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19 February 2024

Daniel Westerman
Chief Executive Officer & Managing Director

Australian Energy Market Operator (AEMO)
L22/530 Collins St, Melbourne
VIC 3000

Via email to: ISP@aemo.com.au

Dear Mr Westerman,

Draft 2024 Integrated System Plan for the National Electricity Market – AGIG submission

Australian Gas Infrastructure Group (AGIG) welcomes the opportunity to provide this submission to the Australian Energy Market Operator (AEMO) on the Draft 2024 Integrated System Plan (ISP) for the National Electricity Market (NEM).

We welcome the Draft ISP and particularly its recognition that the energy system should "operate safely and reliably today while being refitted for tomorrow". As the owner and operator of long-lived gas pipelines and distribution networks, AGIG recognises the imperative to balance the needs of today's energy system with the changes required to secure net-zero emissions.

AGIG is one of Australia's largest energy infrastructure groups with distribution, transmission and storage assets worth over $9 billion. We deliver natural gas reliably, safely and efficiently to over 2 million residential, commercial and industrial customers across Australia. We are committed to decarbonisation and leading the transition from natural gas to renewable gases such as hydrogen and biomethane. We are investing in renewable gas projects - today we have three projects operating or under construction, and a pipeline of several projects at earlier stages which will provide confidence in the deliverability of renewable gas to customers.

We note that the 2024 Draft ISP acknowledges an increased role for gas-fired power generation (GPG), including renewable gases, relative to previous iterations of the ISP. This suggests that there is merit in system planning to remain open to a variety of technology options in dealing with a future that is increasingly uncertain. It also emphasizes the need for the Optimal Development Pathway (ODP) to remain viable across a wide range of scenarios, and for the ISP to be cognisant of developments such as hydrogen production, which can assist in increasing system security. In our view, doing so will ensure that the energy transition is reliable and does not inadvertently result in greater emissions through increased reliance on extending the lives of ageing coal-fired power generation assets.

Natural and renewable gases have demonstrated value in readily responding and absorbing volatility in gas demand. We believe this highlights the need for supportive policies such as a Renewable Gas Target, and the inclusion of renewable gases in the Capacity Investment Scheme (CIS) to encourage the production and supply for natural and renewable gases. Adopting these policies can only contribute to a more resilient system that supports achieving energy transition goals.

Our detailed submission is attached to this letter. Should you have any queries about the information provided in our submission, please contact Shawn Tan, Manager Policy, at shawn.tan@agig.com.au.

Yours sincerely,

Cathryn McArthur
Executive General Manager, Customer and Strategy

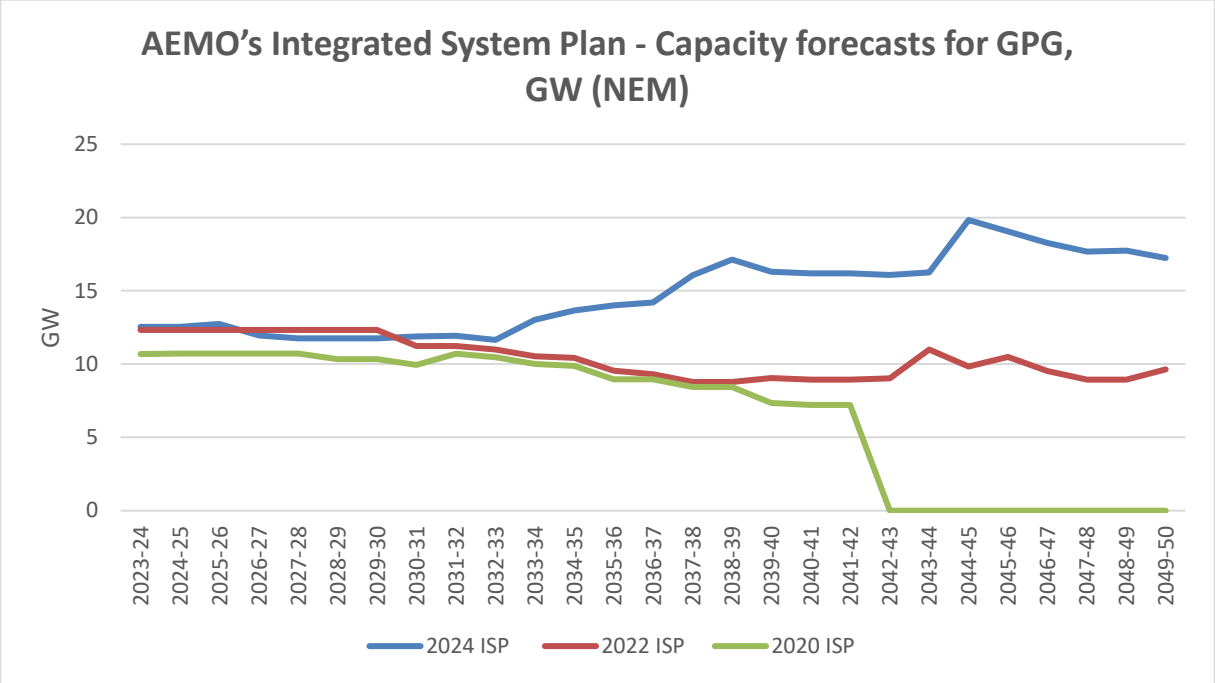
Detailed Submission – AGIG response to Draft ISP Consultation

