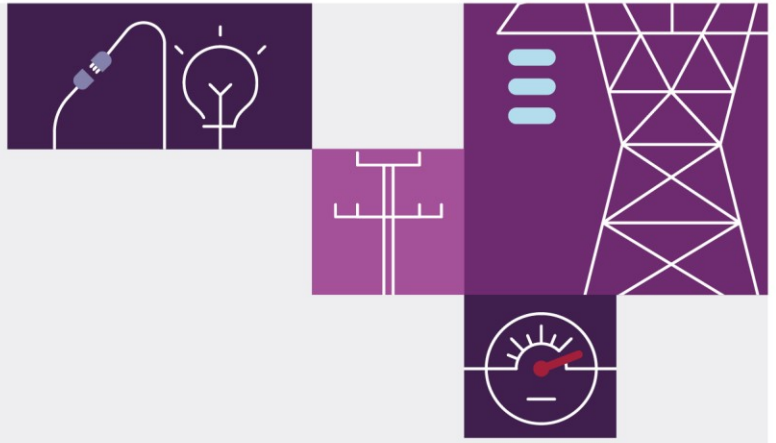


# Appendix 1. Stakeholder Engagement

June 2024

Appendix to the 2024  
Integrated System Plan for the  
National Electricity Market





# Important notice

## Purpose

AEMO has prepared this document to provide information about stakeholder engagement to develop the 2024 Integrated System Plan (ISP), as at the date of publication.

## Disclaimer

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## Version control

Version	Release date	Changes
1	26/6/2024	First release



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## Executive summary

AEMO's *Integrated System Plan* (ISP) is a roadmap for the transition of the National Electricity Market (NEM) power system, with a clear plan for essential infrastructure that will meet future energy needs. The ISP's optimal development path (ODP) sets out the needed generation, storage and network investments to transition to net zero by 2050 through current policy settings and deliver significant net market benefits for consumers.

Development of the 2024 ISP draws on extensive stakeholder engagement and power system planning expertise to develop a roadmap in the long-term interests of consumers. To ensure its quality, accuracy, and suitability, the 2024 ISP must reflect a broad range of stakeholder input.

The 2024 ISP Stakeholder Engagement Strategy<sup>1</sup> articulates how AEMO intended to engage with stakeholders on the development of the 2024 ISP, while this Appendix provides an overview of the engagement that has been undertaken in the delivery of that strategy. This includes a particular focus on the stakeholder engagement journey, stakeholder feedback, and how stakeholder feedback has impacted AEMO's planning and development of the 2024 ISP.

AEMO strives to give all stakeholders as much opportunity as possible to be engaged in ISP planning approach and guide its direction to ensure the best possible outcome.

The engagement opportunities planned at the start of the two-year cycle were delivered as expected and AEMO has appreciated the input and feedback provided by stakeholders at all key development stages of the 2024 ISP (see 2024 ISP Timetable<sup>2</sup>). AEMO recognises it takes considerable time and effort for stakeholders to engage with ISP planning and looks forward to future engagement.

AEMO is committed to evolving and improving the engagement approach with all stakeholders and welcome any feedback on the 2024 ISP Stakeholder Engagement Strategy via email at [ISP@aemo.com.au](mailto:ISP@aemo.com.au).

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<sup>1</sup> The 2024 ISP Stakeholder Engagement Strategy is available on AEMO's website, at <https://aemo.com.au/-/media/files/major-publications/isp/2023/2024-isp-stakeholder-engagement-strategy.pdf?la=en>.

<sup>2</sup> The 2024 ISP Timetable is also available as a separate document, with additional information, at <https://aemo.com.au/-/media/files/major-publications/isp/2022/2024-isp-timetable.pdf?la=en>.

### Key changes from the Draft 2024 ISP

- Stakeholder consultation summary of the Draft 2024 ISP, and AEMO's response. Some of the key changes adopted in the final 2024 ISP include:
  - AEMO undertook further analysis to explore limitations on gas infrastructure and resultant higher fuel costs for GPG and has adapted its modelling inputs and included greater detail on this issue.
  - AEMO included stakeholders' recommendation to model the impact of combined delivery risks by running the *Constrained Supply Chains* sensitivity with updated input parameters.
  - AEMO prepared additional sensitivities to explore low hydrogen electrolyser flexibility, reduced consumer energy resources coordination, additional industrial load in the NEM, and impacts of revisions to the electric vehicle forecast.
  - AEMO considered feedback on the role of the ISP in emphasising workforce needs and has provided workforce projections in the 2024 ISP.
- Consultation summary for the AER's transparency review of the Draft 2024 ISP.



## A1.1 Engagement program overview

Engagement to inform the development of the 2024 ISP was carried out regularly over two years from September 2022 to June 2024, with multiple opportunities for stakeholder input. AEMO's stakeholders include consumers and advocates, industry, market bodies, government, and other interested stakeholders such as environmental groups, academics, and energy industry consultants.

The focus of AEMO's engagement commenced with consulting on inputs, assumptions, and scenarios, and how they are applied in the ISP modelling. This was followed by engagement on the findings of the Draft 2024 ISP and AEMO's reasoning, considerations and analysis supporting the selection of its optimal development path (ODP). Continued engagement since the publication of the Draft 2024 ISP enabled the development of the 2024 ISP, thereby providing a roadmap to inform investment and deliver needed infrastructure for the power system.

AEMO's engagement goal for the 2024 ISP:

Provide stakeholders with appropriate time and opportunity to enable meaningful input into AEMO's planning. Stakeholder views to shape AEMO's modelling and decisions, to create a plan for the efficient development of a safe, reliable, and affordable power system, for the benefit of all Australians, while enabling a net zero future.

The goal AEMO set for the engagement program was used to guide the engagement approach and ensure, where possible, that the 2024 ISP reflects stakeholder needs and expectations.

### A1.1.1 Stakeholder engagement journey

Over the past two years, AEMO has strived to give all stakeholders as much opportunity as possible to get involved in the development of the 2024 ISP.

Table 1 highlights the key activities throughout the stakeholder journey, and the engagement outcomes aligned with the IAP2 Public Participation Spectrum<sup>3</sup>.

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<sup>3</sup> International Association for Public Participation. IAP2 Public Participation Spectrum. At <https://iap2.org.au/resources/spectrum/>. Viewed June 2024.

Table 1 2024 ISP engagement program activity

Stage	IAP2 Goal	Key activities	Output
1. Preliminary engagement	Collaborate	Set up the 2024 ISP Consumer Panel <sup>A</sup> and develop an engagement strategy.	<ul style="list-style-type: none"> <li>Four panel members commenced 7 September 2022; over 40 meetings held over two years to seek advice on key ISP topics.</li> <li>2024 ISP Stakeholder Engagement Strategy delivered July 2023.</li> <li>Delphi Panel design September 2023.</li> </ul>
		Set up AEMO's Advisory Council on Social Licence. <sup>B</sup>	<ul style="list-style-type: none"> <li>Council established on 30 November 2022, six meetings held since November 2022.</li> </ul>
2. 2023 IASR	Consult	Across 12 months: <ul style="list-style-type: none"> <li>Six webinars.</li> <li>Two consumer advocate sessions.</li> <li>Seven government briefings and prior consultations across all jurisdictions.</li> <li>Three dedicated stakeholder briefings.</li> <li>One Delphi Panel (33 experts) to inform scenario weightings for the 2024 ISP.</li> </ul>	<ul style="list-style-type: none"> <li>909 webinar attendees.</li> <li>68 written submissions.</li> <li>One consumer advocates verbal submission with 17 attendees.</li> <li>24 reports/reference material published.</li> <li>Report, consultation summary report, 2024 ISP Consumer Panel report and infographic<sup>C</sup>.</li> </ul>
3. ISP Methodology	Consult	Across four months: <ul style="list-style-type: none"> <li>Two webinars.</li> </ul>	<ul style="list-style-type: none"> <li>25 written submissions.</li> <li>186 webinar attendees.</li> <li>Five reports published.</li> </ul>
4. 2023 Transmission Expansion Options Report	Consult	Across four months: <ul style="list-style-type: none"> <li>Two webinars.</li> <li>Five targeted engagements, including two consumer advocate sessions.</li> <li>Two government briefings.</li> <li>Regular joint planning with Transmission Network Service Providers (TNSPs)</li> </ul>	<ul style="list-style-type: none"> <li>22 written submissions.</li> <li>276 webinar attendees.</li> <li>One joint consumer advocates verbal submission.</li> <li>13 reports/reference material published.</li> </ul>
5. Draft 2024 ISP	Consult	Across five months: <ul style="list-style-type: none"> <li>Two webinars.</li> <li>Two consumer advocate sessions including a verbal comment session.</li> <li>Additional consultation on the Draft 2024 ISP Addendum<sup>D</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>97 written submissions.</li> <li>649 webinar attendees.</li> <li>One ISP Consumer Panel report.</li> <li>One joint consumer advocates verbal submission (six consumer advocates).</li> <li>Four written submissions to the Draft 2024 ISP addendum consultation.</li> </ul>

A. At <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/isp-consumer-panel>.

B. At <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/social-licence-advisory-council>.

C. At <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-iasr-infographic.pdf>.

D. At: <https://aemo.com.au/consultations/current-and-closed-consultations/draft-2024-isp-addendum-consultation>.



## A1.2 Stakeholder feedback – key themes

AEMO considers all stakeholder feedback and summarises material issues from submissions into themes and AEMO responses in consultation summary reports. Table 2 below highlights the key feedback topics for each consultation.

**Table 2 Key themes of consultation feedback**

Consultation	Key feedback topics
<b>Draft 2024 ISP</b>	<ul style="list-style-type: none"> <li>• Consumer energy resources &amp; distribution networks</li> <li>• Modelling approach</li> <li>• Generation &amp; storage developments</li> <li>• Social licence</li> <li>• Delivery risks</li> <li>• Role of gas</li> <li>• Actionable projects</li> <li>• Demand forecast</li> <li>• Communication</li> <li>• Hydrogen</li> </ul> <p>For more information see the <i>2024 ISP Consultation Summary Report</i> June 2024<sup>A</sup></p>
<b>2023 IASR</b>	<ul style="list-style-type: none"> <li>• Scenario design</li> <li>• Generation &amp; demand</li> <li>• Renewable Energy Zones (REZ)</li> <li>• Social licence</li> <li>• Transmission</li> <li>• Hydrogen</li> </ul> <p>For more information see the <i>2023 IASR Consultation Summary Report</i><sup>B</sup>– July 2023.</p>
<b>2023 ISP Methodology</b>	<ul style="list-style-type: none"> <li>• Value of carbon emissions / value of greenhouse gas emissions reduction (VER)</li> <li>• Storage dispatch behaviour</li> <li>• Consumer risk preferences</li> <li>• Transmission project lead time uncertainty</li> <li>• REZ transmission limits</li> <li>• Renewable resource quality</li> <li>• Demand side participation (DSP) Network losses</li> </ul> <p>For more information, see the <i>Consultation summary report – Update to the ISP Methodology</i> June 2023<sup>C</sup>.</p>
<b>2023 Transmission Expansion Options Report</b>	<ul style="list-style-type: none"> <li>• Approach to forecasting transmission costs</li> <li>• Transmission expansion options, including design, lead time, location, and cost estimate</li> <li>• Calculation of approximate generation connection costs</li> <li>• An update to AEMO's transmission cost database</li> </ul> <p>For more information, see the <i>2023 Transmission Expansion Options Consultation Summary Report</i><sup>D</sup> July 2023.</p>

A. 2024 ISP Consultation Summary Report on <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>.

B. See <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-iasr-consultation-summary-report.pdf>.

C. See [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf).

D. See <https://aemo.com.au/-/media/files/major-publications/isp/2023/consultation-summary-report---2023-transmission-expansion-options-report.pdf>.



