

Response to the Review of the Integrated System Plan

energy and
climate change
ministerial council



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Australian Government

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Acknowledgement of Country

We acknowledge the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past and present.

Foreword

We are at a critical juncture in the energy transformation. Recent years have seen significant progress, particularly with renewable energy power generation growing strongly. This is positive, but there is much more to do. In particular, in order to achieve our decarbonisation objectives, we require a significant acceleration of project delivery across the board. Delivery is key to bringing down energy costs, to keep our energy system reliable and to maintain a prosperous economy now and into the future.

In this context, effective planning of the energy system has never been more important. The Australian Energy Market Operator (AEMO) has long been a trusted advisor for governments and investors. AEMO's Integrated System Plan (ISP) is the National Electricity Market's preeminent long-term planning document. It sets out the essential electricity infrastructure needed to meet energy demand over the long term, while achieving decarbonisation across the energy sector.

The ISP has been filling this role for some time now. Over this period, we have seen ongoing changes to the way that energy systems and markets are developing. There are growing interrelationships between different components of the energy system. Households and businesses are increasingly taking responsibility for meeting their own energy needs. And technologies, including AI, are emerging to take advantage of opportunities built off better data.

In this context, in October 2022, Energy Ministers from across the country initiated a review to consider the optimal function and form of the ISP. This review has identified a series of opportunities to supercharge the ISP, in particular by enhancing consideration of a range of factors critical to the energy transformation. The changes are expected to ensure that the ISP expands to set a direction for the transformation across the energy system as a whole, including consideration of non-electricity technological advances, while maintaining its critical function in directing investment in electricity infrastructure.

With the right settings, we can expect to see the influence of the ISP expand in guiding decision making by investors, governments, and the public.

The Hon Chris Bowen MP

Chair of the Energy and Climate Change Ministerial Council

Minister for Climate Change and Energy (Cwth)

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List of Abbreviations

Name in full	Acronym
Australian Energy Market Operator	AEMO
Consumer energy resources	CER
Distribution network service provider	DNSP
Energy and Climate Change Ministerial Council	ECMC
Gas-fired power generation	GPG
Integrated System Plan	ISP
National Electricity Market	NEM
National Electricity Rules	NER
Optimal development path	ODP

1 Introduction

A long-term challenge for our energy systems is finding the best way to strategically shift the energy sector towards achieving net-zero emissions by 2050 while maximising affordability and reliability. Energy Ministers are focussed on ensuring Australia's energy system planning keeps pace with the significant change occurring within the system.

Through the National Electricity Law and the National Gas Law, Energy Ministers have established a critical role for the Australian Energy Market Operator (AEMO) in energy system planning. AEMO's Integrated System Plan (ISP) is the preeminent planning document for the National Electricity Market (NEM). Now in its fourth iteration, the ISP plays a crucial role in providing consistent projections about where and when investments in new electricity infrastructure will be required to support the energy transformation.

The ISP has become increasingly central to Australia's energy transition since it was first published in 2018, highlighting how AEMO's role is changing as the energy market rapidly evolves. The ISP continues to provide a comprehensive plan for transmission businesses. However, governments and energy sector participants also now look to the ISP for guidance on issues across the energy value chain, including the changing nature of energy demand, the interrelationship between electricity and gas markets, the transition from coal and gas use, and the supply of affordable and reliable renewable electricity generation and storage.

Energy Ministers do not underestimate the challenge of delivering the ISP in a dynamic environment. As the energy system evolves, so too must the policy frameworks that surround the ISP to ensure they best meet the needs of those who rely on it. For this reason, Energy Ministers commissioned a Review of the ISP (the review), with this review led by the System Planning Working Group under the National Energy Transformation Partnership.

The primary function of the review was to consider whether the scope and function of the ISP was fit-for-purpose to support the energy transformation. It sought opportunities to maximise the value of the ISP by considering the changing operating environment for the energy system. At the highest level, the review concluded that AEMO was very effective in meeting the role established for it under current ISP frameworks, but that there were opportunities for AEMO to provide further advice on several matters key to the energy transformation.

This response outlines the range of actions that Energy Ministers have agreed to take in response to the recommendations of the review.

2 Actions

2.1 Better integration of gas into the ISP

AEMO's draft 2024 ISP, along with previous iterations, underscore the critical role that gas will play in supporting Australia's decarbonisation objectives, including achieving the Australian Government's target to reach 82% of electricity generated from renewables by 2030 and net zero by 2050.

