

*Please note that this webinar will be recorded and published online*



# Draft 2023 Inputs, Assumptions and Scenarios Report (IASR) submissions

Reflections webinar

22 March 2023



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 and present.**

# Today's objectives



Inform stakeholders of submissions received to the Draft 2023 IASR



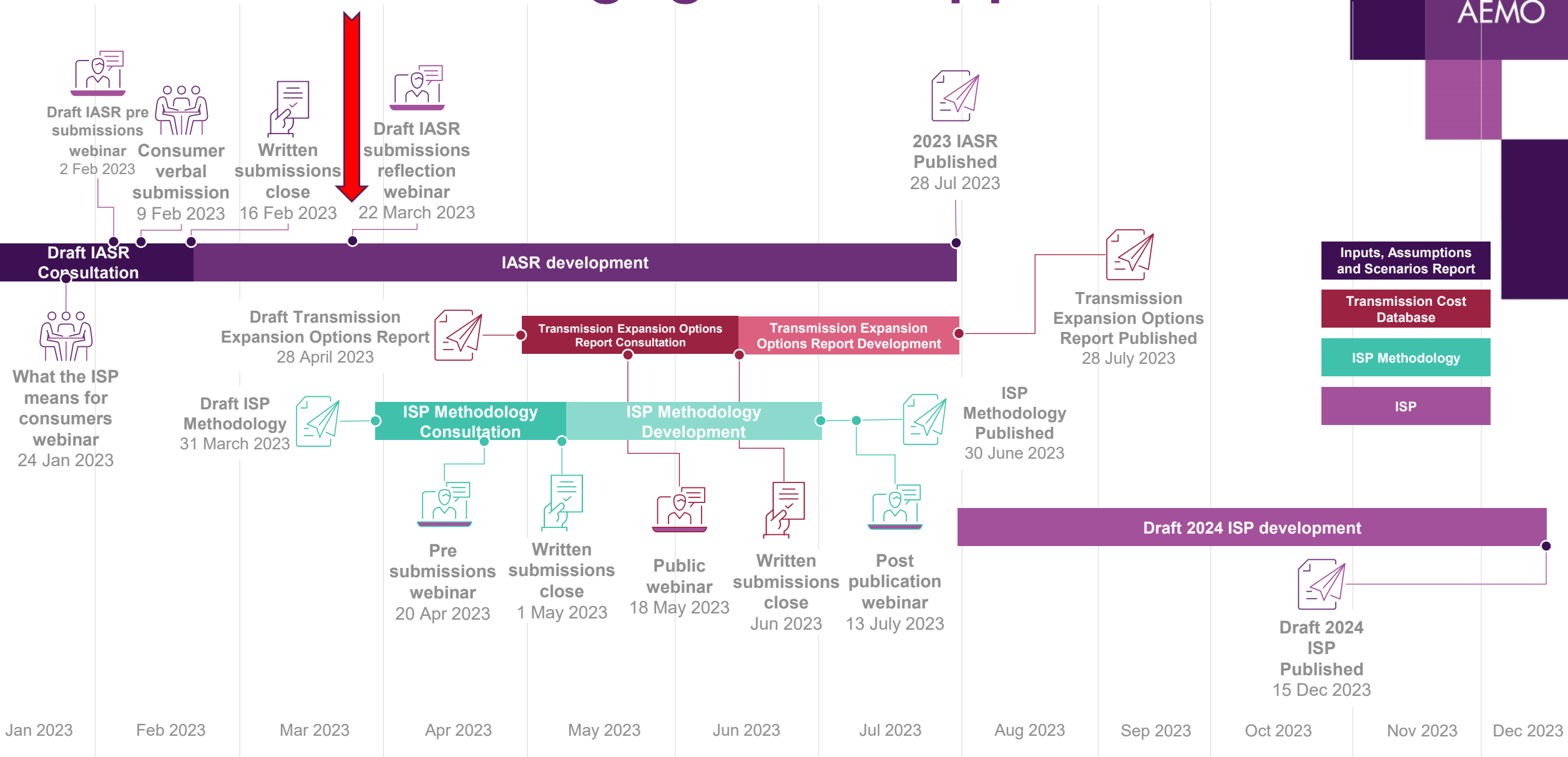
Provide an overview of the common areas of feedback from submissions