## A1.3 Preliminary engagement

### A1.3.1 Engagement strategy development

The purpose of the 2024 ISP engagement strategy was to articulate AEMO's stakeholder engagement for developing the 2024 ISP.

In developing the engagement program, AEMO recognised the challenges of engaging with highly technical subject matter that is broad in scope, involving a range of stakeholders across the NEM. AEMO took time to map major engagement priorities and determine the scope of engagement to ensure guidance was provided to stakeholders on how they could get involved and participate in consultation<sup>4</sup>.

The Australian Energy Regulator's (AER's) Forecasting Best Practice Guidelines<sup>5</sup> provide consultation requirements and invaluable guidance for AEMO on the expectations for a genuine, reasonable, and efficient engagement process.

AEMO consulted with the 2024 ISP Consumer Panel on the engagement strategy and will apply learnings for future engagement processes in development of the 2026 ISP and, where relevant, other activities and work.

### A1.3.2 Engagement approach

Throughout the engagement program, AEMO's approach was to provide stakeholders with a range of opportunities to consult, collaborate or co-design on relevant elements of the 2024 ISP.

This section provides detail on how AEMO approached engagement for the development of the 2024 ISP including principles and commitments, engagement scope, stakeholders engaged, as well as the engagement methods used.

#### Engagement stages

The 2024 ISP was developed across the following key stages with engagement occurring at each stage:

- Preliminary scenarios.
- Draft IASR development and consultation (*Transmission Expansion Options Report* is a sub-set of the IASR).
- Final IASR development and *Transmission Expansion Options Report*.
- *ISP Methodology* development and consultation.
- Final *ISP Methodology* development.
- Draft ISP development.
- Draft ISP consultation beginning with the publication of the Draft 2024 ISP.
- Final ISP development (2024 ISP published on 26 June 2024).

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<sup>4</sup> AEMO's target level of engagement is mapped against the IAP2 Spectrum of Public Participation. For further information, see <https://iap2.org.au/resources/spectrum/>.

<sup>5</sup> At <https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%202025%20August%202020.pdf>.



The 2024 ISP Timetable provides a high-level overview of the key milestones related to the 2024 ISP.

Stakeholder input is essential to the development of the 2024 ISP. Table 2 shows the stakeholder engagement AEMO undertook during 2023 to develop the 2023 IASR, the Draft 2024 ISP and the final 2024 ISP. AEMO thanks all stakeholders who have taken the time to get involved, provide submissions, and attend webinars.

### A1.3.3 Engagement process and opportunities

The 2024 ISP stakeholder engagement strategy has been implemented to prepare the final 2024 ISP. A copy of the engagement strategy and past engagements including webinar recordings are on the 2024 ISP Stakeholder Engagement webpage<sup>6</sup>.

Figure 1 outlines the consultation engagement process and status of engagement activities undertaken to develop the 2024 ISP.

If you have any questions for the AEMO ISP team, please email [ISP@aemo.com.au](mailto:ISP@aemo.com.au). Join the ISP mailing list to stay informed on current ISP engagement opportunities as we commence development of the 2026 ISP<sup>7</sup>.

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<sup>6</sup> At <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/opportunities-for-engagement>.

<sup>7</sup> Join the ISP mailing list at <https://aemo.us10.list-manage.com/subscribe?u=eae433173c2b1acb87c5b07d1&id=37df37c168>.

Figure 1 2024 ISP development process and status of report and engagement activity

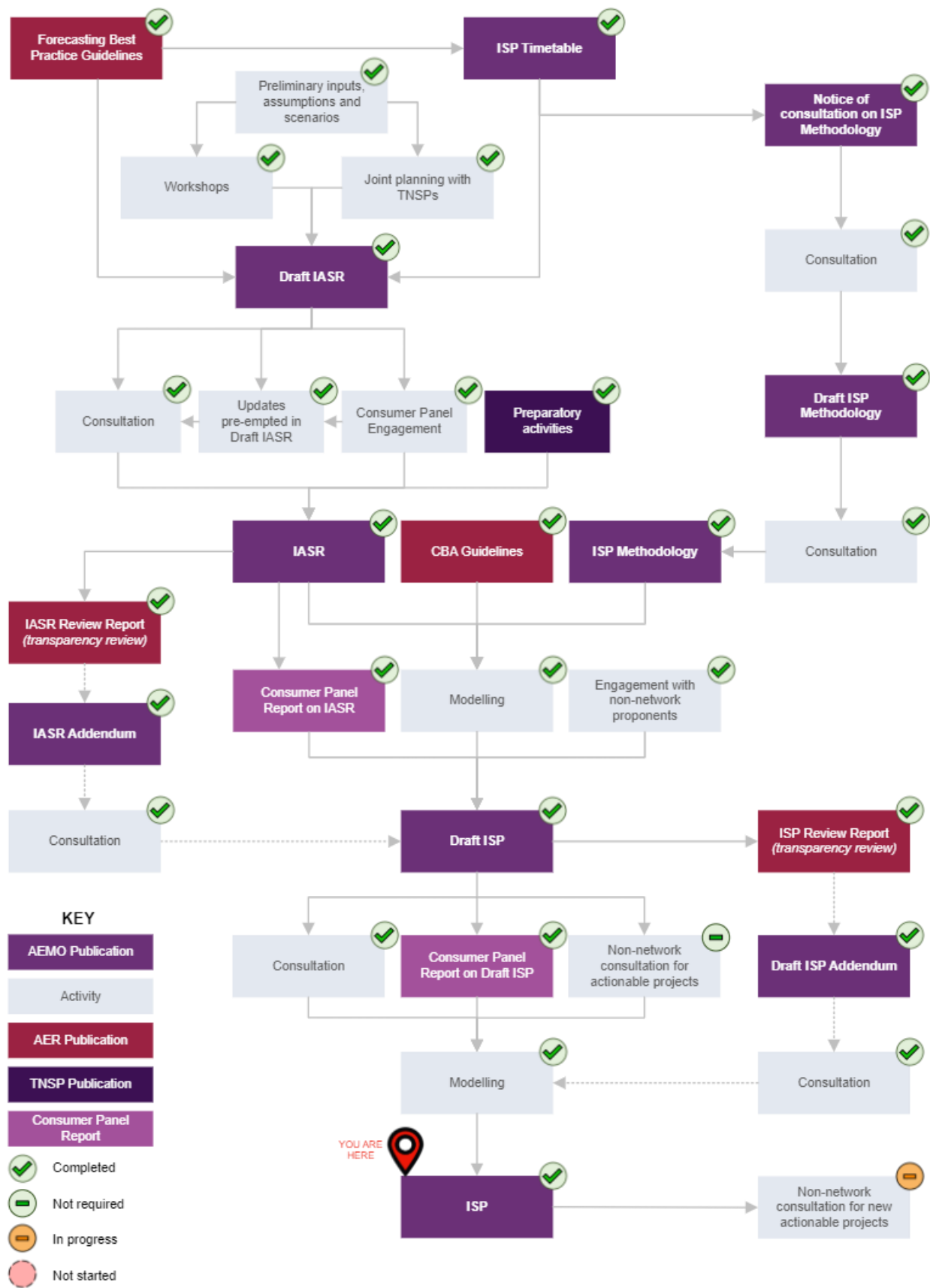
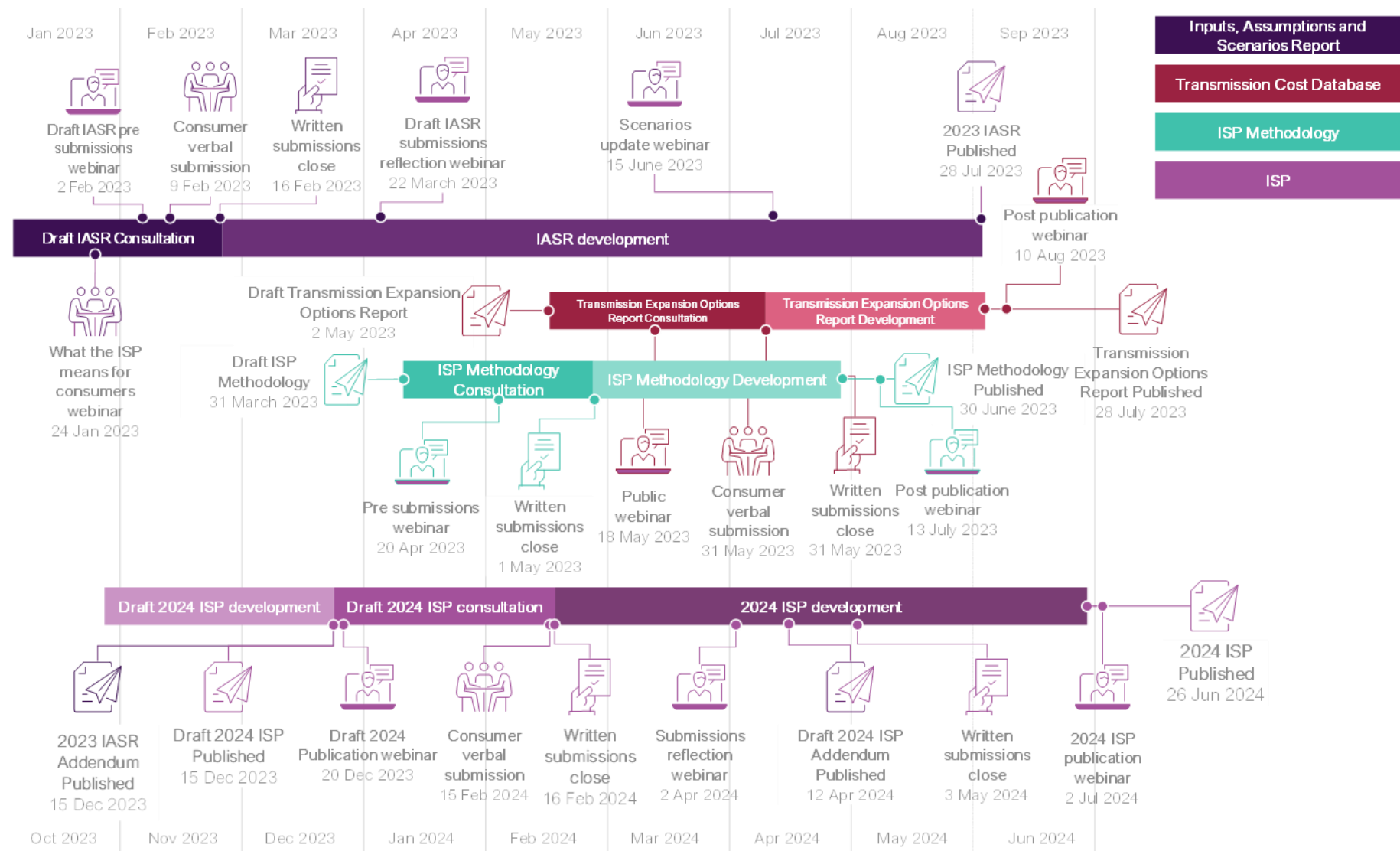


Figure 2 The 2024 ISP development cycle





## Engagement scope

AEMO’s engagement program focused on engaging on areas of its planning that matter most to consumers and stakeholders, and where they can have the greatest influence. AEMO continually informs stakeholders throughout the ISP development cycle.

Table 3 below provides an outline of the key areas that included the consult, involve and collaborate levels of IAP2 spectrum of engagement with key stakeholders.

**Table 3**     **ISP engagement scope**

Topic	Scope
Methodology	Consult stakeholders for feedback on proposed modelling, methodology and analysis.
Inputs, assumptions, and scenarios	Consult stakeholders on proposed inputs, assumptions, and sensitivities.
Transmission expansion	Collaborate with TNSPs on transmission expansion options including conceptual design, lead time, location, and cost estimate.  Consult stakeholders for feedback on methodology (design, project lead time, location, cost estimates), flow path augmentation options, REZ augmentation options and generator connection costs.
Cost/affordability	Involve the 2024 ISP Consumer Panel on cost of transmission augmentations as outlined in the 2023 <i>Transmission Expansion Options Report</i> consultation summary.
Scenario weighting	Collaborate with the 2024 ISP Consumer Panel to co-design the Delphi Panel to help determine scenario weightings for use in the 2024 ISP.

