002% USE. Consistent with the Update to the 2021 ESOO, this reliability gap is four years earlier than forecast in the 2021 ESOO, following changes in generation including the announced earlier closure of the Eraring Power Station.

Reliability risks in Queensland increase from 2029-30, above the reliability standard of 0.002% USE. Risks arise when Vales Point Power Station in New South Wales is expected to retire (and after the expected closure of Callide B Power Station in Queensland), as expected USE is shared across the two regions.

Expected unserved energy, 2022-23 to 2031-32, Central outlook



Retailer Reliability Obligation (RRO) requests are required for relevant reliability gap periods

In this 2022 ES00, the following reliability gaps meet the requirements for RRO instrument requests:

- AEMO is requesting a T-1 reliability instrument for **South Australia** in **2023-24**.
- AEMO is requesting a T-3 reliability instrument for **New South Wales** in **2025-26**.

Additionally, AEMO is advising that a reliability gap is no longer forecast in New South Wales in 2023-24.

The AER will begin consultation on the reliability instruments soon.

<https://www.aer.gov.au/retail-markets/retailer-reliability-obligation/register-of-reliability-instruments>

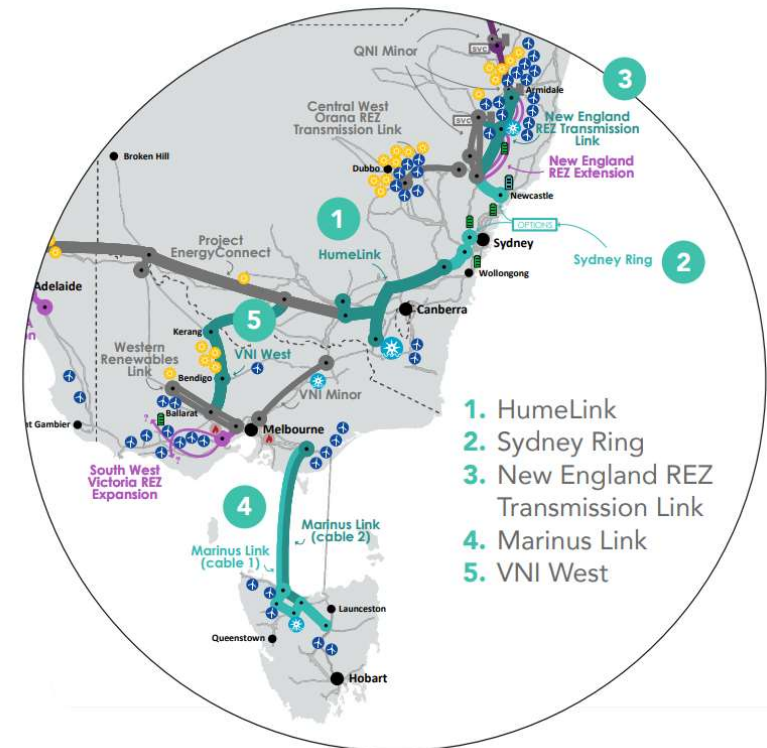
Anticipated and actionable developments are included in a sensitivity

The pipeline of anticipated generation and storage developments currently are:

- Almost 1,200 MW of wind generation.
- Approximately 850 MW of solar generation.
- Approximately 1,200 MW of battery energy storage systems.
- Approximately 100 MW of peaking capacity operated with gas or diesel fuels.

The range of transmission developments are included in the sensitivity:

- Central West Orana and New England renewable energy zone (REZ) transmission links, and the Hunter Transmission Project (including potentially earlier investments to support the system integrity protection scheme [SIPS]) in New South Wales, and the Western Renewables Link in Victoria.
- Actionable transmission developments identified in the 2022 Integrated System Plan