The role of gas-fired power generation (GPG)

In the Draft ISP, we welcome the growing recognition that gas and GPG today plays an important role in the NEM and Australia's energy system as a whole and will continue to do so as the market transitions to net-zero emissions. GPG currently plays, and will continue to play, a vital role in ensuring the ongoing reliability of the NEM. We have replicated, using data sheets provided on the Draft ISP consultation page, AEMO's forecasts in relation to GPG for discussion below.

As shown by the comparison of consecutive ISP forecasts in **Figure 1** below, the Draft ISP sees a greater role for GPG starting from 2032-33 compared to previous ISPs. The Draft ISP is correct to highlight that this does not equate to more energy delivered, but a need for more capacity to meet peak demand, particularly in winter.

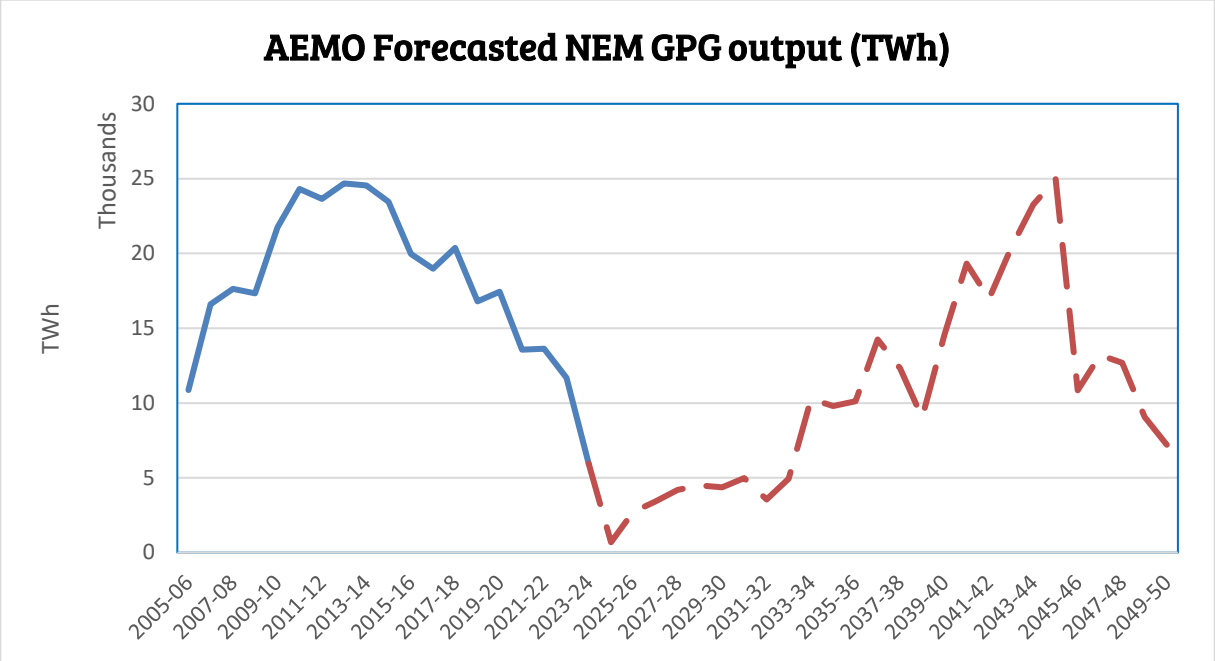
Figure 1 Comparison of GPG capacity from previous ISPs



We note that the variation in forecasts (relative to previous ISPs) above, demonstrates fundamental uncertainties as to the role of various technologies in providing energy and market services over the long term. This is reflected in AEMO's changing forecasts for the role of GPG in the NEM post-2040. As new information is received and projects are delivered, or conversely, fail to be delivered or are delayed, the retention of options ensures that the market can react quickly to changes and pursue investments where needed. In our view this demonstrates the benefit of leaving options open, and taking a technology agnostic approach in light of uncertainty.