## Engagement principles and commitments

AEMO’s engagement on the 2024 ISP is underpinned by three key guiding principles:

- **Engage closely with stakeholders:** the program has been run with high levels of stakeholder engagement, including regular input from the 2024 ISP Consumer Panel on a range of matters relevant to consumers and providing industry with a forward view of options to assist with their own planning.
- **Deliver effective solutions:** AEMO works closely with market bodies, participants, and industry to ensure the solutions proposed in the 2024 ISP are practical and possible.
- **Deliver as efficiently as possible:** AEMO continually works to identify opportunities for the most cost-effective development path that does not compromise on power system safety, reliability, or security.

To deliver on engagement principles and objectives, AEMO committed to respect stakeholder time, be transparent, and tailor material for the audience. AEMO also follow the ISP regulatory requirements, including provisions in the NER and relevant AER guidelines.

View the full ISP 2024 Engagement Strategy including the ISP regulatory framework (Appendix A) on AEMO’s website<sup>8</sup>.

<sup>8</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/2024-isp-stakeholder-engagement-strategy.pdf>.



Stakeholder map

Figure 3 shows the segmentation of 2262 stakeholders that interacted with AEMO by providing submissions and attending ISP related engagement events during development of the 2024 ISP.

**Figure 3 Stakeholder segmentation of webinar attendees and consultation submissions (2262)**

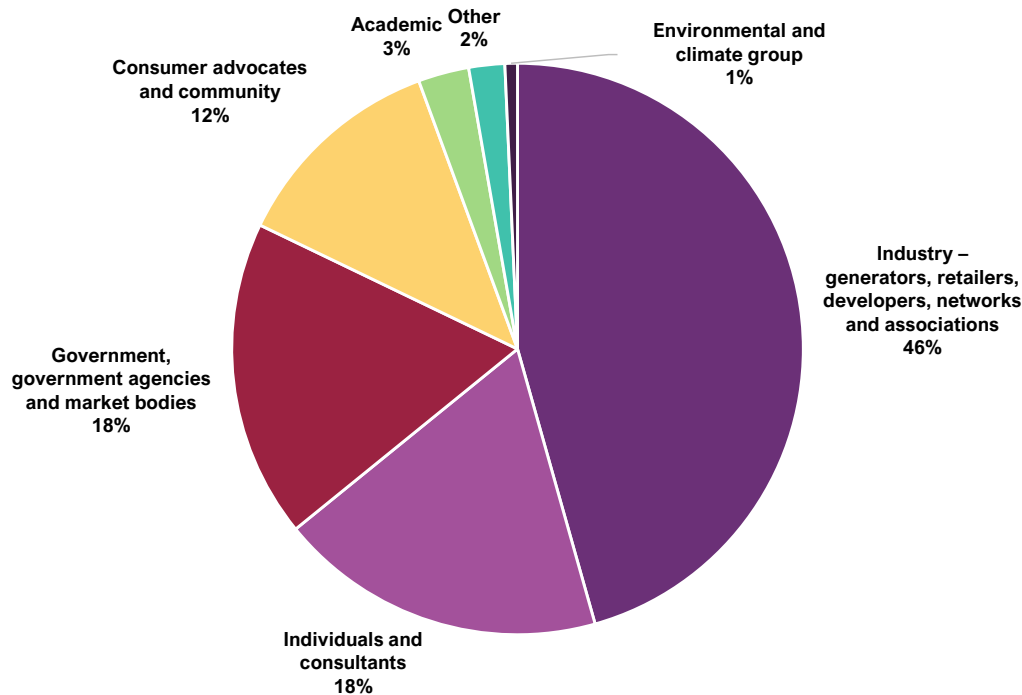
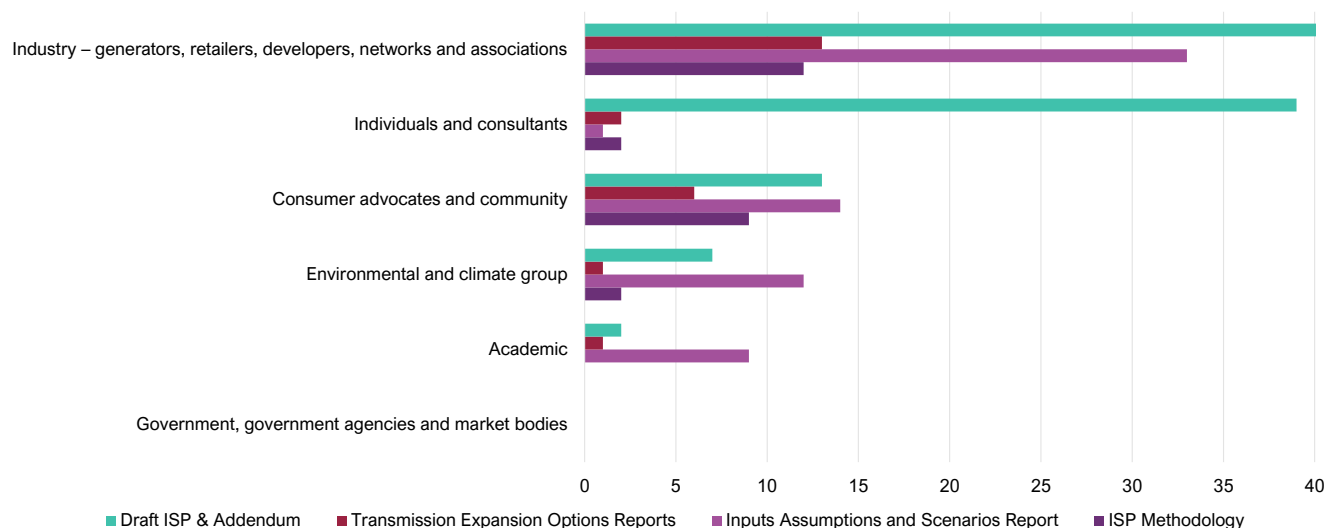


Figure 4 shows the number of submissions received by stakeholder segments on each of the four core reports consulted on that informed the development of the 2024 ISP (220 total): the *2024 ISP Methodology*, the 2023 IASR, the 2023 *Transmission Expansion Options Report*, and the Draft 2024 ISP. No submissions were received from Government, government agencies and market bodies, but they are included for completeness.

**Figure 4 2024 ISP-related consultation submissions by stakeholder segment**



## Engagement impact

Table 4 shows the key impacts of stakeholder feedback received during the development of the 2024 ISP.

**Table 4 Key consultation feedback adopted**

Topic	Outcome
<b>Social licence</b>	Developed a dedicated social licence appendix for the first time, and explored a social licence sensitivity of the risks of low social licence to the development of transmission infrastructure.
<b>Modelling</b>	<p>Development of consumer risk preference research and a quantitative metric for the first time, based on a recommendation made by the 2022 ISP Consumer Panel. AEMO published the results of the research alongside the Draft 2024 ISP.</p> <p>Changes to gas infrastructure assumptions across all three scenarios to address stakeholder feedback querying the gas results in the Draft 2024 ISP. Changes to assumptions were made to explore the ability of gas infrastructure to back up renewable supply during periods of dark and still weather and during tight supply/demand conditions, including applying additional about fuel switching and additional costs.</p> <p>Applied a value of emissions reduction, consistent with the methodology set out by Energy Ministers for an interim value of greenhouse gas emissions reduction, and the AER's draft guidance on valuing emissions reduction. Included additional renewable energy and emissions reduction policies, including the Federal Government's expanded Capacity Investment Scheme.</p> <p>An expanded supply chain sensitivity was completed for the final 2024 ISP based on stakeholder calls for sensitivity analysis to test multiple and compounding risks to delivery of the energy transition.</p> <p>Additional sensitivities were prepared to explore low hydrogen flexibility sensitivity, reduced consumer energy resources coordination, additional industrial load in the NEM, constrained supply chains, impacts of revisions to the electric vehicle forecast, and an alternative weather sequency sensitivity to test alternative weather patterns than those already in the forecast. All of these are in response to stakeholder feedback received in response to the Draft 2024 ISP.</p>
<b>Methodology</b>	<p>Aligning assumed renewable energy resource quality in REZs with historical performance by incorporating values consulted on with stakeholders through the 2023 IASR process.</p> <p>For example, directly used stakeholder feedback to apply an 80% limit for each offshore declared area (reduced from assumed 90% that was deemed too generous).</p> <p>Based on stakeholder feedback, AEMO removed its proposed amendments to limit the foresight of storage devices in the ISP capacity outlook model. In response AEMO has explored alternative approaches to perfect foresight in Appendix 4 of the 2024 ISP.</p>
<b>Scenarios</b>	<p>Changes to scenarios as part of the 2023 IASR consultation including removing the <i>Slow Change</i> scenario and changes to the <i>Progressive Change</i> scenario, mainly to align with decarbonisation policies.</p> <p>Following feedback, AEMO reconsidered the amount of hydrogen blending in the gas distribution network, with the <i>Green Energy Exports</i> scenario now featuring a maximum of 10% by volume. Hydrogen for exports and green steel remained unchanged.</p> <p>Based on feedback, the 'return-to-normal' timepoint for all technology capital costs was extended from 2027 to 2030 for the <i>Step Change</i> and <i>Green Energy Export</i> scenarios.</p>
<b>Transmission options</b>	<p>Various conceptual transmission network options changes based on close joint planning with TNSPs and jurisdictional bodies. Stakeholder feedback has been considered and fed into the process including input on conceptual design, lead time, location, and cost estimates. In particular, extensive joint planning between the draft and final ISP, as well as receipt of submissions on the Draft 2024 ISP from TNSPs, provided input changes relating to transmission network augmentations and power system limits, which were brought into the final modelling.</p> <p>Following stakeholder consultation and specialist advice, AEMO applied additional escalation factors for individual cost components (commodity prices and land cost) rather than assuming that transmission network augmentation costs would increase in-line with economy-wide inflation.</p>
<b>Cost estimates</b>	<p>Changes to transmission cost forecasts including additional forecasts following feedback.</p> <p>Revised gas and coal price forecasts to reflect changes in government policy.</p> <p>Reflected some of the costs for generation technologies (solar thermal) based on comments from stakeholders.</p>
<b>Communication and narrative</b>	Greater recognition of the role of consumer resources and distribution networks, including adding 'distribution networks' in the ISP tagline about where renewable resources are connected. In so doing, the ISP explicitly recognises CER as a significant resource in the transition and the contribution it makes, while also calling out more explicitly the input assumptions regarding coordination and alternative costs if this does not occur to the level assumed.



For a full summary of the consultation feedback and AEMO’s responses, please view:

- 2023 IASR – Consultation Summary Report<sup>9</sup>.
- Update to the *ISP Methodology* – Consultation Summary Report<sup>10</sup>.
- 2023 Transmission Expansion Options – Consultation Summary Report<sup>11</sup>.
- 2024 ISP Consultation Summary Report<sup>12</sup>.

### 2024 ISP Consumer Panel

The 2024 ISP Consumer Panel (the Panel) established by AEMO continues to be central to bringing a consumer-focused perspective to the development of the 2024 ISP, as shown in Table 5. AEMO maintained an open dialogue with the Panel to better understand consumer concerns about how the development of a new power system could affect them. The Panel did not replace broader engagement with energy consumers or their advocates in the ISP process. AEMO welcomed submissions and feedback from the broader consumer advocate community.