Outline next steps in developing the 2023 IASR and further engagement opportunities

AEMO will collect feedback on the content and engagement in today's session through [a post-event survey](#)

# 2023 ISP related engagement opportunities



# 68 IASR consultation submissions from a wide range of stakeholders



## Associations



## Consumer / Community



## Electricity & Gas Networks



## Generation / Retail / Developer



## Government / Consultant



## Academic / Individual



From 50 in 2021 to –  
68 submissions in 2023 (5 confidential)  
531 total pages  
380 submission points

# Overview of Draft IASR 2023 scenario settings



SCENARIO SETTINGS	1.5°C Green Energy Export	1.8°C Orchestrated Step Change	1.8°C Diverse Step Change	2.6°C Progressive Change
<b>National Decarbonisation target</b>	At least 43% emissions reduction by 2030. Net zero by 2050	At least 43% emissions reduction by 2030. Net zero by 2050	At least 43% emissions reduction by 2030. Net zero by 2050	43% emissions reduction by 2030. Net zero by 2050
<b>Global economic growth and policy coordination</b>	High economic growth, stronger coordination	Moderate economic growth, stronger coordination	Moderate economic growth, moderate coordination	Slower economic growth, lesser coordination
<b>Australian economic and demographic drivers</b>	Higher (partly driven by green energy)	Moderate	Moderate	Lower
<b>DER uptake (batteries, PV and EVs)</b>	Higher	Higher	Moderate	Lower
<b>Consumer engagement such as VPP and DSP uptake</b>	Higher	Higher	Moderate	Lower
<b>Energy Efficiency</b>	Higher	Higher	Moderate	Lower
<b>Hydrogen use</b>	Faster cost reduction. High production for domestic and export use	Allowed	Allowed	Allowed
<b>Hydrogen blending in gas network</b>	Unlimited	Up to 10%	Up to 10%	Up to 10%
<b>Biomethane/ synthetic methane</b>	Allowed, but no specific targets to introduce it	Allowed, but no specific targets to introduce it	7.5% blending target for reticulated gas by 2030 and 10% by 2035	Allowed, but no specific targets to introduce it
<b>Supply Chain barriers</b>	Less challenging	Moderate	Moderate	More challenging
<b>Global/domestic temperature settings and outcomes</b>	Applies RCP 1.9 where relevant (~ 1.5°C)	Applies RCP 2.6 where relevant (~ 1.8°C)	Applies RCP 2.6 where relevant (~ 1.8°C)	Applies RCP 4.5 where relevant (~ 2.6°C)
<b>IEA 2021 World Energy Outlook scenario</b>	NZE	SDS	APS	STEPS

# Stakeholder feedback by cohort

## Consumer and community advocates / Academics

- Align more scenarios with Australia's commitment under the Paris Climate Agreement to limit temperature increase to 1.5°C above pre-industrial levels
- Include legislated and/or funded state based policies
- Remove *2.6°C Progressive Change* scenario and replace it with another 1.5°C scenario, which does not rely on rapid hydrogen deployment in the energy system

## Market Participants/Developers

- Current "*2.6°C Progressive Change*" scenario is inconsistent with the Paris Agreement or Australia's current policies.
- The scenarios are too similar to each other and the scenario range is too narrow.
- Model sensitivities that capture key decarbonisation risks, i.e. supply chain issues, challenges associated with global competition and demand for raw materials and skilled labour

## Networks

- Encourage only firm policies that clearly meet the inclusion criteria to be included as core assumptions
- Encourage AEMO to consider providing a clear and transparent method to assess social license issues, particularly for transmission expansion analysis.
- Further consideration of public policy criteria to include state and federal governments emission reduction proposals

## Associations

- Recommends the inclusion of a second scenario consistent with 1.5°C, with a stronger focus on domestic decarbonisation.
- Cost of carbon emissions must now be formally accounted for by regulatory decision makers, AEMO must therefore carefully assess all of its scenarios, inputs and assumptions.
- Important include state, federal policies in addition to current national goal deliver 43% emissions reduction by 2030







# Scenarios



## 1.5°C Green Energy Export

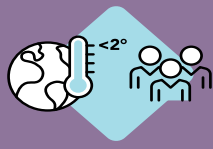
Many submissions were concerned with the cost and technical feasibility of hydrogen blending.