A similar conclusion can also be drawn from the **Figure 2** below which highlights the annual variations in GPG output in the forecasts included in Draft ISP.

Figure 2 Draft 2024 ISP forecast of GPG contribution (TWh)



As AEMO would appreciate, the nature of forecasts is inherently uncertain and must be adjusted to reflect actual events as they occur. Boston Consulting Group (BCG) meta-analysis of future gas market projections shows a range of projections between 40 – 90 per cent of current market scale[1], while AEMO's own projections (2023 GSOO) show a 240 PJ p.a variation in forecast residential and commercial annual consumption alone.

From **Figure 2** above, the projected increase from 2022-23 to 2044-45 in output amounts to ~48 PJ to be delivered by investment in 8GW of capacity (as shown in **Figure 1**), with several spikes and drops in demand in between. This is subject to further forecasting uncertainty.

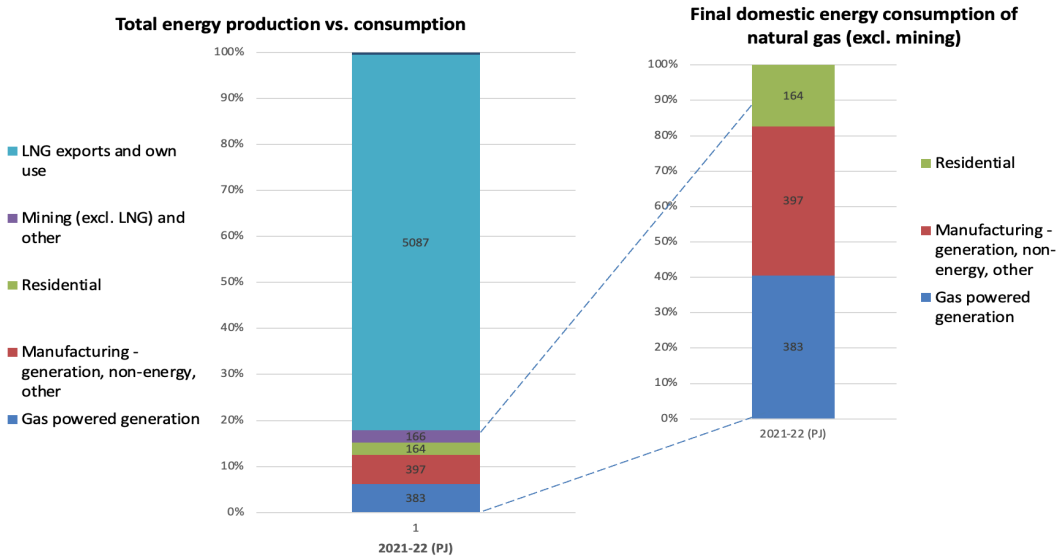
Together these charts demonstrate a fundamental challenge for investors in GPG and associated infrastructure—market and regulatory rules need to support investment in and the ongoing operation of infrastructure that faces uncertainty and variability. However, current energy policies that look at shutting off decarbonisation options (such as Victoria) has resulted in a lack of investment certainty, resulting in delays in replacing an ageing fleet of coal generators that the NEM is still heavily reliant on[2].

To date, investment in much of this infrastructure is underpinned by a diverse customer base; GPG as well as industrial and residential/commercial consumers as shown in **Figure 3** below.

[1] The Role of Gas Infrastructure in the Energy Transition (ROGIET), Boston Consulting Group, June 2023. See: https://www.agig.com.au/gas-infrastructure-crucial-to-australia-energy-transition-

[2] Source: OpenNem at https://opennem.org.au. Over the year from 21 Jan 2023 to 2024, 56.4% of NEM generation was from brown or black coal (~118.8 TWh), particularly in Victoria where 67% (~31.6 TWh) of generation was from brown coal.