However, the role of gas-fired power generation (GPG) within Australia's energy mix is shifting from responding to daily fluctuations in power demand to a strategic backup role for renewable power generation. GPG will need to play a critical firming role alongside electricity storage, particular during winter, to maintain grid stability amid the intermittency of renewable energy sources. Increasing electrification rates across households, businesses and industry are also expected to drive change in the gas sector.

As a result, the demand profiles for gas are expected to change. While demand will reduce overall, there will be significant peaks when it is most needed. This will drive changes in how gas infrastructure is developed and used in response. Forecast changes to gas supply may exacerbate these demand challenges as continued decline of supply from southern fields leads to a greater reliance on gas supply from other sources.

Given these significant drivers, it is critical that the ISP consider the changing dynamics in the gas market to better consider the full range of costs and operational limitations important to determining the role that gas may play in supporting the energy transformation. This should include a more detailed view on the full cost of GPG relative to other forms of generation and energy storage.

Further, in line with amendments to the National Gas Law which will commence in early 2024, AEMO's consideration of gas market conditions will incorporate gases covered under the revised law, including natural gas, hydrogen and biomethane.

Action – Integrating gas into the ISP

AEMO should expand its consideration of gas market conditions in the 2026 ISP. This should include but not be limited to:

- carrying out additional analysis of future gas demand and gas pricing
- developing projections about the future utilisation of gas infrastructure
- collating information about dates of expected gas pipeline or GPG closure or conversion, such as from natural gas to hydrogen.
- updating medium- and long-term projections of gas generator fuel costs, including hydrogen and biomethane, to reflect expectations about gas market developments
- providing more information in the ISP about how ISP modelling scenarios are integrated in its gas supply model.

Working closely with stakeholders and drawing on the deeper understanding of future gas market conditions, AEMO should include ‘development projections’ in the 2026 ISP for the gas sector and:

- use this capability to identify and iteratively analyse the gas sector project trade-offs with electricity development needs, with the sole aim of optimising electricity infrastructure investments in the ISP
- update the development projections to reflect the outcomes of this analysis
- publish the updated development projections in the ISP.

The development projections should set out AEMO’s projections on how it expects the gas sector, including hydrogen and biomethane, to develop (both in terms of demand, and infrastructure investment to supply expected demand) under prevailing policies and market incentives.

2.2 Enhancing energy demand forecasting

Along with the changes that are occurring on the supply side, energy demand is also undergoing a fundamental shift driven by pricing and decarbonisation imperatives. In particular, the increased electrification of transport, households and industry is forecast to continue, driving up aggregate electricity demand which is a key reason for the need to expand generation, storage and transmission capacity. Alongside this, many energy consumers are also taking action to meet their own needs through investment in energy efficiency, solar systems and batteries.

It follows that effective energy demand forecasting that more accurately accounts for growing electrification, evolving energy efficiency measures and modified consumption patterns will be of increasing importance in energy system planning.

AEMO has made recent and ongoing improvements to the demand forecasting approach that it uses for the ISP. However, the environment is rapidly evolving in terms of shifts in energy consumer behaviour, meaning there is scope for the ISP to continue to improve forecasting methodologies, and provide additional information on key criticalities for the forecasts.

These enhancements will provide decision makers with maximum confidence in the ISP’s demand forecasts.

Action – Enhanced demand forecasting

AEMO should enhance demand forecasting in the 2026 ISP by:

- Undertaking targeted stakeholder engagement to enhance assumptions underpinning consumer energy resources (CER) and distributed resources projections in the ISP. The assumptions should reflect a comprehensive view of initiatives affecting CER and distributed resources uptake and evaluate the implications for operational demand.
- Analysing how electrification and CER / distributed resources development sensitivities affect operational demand projections and consider these directly in the ISP modelling where relevant.
- Subject to available information, analysing how distribution network service provider (DNSP) investments, programs and annual plans, may impact CER and distributed resources development, and thereby the Optimal Development Path (ODP) for

transmission, and include these findings in the ISP in order to send clearer signals to inform DNSP planning.

- Developing a framework, methodology and guidance material to support DNSPs and jurisdictions to develop projections and undertake analysis in a consistent manner to support the ISP's development.
- Including a statement in the 2026 ISP, and subsequent ISPs, aimed at informing the market and policy makers about the expected development of CER and distributed resources. The statement should be sufficiently detailed to provide a baseline for the identification of opportunities to promote the uptake of CER and distributed resources within each jurisdiction.