**Table 5** 2024 ISP Consumer Panel engagement activity

IAP2 Goal	Activity	Outcome
Consult & collaborate	Fortnightly meetings with four expert Consumer Advocates	40+ meetings resulting in collaboration a number of deliverables (below).
	Collaboration on: <ul style="list-style-type: none"><li>• Engagement strategy</li><li>• Consumer risk preferences</li><li>• Scenarios and sensitivities</li><li>• ISP Methodology</li><li>• Transmission options and costs</li><li>• 2024 ISP Delphi Panel</li></ul>	Delivery of: <ul style="list-style-type: none"><li>• Co-design of 2024 ISP Delphi Panel.</li><li>• 2023 IASR ISP Consumer Panel report.</li><li>• ISP Review – Directions Report.</li><li>• Four consultation submissions; 2024 <i>ISP Methodology</i>, 2023 IASR, 2023 <i>Transmission Expansion Options Report</i>, and the Draft 2024 ISP Report.</li></ul>

Under the National Energy Rules (NER), the Panel is required to submit two reports to AEMO, within two months of the publication of the final IASR and Draft ISP<sup>13</sup>. The Panel’s reports are required to provide their “assessment of the evidence and reasons supporting” the IASR and Draft ISP<sup>14</sup> and, in preparing these reports, the Panel “must have regard to the long-term interests of consumers”<sup>15</sup>.

<sup>9</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-iasr-consultation-summary-report.pdf>.

<sup>10</sup> At [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf).

<sup>11</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/consultation-summary-report---2023-transmission-expansion-options-report.pdf>.

<sup>12</sup> At <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>.

<sup>13</sup> NER 5.22.7(d)(1)

<sup>14</sup> NER 5.22.7(e)(1)

<sup>15</sup> NER 5.22.7(d)(2) amendments to this clause took effect on 1 February 2024 to replace reference to the long-term interests of consumers with reference to the national electricity objective.



AEMO appointed four members to the Panel on 7 September 2022. Since its creation, the Panel has engaged in great depth on numerous aspects of the development of the 2023 IASR and Draft 2024 ISP. The Panel engaged in direct discussions with AEMO on key issues every fortnight, with over 40 dedicated meetings since September 2022. The Panel has also provided extensive written advice in the form of submissions to additional consultations during the development of the 2024 ISP, including the Australian Government Review of the ISP.

There has been effective collaboration with the Panel on many topics, including:

- 2024 ISP stakeholder engagement strategy – resulting in the adoption of 14 recommendations to the strategy.
- Consumer risk preferences – participation in meetings to co-design and advise on the approach.
- Scenarios and sensitivities – discussion and input resulting in a detailed report with 42 recommendations, and participation in two social licence sensitivity workshops resulting in advice being adopted on social licence principles and parameters.
- Transmission costs – advice and input on the scope of the AEMO Transmission Cost Database and extensive recommendations for future development outlined in a 30-page submission to the 2023 *Transmission Expansion Options Report*.
- 2024 ISP Delphi Panel design for scenario weightings – full co-design of the process including panel selection and results analysis.
- Draft 2024 ISP – in their report they acknowledge that AEMO’s engagement with the Panel is up there with the best they have experienced. For further information on the Panel’s report and AEMO’s response to the recommendations please see Section A1.4.1.
- *ISP Methodology* – advice and input resulting in a formal submission.

The Panel has noted that good progress has occurred on a number of the issues identified by the 2022 Panel, including gas forecasting, the place of hydrogen in the scenarios modelled, and recognition of supply chain issues impacting on project costs and delays<sup>16</sup>.

Further information on the Panel, including terms of reference, member biographies, and all the Panel’s reports and submissions, is available on the Panel’s page of AEMO’s website<sup>17</sup>.

AEMO wishes to record once again sincere thanks to Panel members Mark Henley, Mark Grenning, Craig Memery, Beverley Hughson (appointed May 2023) and Jo De Silva (resigned April 2023). AEMO acknowledges the Panel’s significant contribution to the development of the 2024 ISP. The Panel both constructively challenged and extensively supported AEMO throughout its tenure.

AEMO announced the new 2026 Panel in April 2024<sup>18</sup> to commence at the beginning of the next two-year ISP 2026 development cycle, consistent with a key recommendation from the 2024 Panel.

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<sup>16</sup> At [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/isp-methodology-2023/submissions/17-isp-consumer-panel-isp-methodology-submission.pdf](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/submissions/17-isp-consumer-panel-isp-methodology-submission.pdf).

<sup>17</sup> At <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/isp-consumer-panel>.

<sup>18</sup> See <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/2026-isp-consumer-panel>.



Advisory Council on Social Licence

AEMO established the Advisory Council on Social Licence in November 2022 to better understand broader community sentiment, execution challenges and possible opportunities presented by the construction of new energy infrastructure. The Council has served to build AEMO’s understanding and application of a diverse range of consumer and community perspectives in its thinking, decision-making and advocacy efforts, including input to the 2024 ISP social licence considerations.

Following an early 2024 shared reflections process, Advisory Council on Social Licence members and AEMO have mutually agreed to evolve the Council into a new format that allows for more targeted consultation on an ‘as needed’ basis, aligning advocate expertise to relevant issues. This new Consumer and Community Reference Group is currently being established, and will include members representing various stakeholder segments, such as residential and business energy consumers, regional communities, Traditional Owners and environmental interest groups.

AEMO is thankful to Advisory Council on Social Licence members for their guidance and support, and looks forward to continuing its work with the new Consumer and Community Reference Group to establishing social licence in the energy transition.

For further information on social licence in the 2024 ISP, please refer to Appendix 8.

Table 6     Advisory Council on Social Licence engagement

IAP2 Goal	Activity	Outputs
Collaborate	12 experts from environment/climate, workforce, agriculture, social services, regional and economic development, and First Nations.	Six meetings since November 2022.
	Collaborated and advised on: Defining social licence and narrative. Community sentiment.	Delivery of: <ul style="list-style-type: none"><li>• Social licence appendix advice.</li><li>• Social licence sensitivity input.</li></ul>

## A1.4 Major engagements

Engagement with all stakeholders has been critical to the development of the 2024 ISP, helping improve and refine scenario development and inform forecasting, decision-making and assessment.

Consultations for the 2024 ISP commenced in July 2022 with engagement on the inputs, assumptions and scenarios to be used. It continued with further consultation and engagement that played a significant role in development of the Draft 2024 ISP. This section provides an overview of the key major engagements that have been completed to develop the final 2024 ISP.

There have been four key stages of engagement that have facilitated stakeholder involvement including the development of:

- 2023 IASR including the 2024 ISP Delphi Panel on scenario weightings, social licence sensitivities and 2024 ISP Consumer Panel report on the 2023 IASR.
- 2023 *Transmission Expansion Options Report*.
- 2023 *ISP Methodology*.
- Draft 2024 ISP.

### A1.4.1 Draft 2024 ISP

The Draft 2024 ISP<sup>19</sup> was released for public consultation on 15 December 2023. Engagement opportunities to consult on the Draft 2024 ISP to help inform the development of the final 2024 ISP included:

- A Draft 2024 ISP post publication webinar on 20 December 2023,
- A Draft 2024 ISP Consumer Advocate pre-submission webinar on 30 January 2024,
- A Consumer Advocate verbal submission session on 15 February 2024, and
- A submission reflection webinar on 2 April 2024.

AEMO received 97 written submissions, six participants in the consumer advocate verbal submissions and one ISP Consumer Panel report. The material recommendations and AEMO's responses and amendments made in response to stakeholder feedback are outlined in the Draft 2024 ISP Consultation Summary Report<sup>20</sup>.

Key themes that emerged across the submissions included: CER and distribution networks, the role of gas-powered generation, the role of hydrogen, ISP modelling approach, delivery risks facing the energy transition, social licence, communication, generation and storage technologies, actionable projects, demand forecasts and the scope of the 2026 ISP to include distributional effects and the role of demand-side energy resources.

Table 7 summarises the key themes from submissions by volume (Figure 4 earlier shows the submissions by stakeholder category). This table indicates the quantity of stakeholders comments, by cohort, for each of the key feedback themes identified by AEMO across the full set of submissions. Darker purple indicates more comments,

<sup>19</sup> The Draft 2024 ISP and overview can be viewed at <https://aemo.com.au/consultations/current-and-closed-consultations/draft-2024-isp-consultation>.

<sup>20</sup> At <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>.

lighter purple indicates fewer comments, and white areas indicate no comments. The submissions are published on the consultation page<sup>21</sup>.

**Table 7 Draft 2024 ISP top consultation submission themes**

Key themes	Industry (generators, retailers, developers, networks and associations)	Individuals and consultants	Consumer and community advocates	Environmental and climate groups	Academics
CER & distribution networks					
Modelling approach					
Generation & storage developments					
Social licence					
Delivery risks					
Role of gas					
Actionable projects					
Demand forecast					
Communication					
Hydrogen					
2026 ISP					

### 2024 ISP Consumer Panel's report on the Draft 2024 ISP

The 2024 ISP Consumer Panel provided its report<sup>22</sup> on the Draft 2024 ISP to AEMO on 16 February 2024, as required under the NER<sup>23</sup>. The key elements of the Panel's conclusions and recommendations are summarised below. The report included comment on the *Addendum to the 2023 IASR*.

The Panel identified six major recurring themes and made numerous recommendations which are summarised in Table 8 along with AEMO's responses. These include considerations for the final 2024 ISP and implications for the 2026 ISP.

The Panel also acknowledged the difficulty and complexity of understanding and mitigating risks associated with the development of the ISP, noting that AEMO will need to continue to consider new ways of forecasting and engaging on the future of the power system and how the energy transition will occur.

<sup>21</sup> At <https://aemo.com.au/consultations/current-and-closed-consultations/draft-2024-isp-consultation>.

<sup>22</sup> At [isp-consumer-panel-report---draft-2024-isp.pdf \(aemo.com.au\)](#).

<sup>23</sup> NER 5.22.7(d)

AEMO will work with the 2026 ISP Consumer Panel on the further consideration and implementation, where possible, of these recommendations in the 2026 ISP cycle.

Table 8 2024 ISP Consumer Panel recommendations on the Draft ISP

Theme	Recommendation	AEMO response
<b>Overall framing<sup>24</sup></b>	<p>The ISP Consumer Panel recommend that the ISP should be framed as a transmission plan rather than a whole of system plan, as demand side options are not optimised as an output of the ISP modelling process.</p> <p>The Consumer Panel considers that this matter should be reflected in the tagline used to summarise parts of the ISP (that is, AEMO's variations on the statement that "with coal retiring, renewable energy connected with transmission, firmed with storage and backed up by gas-powered generation is the lowest cost way to supply electricity to homes and businesses throughout Australia's transition to a net zero economy."). The ISP Consumer Panel suggests an alternate tagline.</p> <p>The ISP is required to include government energy and climate policies across all scenarios and in the ODP if they meet thresholds specified in the National Electricity Rules. The ISP Consumer Panel is concerned that this "constrains the transparency of results for consumers", and that "the more that policy expansion continues, the less the result will be an Optimal Development Plan from a consumer perspective."</p>	<p>AEMO acknowledges that the ISP model currently optimises for supply side developments, while taking demand side behaviours in the electricity system as an input. The ISP takes a scenario-based approach to planning. Each ISP scenario contains a demand side development outlook consistent with the parameters of the scenario and the ISP model determines the supply side investments.</p> <p>AEMO recognises the contribution of demand side developments and has updated the main finding tagline to reflect this by including reference to renewable energy connected by distribution networks as well as transmission. In addition, supporting documentation for the ISP (such as the Addendum to the Draft 2024 ISP) provides greater detail about the forecasting approach taken for demand side options.</p> <p>AEMO agrees that further efforts to co-optimize supply side and demand side developments is valuable and AEMO is exploring this as per the Energy and Climate Change Ministerial Council (ECCMC) recommendations for incorporation into the 2026 ISP.</p> <p>AEMO agrees that the inclusion of government policies and targets in the ISP modelling do influence the suite of developments which are identified as an output of the model. AEMO considers that it is appropriate to include committed government policy in the ISP, consistent with the National Electricity Rules, to ensure that the ODP remains within the bounds of the policies underway for delivery by the Australian state and federal governments.</p> <p>AEMO has not sought to evaluate the impact of each policy or target in isolation through the ISP, as this is not the role of the ISP and would introduce further complexity and uncertainty into the modelling process. It is true that transparency of results for consumers is very important, and AEMO has sought to include as much detail as possible about the inclusion of government policies, such as through the addition of content in the Addendum to the Draft 2024 ISP.</p>
<b>Affordability</b>	<p>The ISP should not make any judgements about affordability as allocating responsibility for funding the ODP is outside the scope of the ISP, and the ISP does not publish forecasts of retail prices.</p> <p>AEMO should provide more clarity about whether it considers that its approach to measuring consumer affordability is valid, and develop measures of the distributional impacts of the ISP.</p>	<p>AEMO agrees that energy affordability for consumers is extremely important. Although allocating funding responsibilities for the ODP sits outside the ISP's remit, AEMO considers some commentary on affordability to be valid as the ODP is selected to deliver the highest net market benefits while also ensuring secure and reliable electricity supply and emissions reduction.</p> <p>AEMO considers this approach to be consistent with the National Electricity Objective to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers "with respect to price".</p>

<sup>24</sup> Overall framing addresses the 'Transmission' Plan vs 'whole of system' plan, and constrained ODP themes.