Figure 3 GPG share of total natural gas production in Australia



Source: Australian Energy Statistics, Table O

Energy users, including GPG, have different levels of demand over time and are geographically dispersed. As shown in **Figure 3** above, GPG forms around 41% of final domestic energy consumption, with ~28% of this used in the NEM. GPG consumption of gas sits within part of a wider natural and renewable gas supply chain of production and transport. This supply chain requires a transportation network and storage infrastructure with the lowest cost means of moving and storing gases, something that existing pipelines and distribution networks offer today. A diverse customer base supports the delivery of lowest cost energy to market by sharing enabling infrastructure and costs as widely as possible.

However, with current policies such as those in Victoria seeking to close off options to residential and commercial customers and forcing them to pursue electrification, the economics of this infrastructure is likely to change. Government policy interventions to decrease the customer base for use of fixed cost gas infrastructure increases costs to economy as whole - stifling economic activity in sectors that benefit from sharing costs of transporting gases with other customers on the network. Maintaining a diverse customer base, including residential customers, with a transition to renewable gases can result in better outcomes for the economy and emissions.

The Draft ISP recognises this challenge in stating that *"Further market reform is required to ensure incentives are in place for investors to develop an optimal level of capacity"*. We are supportive of AEMO's recommendation that further work to ensure that the market rules can support the optimal GPG capacity and production of gases. We consider this can occur through inclusion of renewable gases in the Capacity Investment Scheme (CIS), and a federal Renewable Gas Target[3] to encourage the production and demand of renewable gases. This will also have the benefit of ensuring that associated infrastructure is financeable over the long term.

Optionality and broader system planning

While the ISP has no legislative role in the planning, delivery and operation of gas pipelines, the ISP's inputs, assumptions and outcomes will have significant implications far beyond the electricity system

[3] See https://www.energynetworks.com.au/news/energy-insider/2023-energy-insider/renewable-gas-policy-options-to-support-australias-decarbonisation-journey/

to gas users and asset owners. The inherent variability and uncertainty for GPG outlined above, is also likely to be prominent for other uses of gas (including renewable gases in the medium-term).

Optionality is an efficient response to uncertainty. Providing more options in response to increased reliance on ageing coal-fired generation fleet[4] and delays in transmission and renewables development will aid in increasing reliability, system security and emissions reduction outcomes. We strongly encourage the ISP to consider several important parallel developments that affect NEM demand and the ODP, being the ability of hydrogen production to support the grid at times of minimum demand, and the role of gas-usage in achieving emissions reduction outcomes.

Hydrogen production supports the grid at times of minimum demand

The Draft ISP can take into consideration broader complementarities between hydrogen production and grid stability. As per Figure 4 below, AGIG's Hydrogen Park (HyP) South Australia[5] operation has demonstrated its ability to support the grid at times of minimum demand and surplus renewable energy. Other similar projects, currently being constructed in Victoria[6] and Queensland[7], and our project pipeline, are expected to provide similar benefits and help increase the availability of renewable energy.

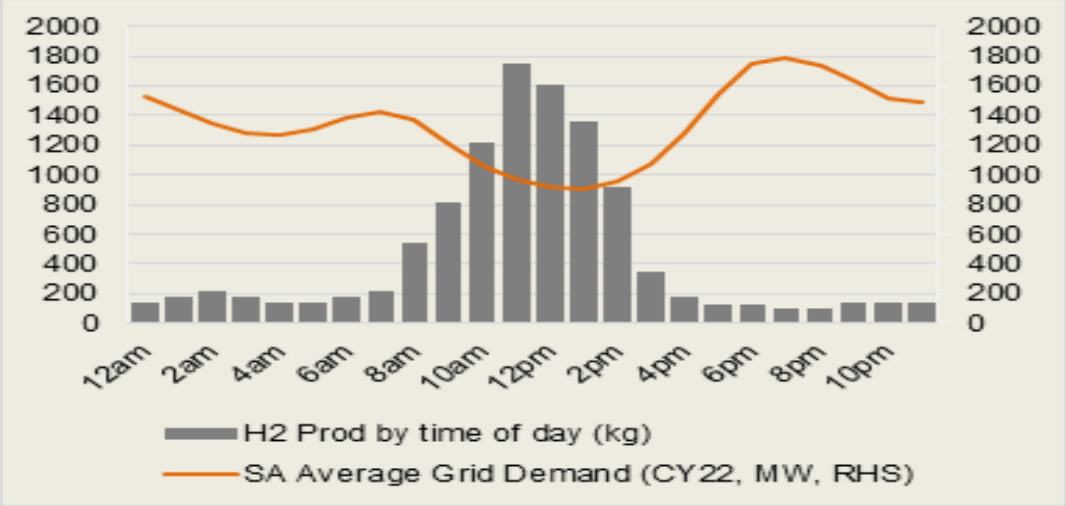
Hydrogen production supports the grid at times of minimum demand – HyP South Australia