Mixed views on the scale of hydrogen, with more doubting than supporting.

**Many submissions sought a non-hydrogen 1.5°C scenario.**

Some confusion over biomethane's role in the scenario, and some concerns over fugitive emissions from hydrogen.

Some concerns that consumers would bear the scenario's infrastructure costs



## 1.8°C Orchestrated Step Change

**General support**, with range of views on consumer appetite for orchestration.

Some enthusiasm for inclusion of tariff reform and DSP.

Some concern about grid interactions (i.e., DNSP hosting capacity)

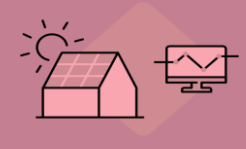
**Possibility of combining the two 1.8°C Step Change scenarios**



## 1.8°C Diverse Step Change

**Mixed views**, including more/less CER and VPP.

Some dislike of the gas and biomethane components of the scenario. Some considered government support for gas as implausible, but in contrast, some commented that more social licence was required to move away from existing gas use



## 2.6°C Progressive Change

**Frequent concern that the scenario was inconsistent with Paris Agreement commitments, some proposed removing the scenario.**

Mixed views on other scenario settings, but more wanted further downside exploration.

A wider spread of scenarios  
Consideration of resilience, especially to climate change

Strong electrification  
Inform policy, not just respond to it

# Electrification

## Support for a strong electrification scenario or sensitivity

Six submissions supported the inclusion of a strong electrification scenario or at least a sensitivity; two further suggested coupling with strong energy efficiency.

## Consideration of cost, investment decisions and consumer behaviour

Eight submissions sought consideration of: costs to consumers to convert appliances; technical barriers such as space limitations; individual investment decisions of firms; network augmentation costs; or cost of stranded gas assets.

## Magnitude of electrification

Two submissions suggested electrification was too strong and ignored wider biofuel options or policy lag. Views differed on *2.6°C Progressive Change* electrification, with one suggesting moderation, and two supporting an increase citing the 2022 ISP *Step Change* scenario and South Australian evidence.

## Compatibility with other scenario settings

Submissions queried the compatibility of electrification with other scenario settings, including strong hydrogen in *1.5°C Green Energy Exports*, and whether strong electrification should be paired with a strong economy.

# Other consumption drivers

## Energy efficiency

Submissions sought more detailed information on policy inclusion; one suggested that AEMO put forward policy options. Others suggested settings were too high or low.

## Large industrial loads

Submissions suggested including committed and prospective loads to capture the high load growth expected in some regions.

## Economic and population drivers

Submissions reinforced the need to match economic outcomes with load growth. They also queried whether AEMO's forecasts matched recent trends or considered recent government strategies.

## Fuel pricing

One submission suggested that high gas prices incentivises fuel switching to electricity or alternative gas. This reduced gas demand will not return.

# Generator assumptions

## Candidate technology options

A number of additional technologies were proposed: waste to energy, nuclear, high-efficiency-low-emissions coal, thermal storage and other alternative storage technologies. Submissions supported the categories of fixed and floating offshore wind.

## Build costs – supply chain considerations

Submissions emphasized consideration of supply chain constraints in Gencost, including how they are modelled, and the assumption they will ease in the late 2020s (with both support and skepticism expressed).

## Financial parameters / Discount rates

Feedback on discount rates included:

- It appears to be low,
- alternatively AEMO to consider a more long-term approach to setting the discount rate with current challenges not overly influencing it, and
- it could be made more clear how it reflects AER guideline requirements

A number of submissions commented on AEMO's proposed approach to model an offshore wind sensitivity.

## Offshore wind sensitivity

Submissions were split, with some considering appropriate AEMO's proposed approach to model Victoria's targets as a sensitivity and not be part of the core scenario settings. Others argued for either more clarity on its exclusion relative to other policies, or for its outright inclusion within core scenarios.

# Social licence (transmission and REZ)

## Transmission network costs and generator connection costs

Broadly supported, although one submission noted a limited level of accuracy in applying these costs; they should not be relied upon in the ISP cost-benefit analysis. Furthermore, sensitivities to additional supply chain cost increases are required.