Theme	Recommendation	AEMO response
		As discussed in Appendix 6, all else being equal, the least-cost development paths under each of AEMO's three scenarios provide net market benefits across the ISP planning horizon when compared with the counterfactual. That is, the counterfactual would result in higher long-term energy costs, leading to worse affordability for consumers.
<b>Actionable projects</b>	Clarify the status of Project Marinus Stage 2 as an actionable project given that the optimal delivery is in the 2030s and in some scenarios is beyond the nominated project proponent date. AEMO should provide further justification to support Project Marinus Stage 2 as an actionable project and demonstrate compliance with the AER's Cost Benefit Analysis Guidelines to balance the risk of overinvestment against underinvestment.	<p>AEMO has provided additional explanation of the case for Project Marinus Stage 2 in section 3.3.2 of the 2024 ISP Consultation Summary Report, and in Appendix 6 Cost Benefit Analysis of the final 2024 ISP.</p> <p>AEMO continues to find that Project Marinus is an actionable ISP project – both Stage 1 and Stage 2 – with a CDP including Stage 2 being identified as the path with the greatest weighted net market benefits, as well as one of the most resilient development paths, and delivering the highest-ranked weighted net market benefits across the majority of sensitivity analyses undertaken.</p> <p>AEMO considers that the selection of the ODP for the final 2024 ISP is consistent with the AER's Cost Benefit Analysis Guidelines as they relate to the requirement for AEMO to consider consumer risk preferences. AEMO considers that the identified net market benefits from Project Marinus (Stages 1 and 2) strikes the right balance of risk to consumers. Underinvestment in this project could mean that consumers do not receive the benefits of the project, namely access to low-cost renewable generation and security of supply.</p>
<b>Delivery risks<sup>25</sup></b>	<p>Include a sensitivity on project timing relating to a delay in planning and environmental approvals for electricity infrastructure.</p> <p>The ISP should advocate for mechanisms, policies and practices that will help deliver the ODP. AEMO should consider more commentary on policy responses to mitigate the risks discussed in Chapter 8 of the ISP regarding policy and market settings.</p>	<p>AEMO has conducted a combined risk sensitivity in the final 2024 ISP and supply chain constrained sensitivity in the Draft 2024 ISP. These sensitivities include delays to transmission and generation developments and though not specifically intended to reflect approval delays, these sensitivities do by proxy demonstrate the impact of delay. AEMO has also based the delay to lead time of generation developments on real world project outcomes, which allows some capture of recent approval times. AEMO therefore has not conducted additional sensitivities to test the delays due to planning and environmental approvals.</p> <p>AEMO recognises the importance of mechanisms, policies and practices for delivering the ODP and has highlighted the risks facing the energy transition in this area in the 2024 ISP. AEMO will continue to work with governments, network organisations, developers, and other industry participants to support the timely progression of the work needed to deliver the energy transition.</p>

<sup>25</sup> AEMO considers this to be the 'how?' theme and is discussed further in section 3.2 of the 2024 ISP Consultation Summary Report

Theme	Recommendation	AEMO response
<b>CER &amp; distribution network</b>	AEMO and the ISP Consumer Panel to consider implications of the Energy Security Board findings in February 2024 on the role of CER in the transformation of the NEM, as part of finalising the 2024 ISP <sup>26</sup> .	AEMO has considered insights from the Energy Security Board report. As the report makes recommendations rather than final determinations or rules, AEMO has not incorporated modelling any changes into the final ISP as a result of the report. Rather, AEMO will continue to progress reform in this area with the Energy Security Board (now known as the Energy Advisory Panel) and other market institutions through separate reform processes.
<b>Communication</b>	<p>The final 2024 ISP should discuss the following points in further detail:</p> <ul style="list-style-type: none"> <li>information to customers about the cost challenges, as well as 'common good' benefits of the ISP and related transition costs</li> <li>application of the AER's Cost Benefit Analysis Guidelines and its limitations in a consumer summary</li> <li>the risk of forecast errors in the executive summary and in Appendix 6</li> <li>the downside impact of connection to international material and equipment markets more explicitly</li> <li>judgement applied to balancing reliability and affordability, particularly recognising that reliability standards are set exogenously</li> <li>discussion of sensitivity results</li> <li>method for determining the social licence sensitivity parameters</li> </ul>	<p>AEMO has considered these recommendations for the final 2024 ISP as follows:</p> <ul style="list-style-type: none"> <li>included additional material about keeping costs as low as possible, net benefits, and common good with regard to the benefits of CER orchestration in the 2024 ISP Overview</li> <li>decided not to include further information about forecast errors in the ISP reporting, as a forecast is uncertain by nature and AEMO considers that this is understood by the readership</li> <li>included an additional note in the 2024 ISP regarding the impact of connection to international material and equipment markets</li> <li>did not include additional information about judgement applied to balance reliability and affordability, as Appendix 4 System Operability already provides several sections about adjustments made to ensure that the ODP complies with the reliability standard, and Appendix 6 Cost Benefit Analysis provides extensive information about the cost benefit analysis informing the ODP selection</li> <li>retained the existing approach to explain the detail of sensitivity analysis results in Appendix 6 Cost Benefit Analysis to ensure that this economic analysis is fully explained with an appropriate level of detail</li> <li>included additional information about the method used to determine the social licence sensitivity parameters.</li> </ul>
<b>GenCost</b>	The ISP Consumer Panel encourages AEMO to seriously consider using the draft CSIRO 2023-24 GenCost results in the final ISP modelling, rather than continuing to use the final 2022-23 GenCost results. We await other submissions' views on this matter.	AEMO has reviewed the draft 2023-24 GenCost results (which were still under consultation when the ISP modelling was being undertaken) and retained the 2022-23 GenCost results, as the updated GenCost values were not considered to be material enough to impact the ODP. In addition, only one other stakeholder submission touched on this matter, from <b>Stride</b> , relating to the technical and economic life of pumped hydro and hydro generation installations (addressed separately in Section 3.12 of the 2024 ISP Consultation Summary Report).

<sup>26</sup> Energy Security Board (now known as the Energy Advisory Panel). February 2024. *Consumer energy resources and the transformation of the NEM report*. At <https://www.energy.gov.au/energy-and-climate-change-ministerial-council/energy-ministers-publications/consumer-energy-resources-and-transformation-of-nem>.

Theme	Recommendation	AEMO response
<b>System security &amp; reliability</b>	AEMO provide greater clarity about their approach to how all categories of system security costs are calculated and why they are included/not included, and the large cost accuracy range for synchronous condensers costs.	AEMO has provided more information on this matter in the Addendum to the Draft 2024 ISP, in response to the AER transparency review.
<b>Improvements for the 2026 ISP</b>	<ul style="list-style-type: none"> <li>Co-design further development to consumer risk preferences with the 2026 ISP Consumer Panel for application to future ISPs.</li> <li>Enhance recording and reporting of third party CER and distribution network involvement on the electricity market</li> <li>Energy Ministers should develop a national CER orchestration strategy to be implemented as part of the development of the 2026 ISP, while AEMO should seek to better quantify impact of effective orchestration and measures, and the risks if this is not successful, to enable improvements in policy and forecasting.</li> <li>AEMO investigate using different discount rates for regulated and unregulated assets in assessing the net market benefits, given that investors differ in their cost of capital for these assets. Also consider consumer discount rates in the context of consumers' decisions on behind the meter investments.</li> <li>Establish an increased cost as well as schedule delay for the supply chain sensitivity.</li> <li>Develop measures of the distributional impact of the ISP.</li> <li>Explore the options for reporting on potential levels of future curtailment and spilling to maximise use of generation.</li> <li>A more comprehensive approach to analysing the hydrogen cost assumptions and how they may influence the scenario variables.</li> <li>Incorporate gas supply and pipeline augmentation requirements to meet long term GPG gas requirements from the GSOO and develop a Gas Costs Database (akin to the Transmission Cost Database) to inform the 2026 ISP modelling.</li> <li>System security issues should be examined more closely as part of the Methodology review in the 2026 ISP.</li> <li>Commence wide-ranging consultation on the ISP scenarios earlier in the 2026 ISP process including industry and consumer stakeholders, as well as the 2026 ISP Panel to assess possible improvements to the Delphi process.</li> <li>Develop a strategy to document engagement with First Nations communities and include this record in future ISP documentation, to effectively recognise the interests and concerns of First Nations communities.</li> <li>Conduct a thorough review of the 'unknown risk' factor in the 2026 ISP Transmission Cost Database (TCD) based on more up to date data.</li> </ul>	<p>AEMO has recorded these suggestions in Section 3.11 of the 2024 ISP Consultation Summary Report, alongside suggestions for the 2026 ISP provided by other stakeholders in response to the Draft 2024 ISP.</p> <p>The scope of improvements and inclusions in the 2026 ISP will be considered separately, including through consultation on review of AEMO's ISP Methodology, consultation on the 2025 IASR, and consultation on the Draft 2026 ISP.</p>



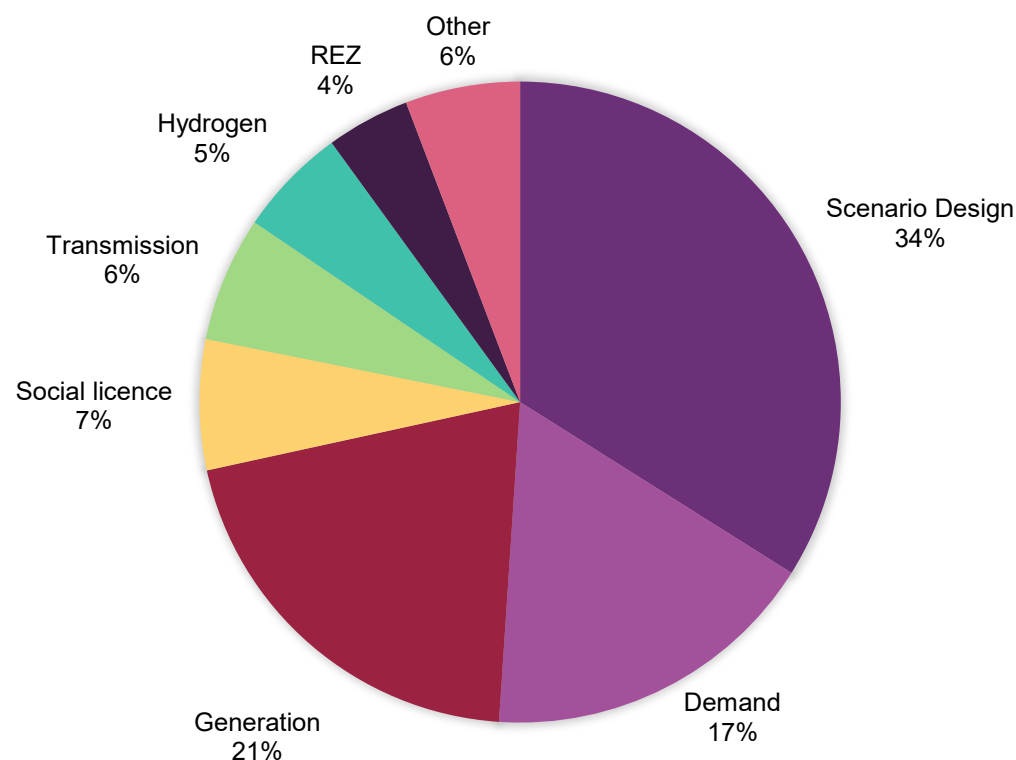
### A1.4.2 Inputs, assumptions, and scenarios

The 2023 IASR<sup>27</sup> includes three scenarios that are used to support forecasting and planning in an uncertain environment, and assess future risks, opportunities, and development needs to match electricity supply and demand. Additionally, a range of sensitivities are defined to explore how forecasting and planning results may differ if a key assumption changes.