Renewable hydrogen production for other uses can complement grid-connected renewable electricity and Renewable Energy Zones (REZ) by providing a flexible load that can respond to variation in renewable electricity generation (as demonstrated at our Hydrogen Park South Australia (HyP SA)). This improves the commerciality for existing and planned renewable electricity generation.

Error! Reference source not found. shows hydrogen production from HyP SA and SA grid demand over a 24 hour period. The figure illustrates that during periods of low electricity demand and high solar and wind generation (mid-day between 10AM to 2PM), hydrogen production increases at a time when electricity prices are low. It can also enhance grid stability whilst overcoming renewable electricity curtailment at times of low demand and help lower transmission augmentation costs over time. Combined this could reduce the cost of renewable electricity generation and transmission infrastructure.

Hydrogen is produced at HyP SA when wholesale electricity costs are low. However, approximately 73% of the operational costs for production at HyP SA is driven by electricity network costs.

Figure 4 - HyP SA hydrogen production against the "duck curve"



Source: HyP SA Operational Dashboard – February 2023

[4] See https://www.theaustralian.com.au/nation/outages-at-loy-yang-a-highlight-vulnerability-of-victorias-power-grid/news-story/647c8de5342b71abfc1af39690c549a8

[5] See https://www.agig.com.au/hydrogen-park-south-australia

[6] See https://www.agig.com.au/hydrogen-park-murray-valley

[7] See https://www.agig.com.au/hydrogen-park-gladstone

In the longer term, and as shown in Figure 5 below, producing renewable hydrogen in Renewable Energy Zones (REZ) can allow renewable hydrogen to be transported via the distribution networks to demand centres[10]. It can also reduce the investment required in electricity transmission and create the business case for the build out of renewable electricity and its offtake for times when the electricity grid is constrained, or when electricity wholesale prices are low.

Figure 5 Co-location of existing distribution network and REZ

Source: Australian Hydrogen Centre

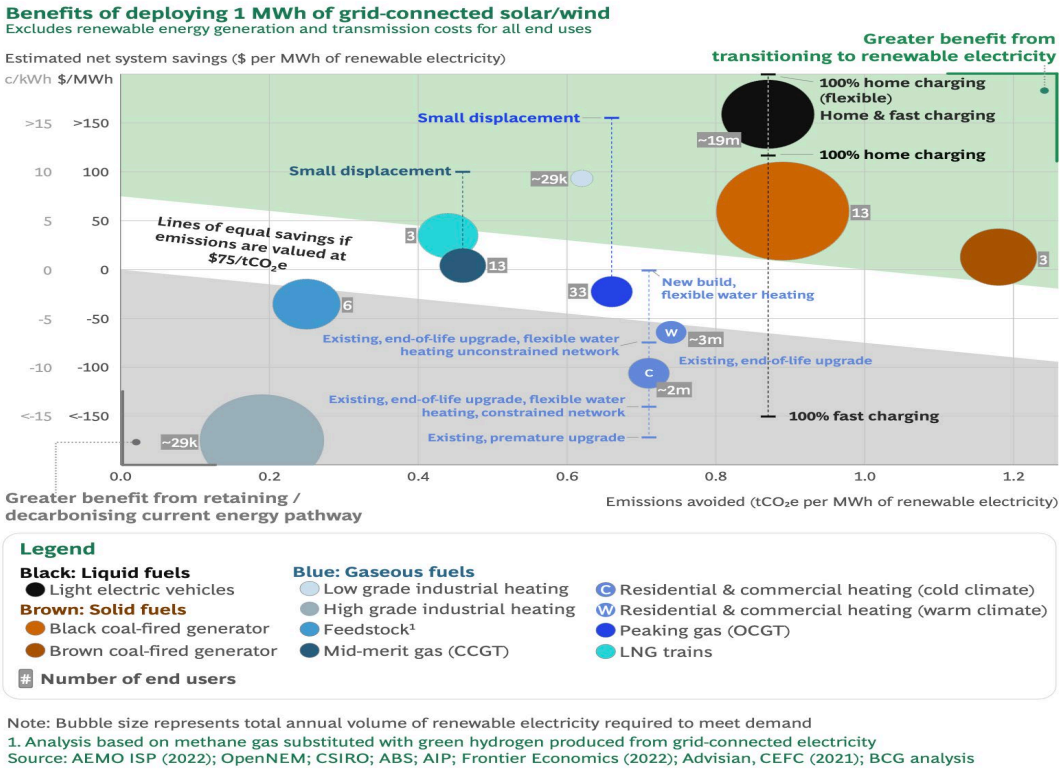
The role of gas infrastructure in achieving emissions reduction outcomes