## Project lead time

Stakeholders broadly supported applying a sensitivity to reflect longer lead times (project execution, commissioning delays, and late community engagement).

## Land use-penalty factors

Some submissions disagreed with the use of land use-penalty factors and suggested AEMO apply strategic land use mapping analysis (by TNSPs or others) or detailed multi-criteria analysis (MCA).

## Social licence sensitivity Strong support for inclusion of sensitivity

Many organisations submitted on this topic, with one suggesting a sensitivity where 50% of developments are cancelled as a worst-case scenario

# Carbon emissions

## Carbon sequestration

Submissions expressed concern with the level of carbon sequestration assumed across the scenario collection, as well as the presence of Direct Air Capture technologies in the multi-sectoral modelling.

## State emission targets

Some submissions argued that AEMO should endeavour to include economy-wide state-level emission targets in its modelling. Others suggested to only include legislated targets.

## Other sensitivities

Stakeholders noted potential sensitivities for consideration:

- Strong Electrification, as per 2022 ISP
- Supply chain constraints
- Alternative build costs
- Pumped Hydro Energy Storage project execution risks



# Hydrogen

## Steam Methane Reforming (SMR) with Carbon Capture and Storage (CCS)

Submissions questioned the ability to meet emissions targets if SMR is used, and potential competition from Autothermal Reforming (ATR)

## Fugitive emissions of hydrogen

Submissions were concerned about pipeline leakage rates, and Hydrogen itself being an indirect greenhouse gas

## Transporting hydrogen

Submissions raised the issue of transporting molecules or electrons in the hydrogen value chain, with concerns that ignoring molecular transport would significantly overestimate the amount of electrical transmission needed

## Hydrogen blending in distribution pipelines

Submissions questioned the technical feasibility of hydrogen blending in pipelines. Economic feasibility was also questioned, given the very low efficiency of using hydrogen for heating and significant upgrade costs required.

# Fuel price forecasts and generator performance

## Fuel Price Forecast

Two submissions supported the need for a review of gas price forecasts, once Government interventions become clearer.

## Interaction between gas and electricity systems

Submissions raised concerns on the availability of gas supply for generation, as well as the impacts of forecast gas prices on fuel switching from gas to electricity on the demand side.

## Operation of storage

One submission “encourages AEMO’s ongoing investigation around modelling of storage behaviours and the role of perfect foresight,” expressing concern that perfect foresight and absence of ancillary services from market models lead to a potential overestimate of storage performance

## Generator performance data

One stakeholder asked for more transparency on how generator performance settings (seasonal ratings, heat rates, minimum stable levels, etc) are sourced and verified

# Demand side participation (DSP)

Stakeholders asked for additional information about DSP and other flexible demand sources

Two submissions sought more detailed information on DSP, similar to what is available for other sources of flexible demand, such as batteries and EV.

Bottom-up study should be undertaken to validate DSP potential (and Energy Management more widely)

Two submissions sought validation of the 8.5% of peak demand estimate used. One was suggesting this for DSP alone and one for energy management (including energy efficiency) more broadly.

The DSP assumptions and reasoning for specific scenarios were questioned

Three submissions sought more clarity on DSP assumptions, with one recommending increased DSP in the *1.8°C Orchestrated Step Change* scenario.

The ability of DSP to affect minimum demand was pointed out including that electrification might grow this potential

One submission stated that electrification was likely to increase the amount of flexible demand sources, noting that DSP served markets beyond energy arbitrage (like FCAS, min demand)

# Next Steps

Provide feedback on the content and engagement of today’s webinar, through [this post event survey](#)

Further 2024 ISP related engagement opportunities	Date
<b>March FRG – Energy Efficiency</b>	<b>29 March 2023</b>
<i>Draft ISP Methodology Published</i>	<i>31 March 2023</i>
<i>ISP Methodology – pre submissions webinar</i>	<i>20 April 2023</i>
<i>Draft Transmission Expansion Options Report published</i>	<i>28 April 2023</i>
<i>Transmission Expansion Options Report – pre submissions webinar</i>	<i>18 May 2023</i>
<i>Final ISP Methodology published</i>	<i>End June 2023</i>
<i>ISP Methodology publication webinar</i>	<i>13 July 2023</i>
<b>Final IASR published</b>	<b>28 July 2023</b>
<i>Transmission Expansion Options Report published</i>	<i>28 July 2023</i>

Key  
**IASR**  
*ISP Methodology*  
*Other ISP related*



# ISP Methodology

AEMO will release a consultation paper and draft ISP Methodology on 31 March 2023. Written submissions are requested to [ISP@aemo.com.au](mailto:ISP@aemo.com.au) by 1 May 2023. The final updated ISP Methodology will be released in June 2023. Key update topics are listed below.