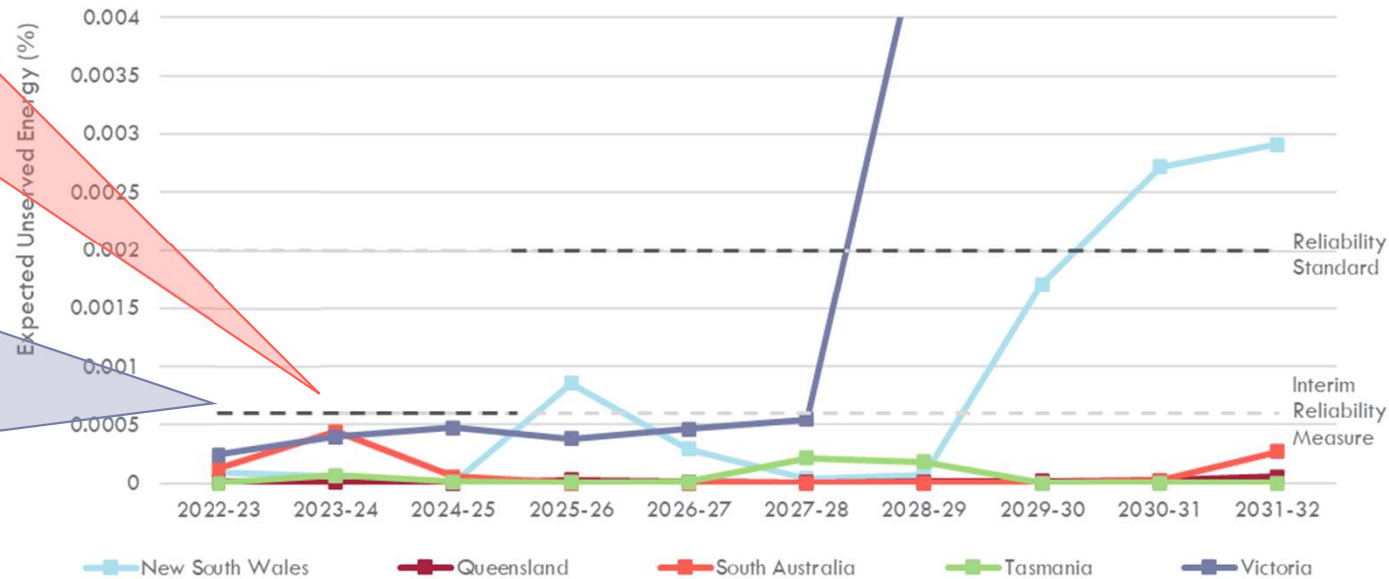


Significant improvements are forecast if anticipated and ISP actionable developments are included

Expected USE in South Australia is forecast to remain within the IRM. The forecast reliability gap is able to be addressed with the development of Bolivar Power Station, and 3 Battery Energy Storage Systems. These developments help offset gaps forecast in later years also.

Reliability is forecast within the IRM until the expected retirement of Yallourn Power Station. While ISP actionable developments significantly improve the outlook, further generation developments are required at this point. Developments associated with the second auction of the Victorian Renewable Energy Target will assist and are not included in this forecast.

Expected unserved energy, 2022-23 to 2031-32, Central outlook, with anticipated and actionable developments