Jurisdictions and market participants are increasingly gathering data that can help improve demand forecasts. It follows that AEMO and governments should work together to analyse how this data can be used to enhance demand projections in the ISP. Undertaking this work in the context of an AEMO-defined framework will also enable governments to develop consistent scenarios and projections from which they can draw to inform separate energy planning activities.

Action – Better data on industrial and consumer electrification

Jurisdictions and AEMO will work together to ensure the provision of key inputs for the 2026 ISP that includes information about relevant jurisdictional policy developments and scenarios and projections about industrial and consumer electrification demand in NEM sub regions.

Over the longer term, a truly whole-of-system plan must consider the relative merits of additional investment on both sides of the market. AEMO's existing approach focuses on determining set levels of energy demand that can be met flexibly by investments on the supply-side.

In saying that, the investment decisions taken on the demand-side by households and businesses are impacted by a range of factors that extend beyond consideration of whole-of-system efficiency alone. The data environment for the demand-side also remains less developed than for supply-side investments. Given these factors, further consideration is warranted to understand how best to give effect to investment optimisation that spans the demand- and supply-sides of the market.

Accordingly, we consider that AEMO should continue to work with stakeholders, including DNSPs and government, to develop an appropriate approach to optimising investment across both the supply- and demand-side over the longer term.

Action – Optimising for the demand-side

The System Planning Working Group and AEMO will work with the relevant stakeholders, including DNSPs, to develop a suitable approach to trade off the cost of unlocking increasing tranches of orchestrated CER and distributed resources against other investment options for use in the earliest ISP practicable.

The System Planning Working Group will report to the Energy and Climate Change Ministerial Council (ECMC) on progress made in implementing this approach following the 2026 ISP.

2.3 Deeper analysis of coal-fired generation shutdown scenarios

Managing the exit of the existing coal-fired generation is critical to achieving decarbonisation objectives, but also to ensuring energy remains reliable. In particular, unanticipated or early exits by generators can have significant ramifications where appropriate plans are not in place to support the energy system in their absence. A key consideration is whether sufficient energy storage is being brought online to manage the intermittency of replacement forms of renewable generation.

While various iterations of the ISP have consistently found that coal closures would occur in advance of currently announced closure dates on a least cost adjustment path, it would be of value for AEMO to examine how varying timelines and scales of shutting down coal-fired generators might affect the energy market, addressing uncertainties and risks more explicitly. This would include considering the broader effects of these early closures, such as the need for facilitating investments in firming capacity (e.g. storage) to ensure a reliable energy supply which is a key motivation for the Government's Capacity Investment Scheme.

Action – Coal-fired generation shutdown scenarios

AEMO should analyse the sensitivity of the ODP to alternative coal-fired generation shutdown scenarios, allowing for consideration of facilitating investments in firming capacity, e.g., storage, and including this more prominently as part of the ISP narrative, subject to appropriately managing commercial sensitivities.

2.4 Improving generation and storage information

Clear information about the timing and location of additional generation and storage can help to inform investment decisions for NEM market participants. While some locational information can be inferred from ISP analysis, there are also a range of processes underway separate to the ISP that provide relevant information on locational considerations for generation and storage. Where combined, these provide a solid foundation for NEM participants to develop generation and storage projects. Accordingly, the ECMC considers that the most appropriate course of action is to for AEMO to gather and reflect the advice from other planning processes in the ISP.

Action – Improving locational information

AEMO should centralise the available information on renewable generation and storage, such as by summarising important material from other relevant documents in the ISP and/or including links to other relevant documents in a manner that facilitates easy access for stakeholders. This may be implemented via reference to the Enhanced Locational Information Report, if appropriate.

2.5 Enhanced analysis of system security

Increasing renewable energy generation and storage at household and grid level is fundamentally altering the way our electricity system operates, including in relation to system security since renewable generation has different characteristics to traditional synchronous generation (e.g. lower inertia, higher frequency).

It is therefore considered important that system security is formally considered in optimising the investment path. AEMO should also conduct a detailed examination of how system security considerations might vary in different future scenarios.

Action – Enhanced analysis of system security

AEMO should give greater consideration of system security in assessing the optimal mix of generation, storage, transmission and other infrastructure.

2.6 Alignment with state and territory planning

Given that governments at all levels are progressing plans to support the energy transformation, there is significant interest in how the ISP interacts with other plans. Ensuring aligned development pathways across different regions, which minimise system-wide risks, will enhance the influence of the ISP and improve the efficacy of jurisdictional planning processes in managing system-wide risks.