Following a 12-month consultation process, AEMO published the final 2023 IASR<sup>28</sup> on 28 July 2023.

Over 60 submissions were received from organisations and individuals to the Draft 2023 IASR consultation, conducted from December 2022 until February 2023. Figure 5 provides a summary of the key submission topics received. Full details of the process and outcomes of stakeholder engagement is available in the consultation summary reports for the 2023 IASR<sup>29</sup>.

**Figure 5 2023 IASR key consultation submission topics (69 Submissions)**



### 2024 ISP Delphi Panel

Scenario likelihoods are important for the ISP as they are used to determine the weighted average net economic benefit of every development path in the ISP, including the ODP. Scenario weightings are used to rank

<sup>27</sup> For a detailed explanation of the three ISP scenarios (*Step Change*, *Progressive Change* and *Green Energy Exports*), see Section 2 of the 2023 IASR, at <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-inputs-assumptions-and-scenarios-report.pdf>.

<sup>28</sup> The 2023 IASR, all supporting materials and demand trace data, are at <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios>.

<sup>29</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-iasr-consultation-summary-report.pdf>.



development paths using both a risk-averse and a risk-neutral decision making approach, and are also applied in the regulatory investment test for transmission for actionable ISP projects. The 2024 Delphi Panel was established in August 2023 and consisted of 33 individuals including industry experts, government representatives, network service provider representatives, generators and retailers, researchers, academics, and consumer advocates.

The Delphi Panel represented some of the energy industry’s leaders in the design, governance, development, and use of the NEM, along with a greater representation of consumer advocates compared to the 2022 Delphi Panel. This was an outcome of co-designing the Panel’s participation with the 2024 ISP Consumer Panel, based on feedback on the previous ISP Delphi process.

**What did the Panel do?**

The Delphi Panel considered a critical question: *“Based on your knowledge of the future of the energy sector, what is the relative likelihood of each of AEMO’s three core scenarios for the 2024 ISP?”*

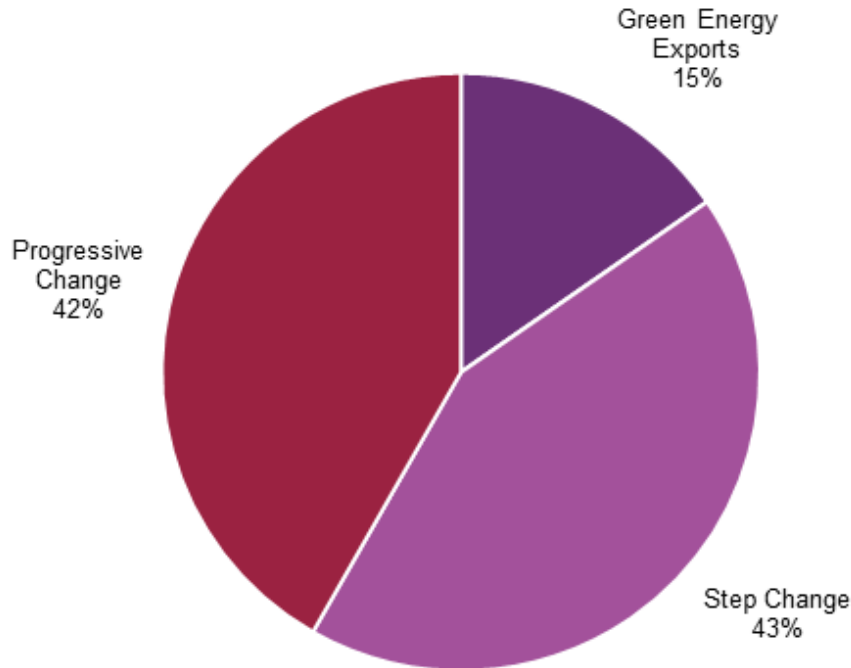
On 1 September 2023, panellists came together for a virtual, anonymous voting process to deliberate on the relative likelihood weightings for the three scenarios.

Over several rounds of voting, panellists provided their own weightings and considered alternative weightings provided by others. Panellists provided their justifications for their selection, and after each round of voting, panellists had the opportunity to revise their weighting for each scenario taking into consideration the views shared by other panellists.

**What was the outcome?**

At the conclusion of voting, the Delphi Panel had produced likelihoods for each scenario, as shown in Figure 6.

**Figure 6    2024 ISP Delphi Panel scenario likelihood**





The *Step Change* scenario received the most consistent level of support following detailed analysis of the Delphi participant feedback.

The 2024 ISP explores all scenarios to determine the investment needs of the future power system. AEMO decided that it is appropriate to use the scenario likelihoods as voted in the Delphi Panel process to inform the selection of the ODP. AEMO determined that the central scenario for relevant 2023-24 planning activities, and the ‘most likely’ scenario for the 2024 ISP,<sup>30</sup> is the *Step Change* scenario.

### AER transparency review of the 2023 IASR

The NER require the AER to complete a transparency review of the 2023 IASR used in the development of the Draft 2024 ISP, that assesses the adequacy of AEMO’s explanation of how the inputs, assumptions and scenarios have been derived, how key inputs and assumptions have changed since the previous ISP, and whether key inputs and assumptions can be verified or otherwise adequately tested with stakeholders<sup>31</sup>. The AER published its transparency review on 28 August 2023<sup>32</sup>.

The AER concluded that “the majority of AEMO’s inputs and assumptions have been adequately explained and AEMO has demonstrated that it has taken into account stakeholder feedback”. However, the AER concluded that some aspects require further explanation of how the key inputs and assumptions have been derived in 14 areas:

- Public policy requirements.
- Value of emissions reduction.
- Social licence sensitivity analysis.
- Carbon budget assumptions.
- Consumption and demand forecasts.
- Consumer risk preferences.
- Victoria storage targets.
- Impact of concessional finance.
- Fuel and renewable assumptions.
- Power system security.
- REZs.
- Unknown risk factor for estimated transmission costs.
- Employment factors.
- Growth in weather extremes.

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<sup>30</sup> To view the full report, see <https://aemo.com.au/-/media/files/major-publications/isp/2023/2024-isp-delphi-panel---overview.pdf>.

<sup>31</sup> NER 5.22.9

<sup>32</sup> At <https://www.aer.gov.au/publications/reports/performance/transparency-review-aemo-2023-inputs-assumptions-and-scenarios-report>.



The NER require that AEMO provide further explanatory information in an addendum to the IASR and undertake consultation on these issues in the Draft ISP<sup>33</sup>. Accordingly, AEMO produced the *Addendum to the 2023 Inputs Assumptions and Scenarios Report*, and published it alongside the Draft 2024 ISP for consultation. AEMO did not receive any submissions that were in response to the *Addendum to the 2023 Inputs, Assumptions and Scenarios Report*, although the ISP Consumer Panel did provide some commentary as part of their Draft 2024 ISP report.

### 2024 ISP Consumer Panel's report on the 2023 IASR

The 2024 ISP Consumer Panel provided AEMO its report<sup>34</sup> on the 2023 IASR on 28 September 2023, as required under the NER<sup>35</sup>. The key elements of the Panel's conclusions and recommendations are summarised below.

The Panel's report made 44 recommendations across seven categories, outlined in Table 9. These include considerations for the 2024 ISP and implications for the 2026 ISP. The Panel also acknowledged the difficulty and complexity of understanding and mitigating risks associated with the development of the ISP, noting that AEMO will need to continue to consider new ways of forecasting and engaging on the future of the power system and how the energy transition will occur. AEMO will work with the ISP Consumer Panel on the further consideration and implementation where possible of recommendations regarding the 2026 ISP cycle.

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<sup>33</sup> NER 5.22.9 (c)

<sup>34</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/isp-consumer-panel-report-on-2023-iasr.pdf>.

<sup>35</sup> NER 5.22.7(d)

Table 9 2024 ISP Consumer Panel IASR report recommendations

Theme	Panel feedback	Panel recommendation	AEMO response
<b>Who pays, consumer risk, social licence</b>	<p>Affordability and 'who pays' for the energy transition is a key theme of the report.</p> <p>The Panel has posed the question "how much will governments be willing to pay to keep consumer support (social licence) for the transition?"</p> <p>The Panel notes that delays in establishing social licence leads to additional cost pressure.</p>	<p>Consider how risks and costs borne by consumers might be better communicated in the 2024 ISP.</p> <p>Advocate for Commonwealth, State and Territory energy ministers to establish a national engagement strategy to develop a consistent approach to landowner compensation.</p>	<p>Through engagement and reform work, AEMO continues to consult with State and Jurisdictional Governments to support the consideration of key social licence issues in relevant policy and regulatory decision-making. This includes discussion on the potential impacts and opportunities brought about by the energy transition and new infrastructure development on rural and regional communities and landholders.</p>
<b>Consumer and community engagement</b>	<p>Complimented that over time the ISP has developed significantly in the depth and breadth of the issues covered and the level of stakeholder engagement. This contributes to "improved consumer engagement in the ISP process and a greater understanding of potential impacts on customers of potential ISP projects".</p> <p>Acknowledgement that AEMO has made an effort throughout the 2024 ISP Consumer program to engage with consumers and community, particularly with the consumer risk preferences project, but that there is more work to do in the 2026 ISP.</p>	<p>Develop the 2026 ISP Stakeholder Engagement Strategy as early as possible and co-design and consult with stakeholders on the draft strategy.</p> <p>Target engagement with those most impacted (communities hosting actionable project infrastructure).</p> <p>Develop a social research program "designed to better understand consumer and community attitudes, perceptions and uncertainties about the future energy market and the role of consumers".</p>	<p>AEMO is in the process of establishing an engagement approach to support the development of the 2026 ISP, with a view to engaging stakeholders to collaborate on the development of the engagement strategy.</p> <p>Following the Federal Government Review of the ISP to ensure it continues to best support Australia's energy transition, there are several actions that AEMO will take that relate to consumer and community engagement. These include improving the accessibility of the ISP, incorporating community acceptance considerations into transmission expansion options, and more effective consideration of demand-side opportunities such as CER.</p>
<b>Distributed network service provider (DNSP) engagement</b>	<p>That the ISP is a whole of transmission plan, not a whole of system plan, and should be referred to as such until AEMO expand DNSP involvement and can consider the "considerable spare capacity in the sub-transmission system for connection of renewable generation that can be utilised while approvals are gained for ISP projects".</p>	<p>Test the outcome of modelling for the 2024 ISP with DNSPs for its practicality and alignment with DNSP observations of network utilisation and trends toward greater decentralisation.</p> <p>Noting DNSPs will be doing "a lot of the heavy lifting for the energy transition".</p> <p>AEMO work with DNSPs to co-design a specific DNSP Engagement Plan for the 2026 ISP.</p>	<p>While the ISP has a regulatory role in actioning transmission investments, AEMO considers that it also plays a significant role in informing investors, policy makers and the public on the energy transition.</p> <p>AEMO notes that the scope of the ISP was recently reviewed by the Commonwealth Government, and that distribution network investments are mentioned in the actions for the 2026 ISP.<sup>36</sup></p> <p>AEMO will continue to engage with DNSPs about the ISP. A DNSP CER Executive forum has been established along with a dedicated DNSP working group to support the ISP Review actions, including forecasting for the 2025 IASR.</p>

<sup>36</sup> At <https://www.energy.gov.au/sites/default/files/2024-04/ecmc-response-to-isp-review.pdf>.