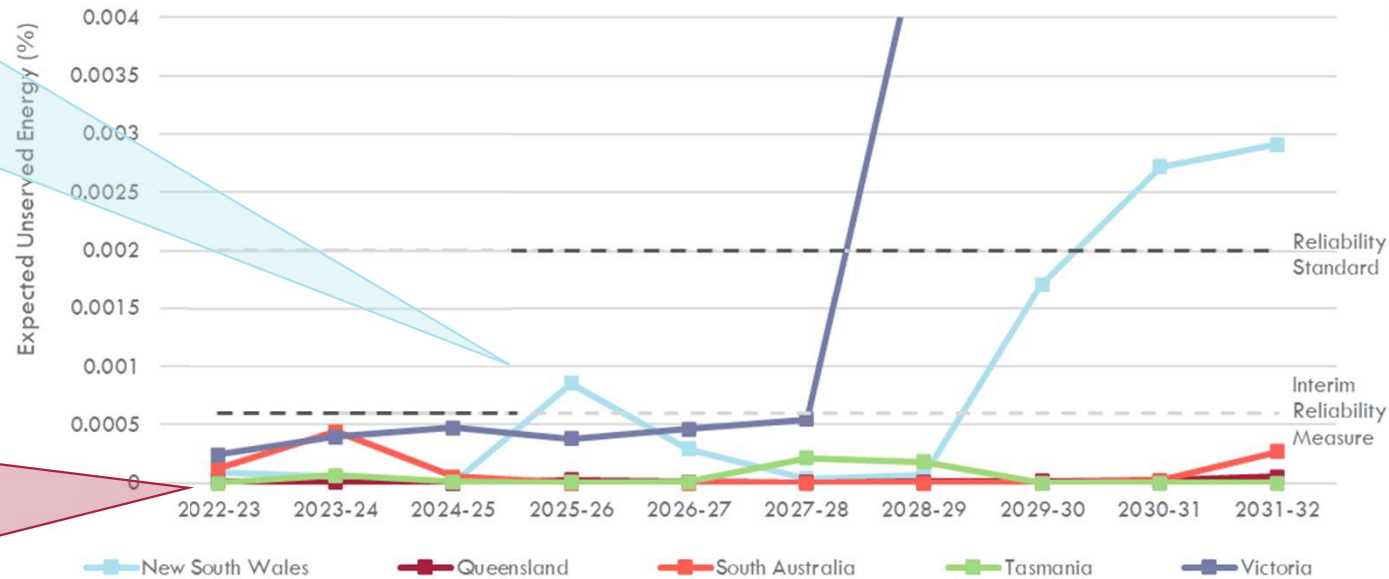


Significant improvements are forecast if anticipated and ISP actionable developments are included

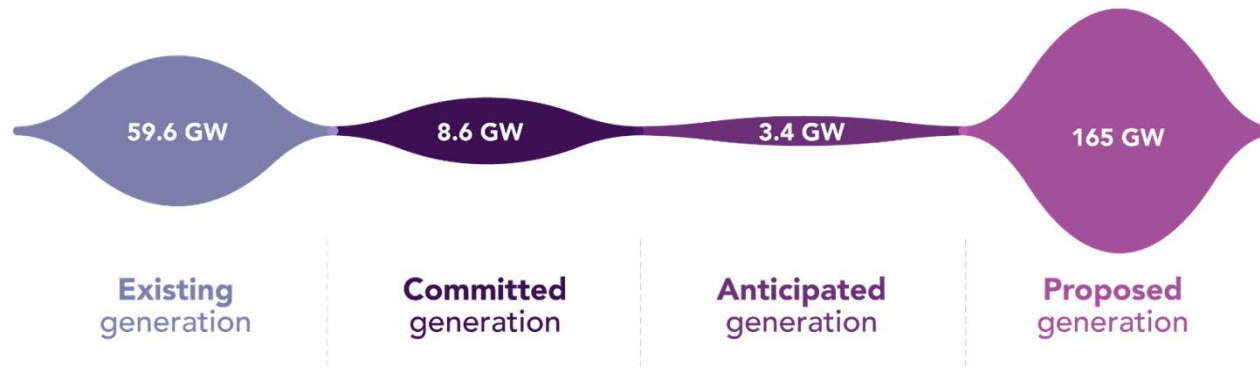
The reliability outlook for New South Wales improves significantly in this sensitivity, as transmission developments allow generation from further afield to reach the Sydney, Newcastle and Wollongong area. Developments associated with the IIO pathway and firming tender will further improve reliability outcomes and are not included in this forecast.

The majority of forecast risks for Queensland are resolved in this sensitivity. This occurs when the reliability improvements in New South Wales lead to less sharing of USE across the two regions.