The National Electricity Rules (NER) provide an existing framework for considering state and territory policies in the ISP. However, clarity about the application of these processes across jurisdictions would assist stakeholders to understand how the projections and scenarios outlined in the ISP align with, and are influenced by, the diverse policy frameworks established by individual state and territory governments.

Action – Jurisdictional policy transparency

In the interests of transparency, AEMO should develop and publish clear, structured and transparent guidelines for its consultation process with jurisdictions around consideration of policy inclusion in the 2026 ISP modelling.

In addition to those policies that meet the automatic thresholds for inclusion set out in the NER, AEMO also evaluates a broader range of policies that are likely to impact the development of the ISP's outcomes. However, this process lacks transparency, resulting in stakeholder confusion. A

clearer explanation of the process used to assess and incorporate these policies would help resolve this confusion.

Action – Clarifying policy inclusions

In the interests of transparency, AEMO should provide more clarity on if and how uncertain or unfunded policies are considered in the 2026 ISP to enhance stakeholder understanding and engagement.

2.7 Timely delivery of actionable ISP projects

The energy transformation must, where possible, avoid hurdles to timely project delivery to ensure best outcomes for affordability and reliability. Governments and NEM participants are taking a broad range of actions, such as enhancements to transmission planning, expanding the available energy workforce, reforms to improve community engagement processes and streamlining regulatory frameworks. These concerted efforts are expected to positively influence project timelines.

The ISP has a role to play too in progressing priority projects. In particular and in addition to the signalling role that it currently plays regarding supply chain and workforce requirements, there are opportunities for the ISP to provide clearer signals to the community about required energy system investments.

Action – Improving the accessibility of the ISP

AEMO should develop additional targeted communications products and activities to support community groups and consumers to engage with the 2026 ISP planning process, separate to the ISP document itself, and informed by a communications strategy.

Noting the connection between early community engagement in establishing trust and overall improved outcomes, it remains important that AEMO, as well as other NEM participants, continue to carry out timely community consultation. Recent and upcoming changes to the NER are designed to deliver earlier consultation within the existing joint planning framework for transmission, yielding additional and more timely information. Systematic incorporation of this type of information should become a feature of AEMO's processes in identifying potential investment options.

Action – Incorporating community sentiment

AEMO should have regard to community concerns or sensitive locations in the identification of the ODP, and consider existing and available data on community sentiment, where available for the 2026 ISP (for example, from CSIRO surveys or as the result of Transmission Network Service Providers' community engagement as part of preparatory activities).

As momentum for the energy transition grows, governments and NEM participants are actively seeking information to inform the planning of new energy infrastructure projects and to ensure they can be completed on time. In some regions, they are conducting landscape level planning, as part of

a regional planning approach, to pinpoint areas that are most suitable (or least suitable) for development, including for new energy infrastructure.

This presents an opportunity for AEMO to acquire additional data to enhance the ISP, particularly concerning environmental values and constraints, if its scale is relevant and practical. There are also opportunities for emerging insights about the limitations of supply chains and workforce availability to be factored in as new initiatives in these areas start to show results. As this type of data becomes available, it is likely to be highly useful for AEMO and will allow for a more accurate assessment of the costs and timeframes for delivering ISP projects.

Action – Additional planning inputs

AEMO should take advantage of the significant focus being given to environmental and regional planning for energy infrastructure, and improving data on supply chain limits, workforce constraints, location-specific environmental information and community sentiment, and consider where the outputs of this work can be incorporated into the 2026 ISP.

3 Implementation

Implementation of the actions outlined in this report will require changes to the legislative framework that governs the development of the ISP, and establishment of enhanced data and modelling approaches. AEMO's ability to implement the changes necessary is in part subject to the timing of the legislative and regulatory changes. Every effort will be made to ensure that changes to the legislative and regulatory framework are settled as soon as possible. Through these processes, stakeholders will be provided with the opportunity to be consulted on the potential rule changes pursued. In addition and noting the upcoming preparations for the 2026 ISP, Energy Ministers intend to provide a joint statement to AEMO to provide guidance on policy expectations and objectives.

With regard to the development of appropriate data and modelling approaches, AEMO has demonstrated a deep level of expertise in its operation of the existing ISP framework. As part of its assessment, the review considered the practicalities involved in implementing the actions outlined above. Noting AEMO's significant expertise, we do not seek to form a view on which particular approach is most appropriate, but consider that AEMO is best placed to determine the approach based on its own assessment.