Theme	Panel feedback	Panel recommendation	AEMO response
<b>Scenarios and sensitivities</b>	The scenarios were already developed before the Panel was established and the Panel needs to be involved in scenario development for the 2026 ISP.	Establish next Panel as early as possible in 2024. Improve communication and engagement on the 'full list' of sensitivities and event driven scenarios earlier, and in parallel with scenario development.	AEMO is in the process of establishing an engagement approach to support the development of the 2026 ISP, and has established the 2026 ISP Consumer Panel and engagement on scenarios at an earlier stage by comparison to the 2024 ISP.
<b>GenCost Report</b>	The Panel has agreed to provide GenCost feedback to CSIRO separately. The GenCost Report is developed by CSIRO and AEMO and investigates the costs of electricity generation and storage technologies.	Provide greater clarity on how AEMO use CSIRO's GenCost results in the 2024 ISP modelling.	AEMO has identified in the Draft 2024 ISP report that the optimal mix of generation, storage and transmission investments considers the capital and operating costs (for generation and storage technologies) from GenCost, and does not use the more generalised levelised-cost of energy guidance.  AEMO is also including a simple explanation of the various inputs and outputs of the ISP, including GenCost in the final 2024 ISP.
<b>Discount rates</b>	There is more work to do on discount rates to better consider discount rates used for network and generation/storage investments.	Engage an expert consultant to prepare a more comprehensive report with a wide sample of network and non-network equity and debt investors prior to the commencement of modelling the final 2024 ISP in early 2024.	AEMO engaged two independent expert consultants to inform the selection of discount rates for the 2024 ISP. The second consultant (Oxford Economics Australia) found anecdotal and empirical evidence to suggest that the 7% central discount rate proposed by the first (Synergies Economic Consulting) was reasonable. Survey information showed that the central discount rate is similar to those used by developers in the NEM. Further details are outlined in section 3.7.1 of the 2023 IASR.  AEMO has also completed sensitivity testing to demonstrate that the optimal development path is robust to a wide range of discount rates, with 3% and 10.5% being explicitly tested.  AEMO does not consider there is merit in further exploring discount rates for the final 2024 ISP, but intends to revisit assumptions for both discount rates and weighted average cost of capital in future ISPs.
<b>Interdependencies</b>	Strategically 'link' the ISP to the policies, programs and practices that the ODP relies on to ensure it is optimal.	Better communicate interdependencies such as policy certainty, transition strategy and energy efficiency in the 2024 ISP.	AEMO continues to provide detailed information on how public policy is treated in ISP modelling.  AEMO has included a section in the Draft 2024 ISP to outline risks to the ODP and to the energy transition, including commentary on orchestration and market reform. AEMO has also released additional information about policy incorporation in the ISP, in the <i>Addendum to the Draft 2024 ISP</i> .



## Social licence sensitivity workshops

AEMO has introduced a new social licence sensitivity in the 2024 ISP, which quantifies some of the risks associated with adverse social licence outcomes for candidate development paths. AEMO is incorporating and considering social licence more explicitly as a key issue facing the energy transition in development of the 2024 ISP. As part of this, AEMO ran two consultation workshops with social licence experts (including both 2024 ISP Consumer Panel and Advisory Council on Social Licence members).

AEMO explored a number of modelling input parameters in the ISP that can be varied to reflect poor social licence outcomes (for example, cost and delays for transmission and generation investment) in consultation with the Consumer Panel and Advisory Council on Social Licence members. The social licence sensitivity provides an initial view of an incredibly complex and evolving topic.

Based on the feedback from these targeted workshops, AEMO has refined the social licence sensitivity parameters to better quantify the additional costs and benefits of social licence outcomes to end consumers.

For further information on the principles, parameters and application of the social licence sensitivity, see Appendix 6, Section A6.12.6, and Appendix 8, Section A8.2.1.

### A1.4.3 ISP Methodology

The NER require AEMO to develop the *ISP Methodology*, which sets out how AEMO will undertake modelling and cost benefit analysis for the Draft 2024 ISP<sup>37</sup>.

An update to the *ISP Methodology* was released on 30 June 2023. This update followed consideration of 25 written and verbal stakeholder submissions to the *ISP Methodology* consultation.

AEMO identified 135 individual points and recommendations within the submissions provided. The main enquiries included in the submissions covered a potential inclusion of a value of carbon emissions, dispatch behaviour of storage devices, how consumer risk preference metrics are developed and applied and accounting for transmission project lead time uncertainty.

A summary of the key themes and the volume of submissions that addressed each is summarised in Figure 7.

For a copy of stakeholder feedback and detailed responses, please see the *Update to the ISP Methodology Consultation Summary Report*<sup>38</sup>.

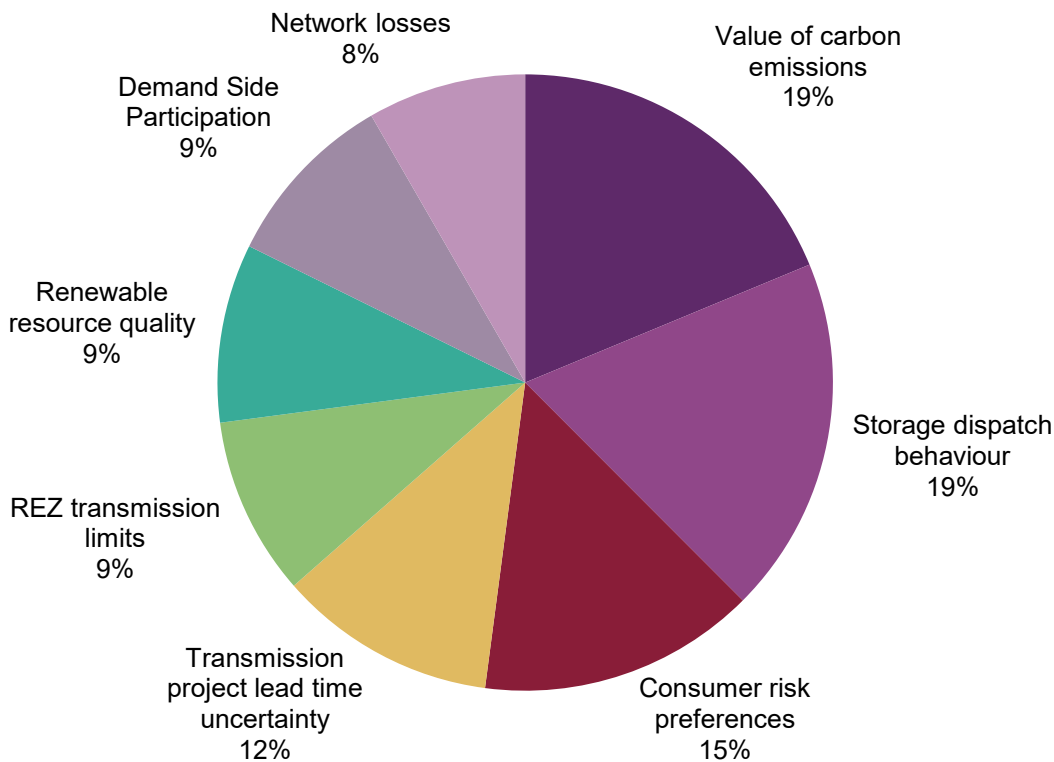
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<sup>37</sup> NER 5.22.8(d)

<sup>38</sup> At [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/consultation-summary-report---update-to-the-isp-methodology.pdf).



**Figure 7 2024 ISP Methodology key consultation submission topics (25)**



#### A1.4.4 2023 Transmission Expansion Options Report

The 2023 *Transmission Expansion Options Report* packages up transmission network expansion options to inform the development of the 2024 ISP. It includes AEMO's approach to forecasting transmission costs and provides transmission options to be evaluated in the ISP alongside generation and storage options.

The final 2023 *Transmission Expansion Options Report*<sup>39</sup>, published on 28 July 2023, was prepared following consideration of stakeholder submissions received in response to the draft report published in May 2023 and is the result of extensive joint planning with TNSPs and jurisdictional bodies.

Stakeholder engagement included 23 written and verbal submissions. The material recommendations and AEMO's responses and amendments made in response to stakeholder feedback are outlined in the 2023 *Transmission Expansion Options Consultation Summary Report*<sup>40</sup>.

Most of the submissions were enquiries on particular flow paths, REZ augmentations, social licence matters, transmission project cost estimates and forecasting approaches, operating expenditure estimates and non-network options.

The expansion options in the report fed into the Draft 2024 ISP.

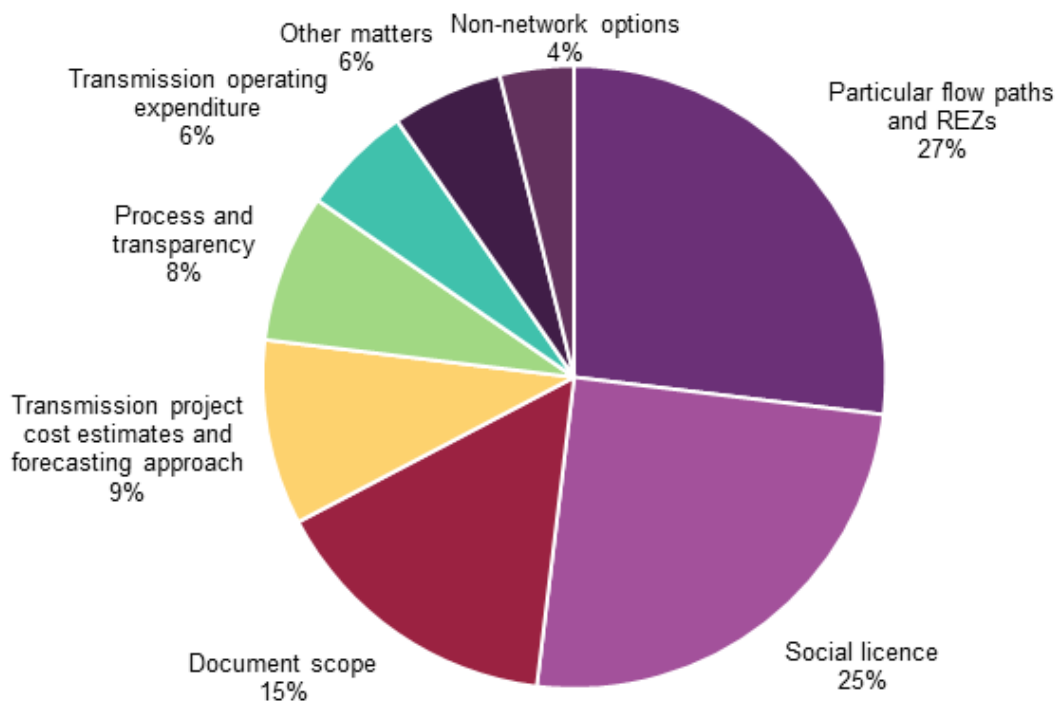
A summary of the key themes and the volume of submissions that addressed each is summarised in Figure 8.

