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Australian Energy Market Operator

Submitted via email to: [ISP@aemo.com.au](mailto:ISP@aemo.com.au)

To whom it may concern,

### **Climateworks Centre submission on the Draft 2024 Integrated System Plan**

Climateworks Centre (Climateworks) welcomes the opportunity to provide a submission to the Australian Energy Market Operator (AEMO) on its Draft 2024 Integrated System Plan (ISP).

We develop expert, independent solutions to assist the transition to net zero emissions for Australia, Southeast Asia and the Pacific in line with limiting global warming to 1.5 degrees Celsius. Co-founded by the Myer Foundation and Monash University in 2009, Climateworks is an independent not-for-profit working within the Monash Sustainable Development Institute.

Climateworks and CSIRO have been engaged by AEMO to conduct multi-sector modelling to quantify the dynamic influences that would shape electricity demand under different emission reduction scenarios. Aside from this role in supporting the modelling and analysis, Climateworks values the opportunity to make this contribution to the ISP.

The prospect of limiting global warming to 1.5 degrees is narrowing. An ISP with a robust and rapid pathway for the decarbonisation of the NEM is vital if Australia is to meet its obligations under the Paris Agreement. The recommendations in this submission will lift the speed of the renewable energy transformation and retain the reliability, security and affordability of the NEM. Our propositions apply to both the Draft 2024 ISP and the process for creating the 2026 ISP.

### **Context: The role of Australia's electricity supply in meeting the objectives of the Paris Agreement**

Electricity generation is Australia's largest source of greenhouse gas emissions. The ISP will therefore be a crucial tool in guiding an orderly transition as coal and gas generation decline. Alongside eliminating emissions from electricity generation, the adoption of renewables is integral to the decarbonisation of industry, buildings and transportation through electrification, powered by zero emissions energy.

Climateworks modelling shows that a Paris-aligned least-cost pathway for Australia can be achieved with renewable energy, backed up by storage, accounting for 85-90 per cent of electricity generation by 2030. This modelling also suggests the overall size of the electricity system will expand from 55 GW today to 137–151 GW by 2030 and 363–398 GW by 2050.<sup>1</sup>

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<sup>1</sup> Climateworks Centre, Climateworks Centre decarbonisation scenarios 2023: Australia can still meet the Paris Agreement,

<https://www.climateworkscentre.org/resource/climateworks-centre-decarbonisation-scenarios-2023-australia-can-still-meet-the-paris-agreement/>

## Feedback on the Draft 2024 ISP

### **Prioritise greenhouse gas emissions reduction targets when determining the optimal development path**

The National Electricity Objective requires AEMO to promote investment in and enhance the operational efficiency of the NEM, with a view to achieving greenhouse gas emission reduction targets.<sup>2</sup> The ISP should, therefore, drive clean energy investment and offer flexibility at a time when the future of markets and technologies is uncertain. That ambition is particularly important for the 2024 ISP, given the influence it could have on the Electricity and Energy Sector Pathway currently being developed by the Australian Government.<sup>3</sup>

To date, the deployment of consumer energy resources has outpaced optimal development path projections and the rate of utility-scale renewable energy deployment has been uncertain. The ISP could be improved if the prospect of renewable energy uptake exceeding forecasts is considered.

Climateworks recommends that AEMO identify where differences between the *Step Change* and *Green Energy Exports* scenarios exist, and give appropriate weight to 'emissions reduction potential' in its determination of the optimal development path. The role of the ISP now extends beyond establishing a pathway for a safe, reliable and secure NEM; it must also prioritise the renewable energy transition. This will enhance the effort to meet greenhouse gas emission reduction targets and help energy market actors prepare for uncertain future energy system dynamics, including a faster-than-expected uptake of renewables. The *Progressive Change* scenario should not be considered as it does not align with the National Electricity Objective.