Expected unserved energy, 2022-23 to 2031-32, Central outlook, with anticipated and actionable developments



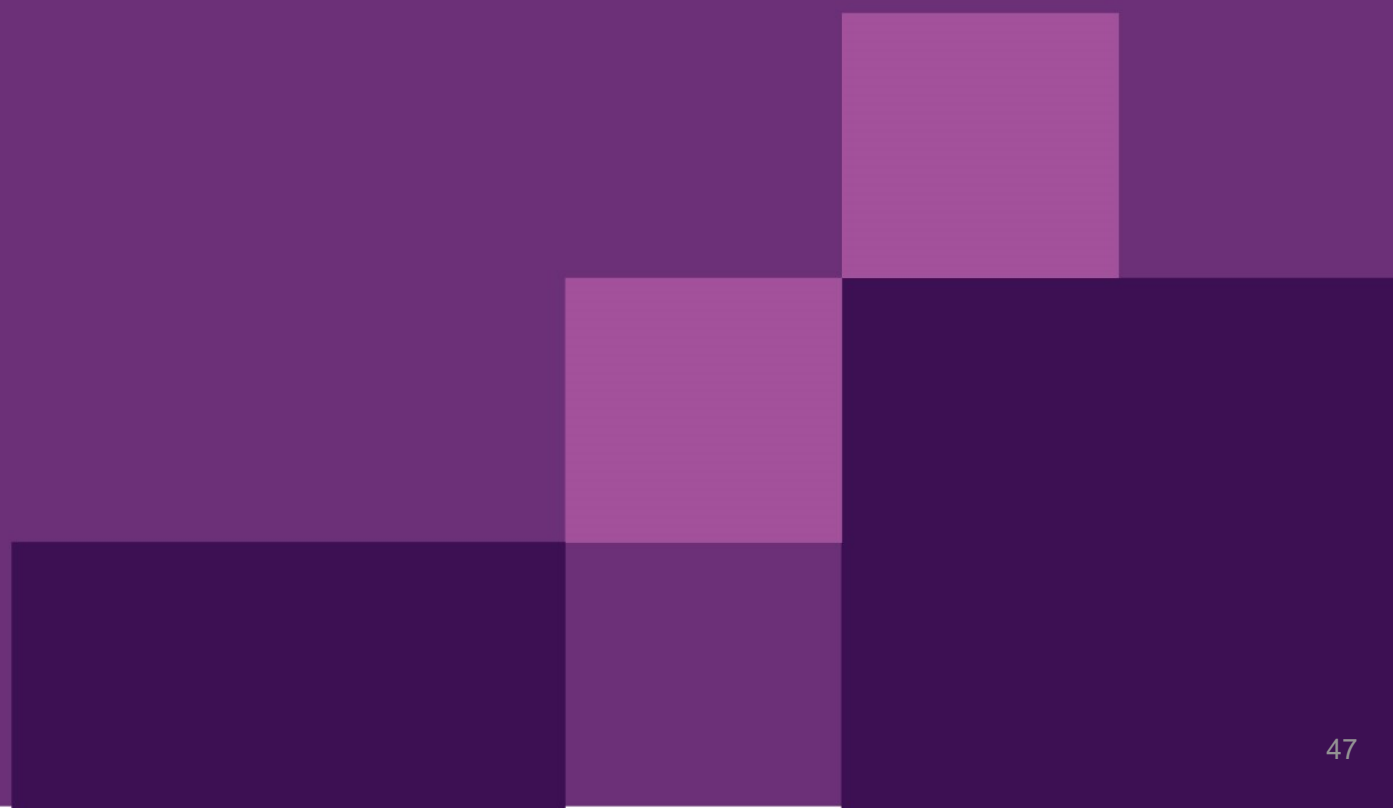
While additional capacity is required, many proposed projects are known



New capacity modelled in the 2022 ISP Step Change scenario additional to that considered in the 2022 ESOO anticipated and actionable sensitivity by 2031-32

	New South Wales	Queensland	South Australia	Tasmania	Victoria
VRE capacity (MW)	12,588	8,586	2,144	2,497	4,232
Firming capacity (MW)	2,000	872	0	390	0
DSP capacity (MW)	206	300	119	24	267

Other business & close





For more information visit

aemo.com.au