<sup>39</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-transmission-expansion-options-report.pdf>.

<sup>40</sup> At <https://aemo.com.au/-/media/files/major-publications/isp/2023/consultation-summary-report---2023-transmission-expansion-options-report.pdf>.



**Figure 8** 2023 Transmission Expansion Options Report key consultation submission topics (23)



#### A1.4.5 AER transparency review of the Draft 2024 ISP

The AER is required to review the adequacy of AEMO's explanations of the derivation of key inputs and assumptions, and how key inputs and assumptions influenced outcomes in the Draft ISP. AEMO published the Draft 2024 Integrated System Plan (ISP) Addendum<sup>41</sup> for consultation on 12 April 2024 in response to the Transparency Review of the Draft 2024 ISP<sup>42</sup> released by the Australian Energy Regulator (AER).

The AER in its Transparency Review concluded that AEMO adequately explained the majority of its inputs and assumptions, and how they contributed to Draft 2024 ISP outcomes and identified five aspects where more explanation would improve transparency. The addendum provided additional information on the questions asked by the AER which related to:

- Scenarios for sensitivity analysis and presentation of results.
- CER.
- Jurisdictional policies for REZs.
- Firming and storage in REZs.
- System security remediation costs.

AEMO received four written submissions in response to the consultation. These submissions had similar themes to those received for the Draft 2024 ISP consultation relating to actionable projects, role of gas and modelling

<sup>41</sup> At [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2024/draft-2024-isp-addendum-consultation/addendum-to-draft-2024-isp.pdf?la=en](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2024/draft-2024-isp-addendum-consultation/addendum-to-draft-2024-isp.pdf?la=en).

<sup>42</sup> At <https://www.aer.gov.au/publications/reports/performance/transparency-review-aemo-draft-2024-integrated-system-plan>.



approach. Summaries of topics discussed in these submissions and AEMO's consideration and response to those submissions are outlined in the 2024 *ISP Consultation Summary Report*<sup>43</sup>.

#### A1.4.6 Non-network consultation

AEMO has issued a call for submissions on non-network options for the four new actionable ISP projects:

- Sydney Ring South.
- Mid North South Australia REZ Expansion.
- Waddamana to Palmerston transfer capability upgrade.
- Queensland – New South Wales Interconnector (QNI) Connect.

Proponents may provide a submission for a non-network proposal to [ISP@AEMO.com.au](mailto:ISP@AEMO.com.au) by 18 September 2024.

AEMO will provide all submissions and proposals to the relevant RIT-T proponent identified in the 2024 ISP to consider in the RIT-T for the corresponding actionable ISP project. RIT-T proponents are required to consider any new credible non-network options that were not previously considered in the ISP that meet the identified need, including any non-network options submitted in response to the above consultation.

#### A1.4.7 Continuous improvement

AEMO regularly evaluates how stakeholders are engaged to ensure this is continually improved and is as effective and collaborative as possible.

AEMO will publish a Draft 2026 ISP Engagement Plan prior to the development of the 2026 ISP, and welcomes any feedback from stakeholders on this plan. The development of this plan will be informed by stakeholder feedback on the 2024 ISP cycle, including through both written submissions and specific stakeholder surveys.

Once again, AEMO thanks all stakeholders for their valuable contributions to the 2024 ISP and previous engagement activities that have supported the 2024 ISP. AEMO looks forward to continuing to work with all stakeholders as the 2026 ISP is developed over the next two years.

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<sup>43</sup>At <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>.

# Glossary

This glossary has been prepared as a quick guide to help readers understand some of the terms used in the ISP. Words and phrases defined in the National Electricity Rules (NER) have the meaning given to them in the NER. This glossary is not a substitute for consulting the NER, the AER's Cost Benefit Analysis Guidelines, or AEMO's *ISP Methodology*.

Term	Acronym	Explanation
<b>Actionable ISP project</b>	-	<p>Actionable ISP projects optimise benefits for consumers if progressed before the next ISP. A transmission project (or non-network option) identified as part of the ODP and having a delivery date within an actionable window.</p> <p>For newly actionable ISP projects, the actionable window is two years, meaning it is within the window if the project is needed within two years of its earliest in-service date. The window is longer for projects that have previously been actionable.</p> <p>Project proponents are required to begin newly actionable ISP projects with the release of a final ISP, including commencing a RIT-T.</p>
<b>Actionable New South Wales project and actionable Queensland project</b>	-	A transmission project (or non-network option) that optimises benefits for consumers if progressed before the next ISP, is identified as part of the ODP, and is supported by or committed to in New South Wales Government or Queensland Government policy and/or prospective or current legislation.
<b>Anticipated project</b>	-	<p>A generation, storage or transmission project that is in the process of meeting at least three of the five commitment criteria (planning, construction, land, contracts, finance), in accordance with the AER's Cost Benefit Analysis Guidelines.</p> <p>Anticipated projects are included in all ISP scenarios.</p>
<b>Candidate development path</b>	CDP	<p>A collection of development paths which share a set of potential actionable projects. Within the collection, potential future ISP projects are allowed to vary across scenarios between the development paths.</p> <p>Candidate development paths have been shortlisted for selection as the ODP and are evaluated in detail to determine the ODP, in accordance with the ISP Methodology.</p>
<b>Capacity</b>	-	The maximum rating of a generating or storage unit (or set of generating units), or transmission line, typically expressed in megawatts (MW). For example, a solar farm may have a nominal capacity of 400 MW.
<b>Committed project</b>	-	A generation, storage or transmission project that has fully met all five commitment criteria (planning, construction, land, contracts, finance), in accordance with the AER's Cost Benefit Analysis Guidelines. Committed projects are included in all ISP scenarios.
<b>Consumer energy resources</b>	CER	Generation or storage assets owned by consumers and installed behind-the-meter. These can include rooftop solar, batteries and electric vehicles (EVs). CER may include demand flexibility.
<b>Consumption</b>	-	The electrical energy used over a period of time (for example a day or year). This quantity is typically expressed in megawatt hours (MWh) or its multiples. Various definitions for consumption apply, depending on where it is measured. For example, underlying consumption means consumption being supplied by both CER and the electricity grid.
<b>Cost-benefit analysis</b>	CBA	A comparison of the quantified costs and benefits of a particular project (or suite of projects) in monetary terms. For the ISP, a cost-benefit analysis is conducted in accordance with the AER's Cost Benefit Analysis Guidelines.
<b>Counterfactual development path</b>	-	The counterfactual development path represents a future without major transmission augmentation. AEMO compares candidate development paths against the counterfactual to calculate the economic benefits of transmission.

Term	Acronym	Explanation
<b>Demand</b>	-	The amount of electrical power consumed at a point in time. This quantity is typically expressed in megawatts (MW) or its multiples. Various definitions for demand, depending on where it is measured. For example, underlying demand means demand supplied by both CER and the electricity grid.
<b>Demand-side participation</b>	DSP	The capability of consumers to reduce their demand during periods of high wholesale electricity prices or when reliability issues emerge. This can occur through voluntarily reducing demand, or generating electricity.
<b>Development path</b>	DP	A set of projects (actionable projects, future projects and ISP development opportunities) in an ISP that together address power system needs.
<b>Dispatchable capacity</b>	-	The total amount of generation that can be turned on or off, without being dependent on the weather. Dispatchable capacity is required to provide firming during periods of low variable renewable energy output in the NEM.
<b>Distributed solar/ distributed PV</b>	-	Solar photovoltaic (PV) generation assets that are not centrally controlled by AEMO dispatch. Examples include residential and business rooftop PV as well as larger commercial or industrial “non-scheduled” PV systems.
<b>Firming</b>	-	Grid-connected assets that can provide dispatchable capacity when variable renewable energy generation is limited by weather, for example storage (pumped-hydro and batteries) and gas-powered generation.
<b>Future ISP project</b>	-	A transmission project (or non-network option) that addresses an identified need in the ISP, that is part of the ODP, and is forecast to be actionable in the future.
<b>Identified need</b>	-	The objective a TNSP seeks to achieve by investing in the network in accordance with the NER or an ISP. In the context of the ISP, the identified need is the reason an investment in the network is required, and may be met by either a network or a non-network option.
<b>ISP development opportunity</b>	-	A development identified in the ISP that does not relate to a transmission project (or non-network option) and may include generation, storage, demand-side participation, or other developments such as distribution network projects.
<b>Net market benefits</b>	-	The present value of total market benefits associated with a project (or a group of projects), less its total cost, calculated in accordance with the AER’s Cost Benefit Analysis Guidelines.
<b>Non-network option</b>	-	A means by which an identified need can be fully or partly addressed, that is not a network option. A network option means a solution such as transmission lines or substations which are undertaken by a Network Service Provider using regulated expenditure.
<b>Optimal development path</b>	ODP	The development path identified in the ISP as optimal and robust to future states of the world. The ODP contains actionable projects, future ISP projects and ISP development opportunities, and optimises costs and benefits of various options across a range of future ISP scenarios.
<b>Regulatory Investment Test for Transmission</b>	RIT-T	The RIT-T is a cost benefit analysis test that TNSPs must apply to prescribed regulated investments in their network. The purpose of the RIT-T is to identify the credible network or non-network options to address the identified network need that maximise net market benefits to the NEM. RIT-Ts are required for some but not all transmission investments.
<b>Reliable (power system)</b>	-	The ability of the power system to supply adequate power to satisfy consumer demand, allowing for credible generation and transmission network contingencies.
<b>Renewable energy</b>	-	For the purposes of the ISP, the following technologies are referred to under the grouping of renewable energy: “solar, wind, biomass, hydro, and hydrogen turbines”. Variable renewable energy is a subset of this group, explained below.
<b>Renewable energy zone</b>	REZ	An area identified in the ISP as high-quality resource areas where clusters of large-scale renewable energy projects can be developed using economies of scale.
<b>Renewable drought</b>	-	A prolonged period of very low levels of variable renewable output, typically associated with dark and still conditions that limit production from both solar and wind generators.

Term	Acronym	Explanation
<b>Scenario</b>	-	A possible future of how the NEM may develop to meet a set of conditions that influence consumer demand, economic activity, decarbonisation, and other parameters. For the 2024 ISP, AEMO has considered three scenarios: <i>Progressive Change</i> , <i>Step Change</i> and <i>Green Energy Exports</i> .
<b>Secure (power system)</b>	-	The system is secure if it is operating within defined technical limits and is able to be returned to within those limits after a major power system element is disconnected (such as a generator or a major transmission network element).
<b>Sensitivity analysis</b>	-	Analysis undertaken to determine how modelling outcomes change if an input assumption (or a collection of related input assumptions) is changed.
<b>Spilled energy</b>	-	Energy from variable renewable energy resources that could be generated but is unable to be delivered. Transmission curtailment results in spilled energy when generation is constrained due to operational limits, and economic spill occurs when generation reduces output due to market price.
<b>Transmission network service provider</b>	TNSP	A business responsible for owning, controlling or operating a transmission network.
<b>Utility-scale or utility</b>		For the purposes of the ISP, 'utility-scale' and 'utility' refers to technologies connected to the high-voltage power system rather than behind the meter at a business or residence.
<b>Value of greenhouse gas emissions reduction</b>	VER	The VER estimates the value (dollar per tonne) of avoided greenhouse gas emissions. The VER is calculated consistent with the method agreed to by Australia's Energy Ministers in February 2024.
<b>Virtual power plant</b>	VPP	An aggregation of resources coordinated to deliver services for power system operations and electricity markets. For the ISP, VPPs enable coordinated control of CER, including batteries and electric vehicles.
<b>Variable renewable energy</b>	VRE	Renewable resources whose generation output can vary greatly in short time periods due to changing weather conditions, such as solar and wind.