### **Economic benefits of green energy exports reflected in the Green Energy Exports scenario**

Australia's bountiful supply of wind, sun, and critical minerals, and its sophisticated industrial capability uniquely place it to benefit economically from renewables. According to the Draft 2024 ISP, the energy transition will create 30,000 new jobs, provide economic expansion opportunities to rural and regional Australia and generate expansive export opportunities across green steel, aluminium, hydrogen and the processing of critical minerals. The Climateworks 2023 'Pathways to Industrial Decarbonisation' report sees a comparable potential.<sup>4</sup>

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<sup>2</sup> Australian Energy Market Commission, National Energy Objectives, <https://www.aemc.gov.au/regulation/neo>

<sup>3</sup> Australian Government. Electricity and Energy Sector Pathway. <https://www.dceew.gov.au/energy/strategies-and-frameworks#:~:text=The%20Australian%20Government's%20Powering%20Australia,industry%2C%20agriculture%20and%20carbon%20farming>

<sup>4</sup> Climateworks Centre, Pathways to industrial decarbonisation: Positioning Australian Industry to prosper in a net zero global economy, <https://www.climateworkscentre.org/resource/pathways-to-industrial-decarbonisation-positioning-australian-industry-to-prosper-in-a-net-zero-global-economy/>

Climateworks modelling shows that to align with a least-cost pathway to limiting global warming to 1.5 degrees would require over 350 TWh of electricity generation by 2030 and 600 TWh by 2050. The investment required in industry abatement and transitioning the electricity system would be roughly \$20.8 billion annually until 2050. While that amount is significant, it is less than a tenth of the \$236 billion in value that would be generated each year.

The *Green Energy Exports* scenario is most closely aligned with the objectives of the Paris Agreement.<sup>5</sup> With appropriate investment in integrated regions, supply chains and network solutions and a NEM capable of meeting future electricity demand, a 1.5-degree aligned pathway will offer the greatest environmental and economic benefit. The fiscal advantage of low-emission exports and a green energy industry reinforces the assertion that the expedited transition aspects of the *Green Energy Exports* scenario should be prioritised in the ISP 2024 optimal development path.

## Considerations for the 2026 ISP

### Expand analysis of the role of demand-side energy resources

Consumer energy resources will be an indispensable component of the new energy system. The proliferation of distributed solar PV has outpaced the most optimistic projections, including those of Climateworks. The uptake of residential batteries, heat pump water heaters and zero-emissions vehicles is rising. Technologies such as independently orchestrated virtual power plant (VPP) networks and vehicle-to-grid demand response services will play an important role in the effort to ensure grid flexibility.

However, demand-side markets, technologies and infrastructure remain underdeveloped. There are significant unknowns about how they will operate and their impact. For example:

- What will be the impact of different levels of decentralised energy on transmission requirements?
- What is fair compensation for the contribution of consumer energy resources to the grid?
- What factors are inhibiting consumer participation in VPP networks, and how can these be overcome?
- To what extent could consumer energy resources provide flexibility to the grid?
- What are the regulatory barriers that must be overcome to enable the widespread deployment of demand management technologies?

These and other areas require further analysis and thinking. Given the complexity, it is unlikely a whole system model for the demand side's role in grid flexibility will be developed in the time available to keep global warming on a 1.5-degree pathway. Modelling for discrete components relating to network constraints, flexibility services, efficiency services, electrification, demand management and consumer preferences should therefore be prioritised as part of scenario

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<sup>5</sup> AEMO, 2023 Inputs, Assumptions and Scenarios Report, <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-inputs-assumptions-and-scenarios-report>

planning for the 2026 ISP. Climateworks recommends that AEMO coordinate alongside the National Energy Transformation Partnership framework to engage a collective of trusted organisations to undertake this work.

### **Plan for an orderly phase-out of gas through better demand-side energy management**

Climateworks supports the orderly phase-out of gas use in the electricity sector in line with a least-cost pathway to limiting global warming to 1.5 degrees. By 2050, gas-fired power plants should be utilised only when electricity demand exceeds supply from variable renewable energy or storage. Climateworks' modelling shows gas generation is less than 1 per cent of total electricity generation in 2050

New and existing storage technologies, over-capacity of variable renewable energy and demand-side management could play an increasing role in providing grid flexibility if incentivised appropriately. These approaches can firm the grid at a lower cost than gas, and can do so without emitting carbon.

Climateworks recommends that AEMO prioritise conducting or obtaining more comprehensive modelling that will inform planning of an orderly phase-out of gas. There is presently insufficient data and analysis to allow AEMO to ensure the orderly shutdown of gas infrastructure as assets become underutilised. Modelling should consider the remaining usable life of existing gas infrastructure, existing contractual commitments, the need to maintain grid stability as alternative firming methods are deployed, how zero carbon gas might alter infrastructure requirements, and the sequence, locations, causal factors and economic and social impacts of gas asset and distribution network closures. That analysis could be included in the 2026 ISP to provide clarity to stakeholders and state/territory government energy policy.

Yours Sincerely,

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