Recent evidence shows the assumptions around electrification for gas users (including industry, residential and commercial) could result in higher emissions than alternative pathways with continued gas usage in the medium-term. The *Role of Gas Infrastructure in Australia's energy transition Report* (ROGIET Report) identified that the greatest system savings and emissions reduction benefits are achieved by a tiered approach to the removal of fossil fuels. This is where grid connected renewable electricity is first applied to displace coal-fired power generation and liquid fuels, leaving residential and commercial heating, high grade industrial heating and gas as a feedstock to the last phases.[8] Therefore we consider alternative pathways for gas usage should also be investigated as part of the ISP.

Natural gas has considerably lower emissions than coal; brown coal has an emission factor of 93.5 kg CO2-e/GJ compared to natural gas at 51.4 kg CO2-e/GJ[9]. In a generation mix still dominated by black and brown coal, the benefits in terms of emissions reduction by prioritising the replacement of coal-fired generation are approximately double to triple for peaking gas (open cycle gas turbine) and mid-merit gas (closed cycle gas turbine) respectively as outlined in **Error! Reference source not found.** below[10]. Importantly, these emissions benefits apply for both gas fired power generation and residential and commercial heating.

[8] See: BCG, ROGIET Report
[9] See: https://www.dcceew.gov.au/climate-change/publications/national-greenhouse-accounts-factors-2021.
[10] See: BCG, ROGIET Report, Refer to Exhibit 6, p9

Figure 6 Extract from BCG's Role of Gas Infrastructure in the Energy Transition report – Exhibit 6, p9



Note: Bubble size represents total annual volume of renewable electricity required to meet demand
1. Analysis based on methane gas substituted with green hydrogen produced from grid-connected electricity
Source: AEMO ISP (2022); OpenNEM; CSIRO; ABS; AIP; Frontier Economics (2022); Advisian, CEFC (2021); BCG analysis

Figure 2 of the Draft ISP projects a steady increase in offshore wind from 2030-31, assuming 1GW of capacity online in 2030-31, gradually increasing to 9GW by 2039-40 – this is expected to coincide with replacement of brown coal generation in Victoria. The importance of optionality is especially relevant in the context of recent announcements[11] that risk delaying the actualisation of these forecasts. Delays are likely to result in an increased role for alternative sources of energy in future ISPs. This might include GPG, or as has been the case in Victoria, extending the life of coal power stations, which would be inconsistent with emissions reduction objectives.

Coal retirement risks, social licence and supply chain risks for renewable generation and transmission deployment, can each be ameliorated by maintaining a portion of gas usage (and by transitioning to renewable gases instead of electrification). More attention needs to be given to broader system planning that takes account of options across the energy system—not just in the electricity system.

We consider a broader range of uncertainty needs to be taken into account in how the ISP treats gas use and electrification as inputs. Alternative pathways can deliver lower costs and lower emissions during the transition and could alter the ODP. In this regard, we welcome efforts underway to allow AEMO to undertake a broader ISP process (a "supercharged" ISP)[12], and strongly support the ISP taking into consideration multiple options to deliver a resilient, reliable and safe pathway to emissions reduction.

[11] See, for example: https://www.theage.com.au/politics/victoria/the-projects-that-would-supercharge-victoria-s-green-energy-future-but-are-stuck-in-limbo-20240106-p5eviy.html
https://www.smh.com.au/politics/federal/plibersek-blocks-construction-of-port-for-victoria-s-first-offshore-wind-farm-20240108-p5evqi.html
https://www.cleanenergycouncil.org.au/resources/resources-hub/renewable-projects-quarterly-investment-report-q3-2023

[12] See https://www.energy.gov.au/energy-and-climate-change-ministerial-council/energy-ministers-publications/terms-reference-review-integrated-system-plan