Transmission project lead time uncertainty

Impact of fossil-fuelled generation on REZ transmission limits

Network losses between REZs and sub-regions

Assumed renewable energy resource quality

Potential inclusion of a value of carbon emissions

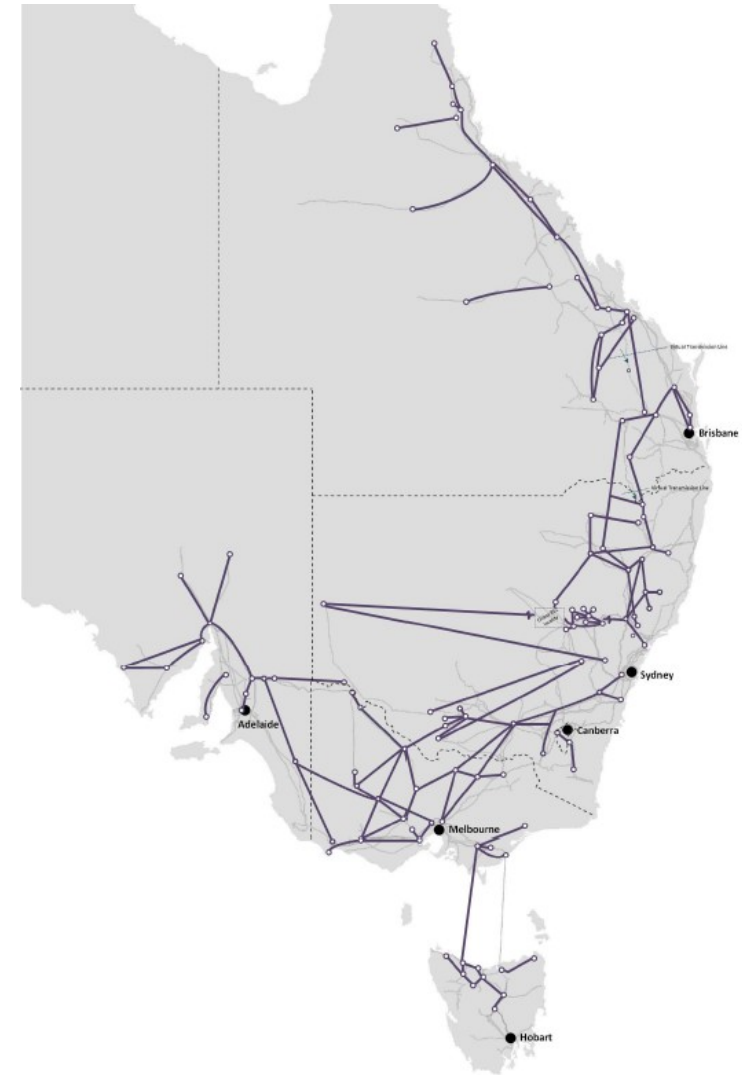
Consumer risk preferences

Dispatch behaviour of short-duration storage devices

Duration of demand-side participation response

# Transmission Expansion Options Report

- The report packages up network expansion options and is provided as input to the ISP market modelling. The model then has the technical and economic information required to optimise transmission investments with generation and storage.
- The report is prepared with advice and feedback from the transmission network service providers and relevant government organisations. AEMO conducts due diligence on network options.
- Many of these projects are at an early, conceptual phase. The expansion options in the report will ultimately be fed into the Draft 2024 ISP for further consultation.
- The Draft Transmission Expansion Options Report will be released on 28 April 2023. AEMO will welcome stakeholder feedback on the contents of the report to [ISP@aemo.com.au](mailto:ISP@aemo.com.au) by end June 2023.







For more information visit

[aemo.com.au](http://aemo.com.au)