

Via email to ISP@aemo.com.au

11 February 2022

Re: Jemena submission to the 2022 Draft ISP Consultation

Jemena welcomes the opportunity to provide input into the Australian Energy Market Operator's (AEMO's) consultation into the Draft Integrated System Plan (ISP) 2022.

Jemena owns and operates a diverse portfolio of energy assets across the east coast of Australia. With more than \$11 billion worth of major utility infrastructure, we supply millions of households and businesses with these essential services every day. Our existing portfolio covers both gas and electricity, and we have strong growth aspirations in both gas and electricity markets, as we see the need to invest in both sectors to enable Australia's transition to net-zero carbon emissions by 2050.

We greatly value the role AEMO plays in developing the Draft ISP, among its many other mandates. We recognise that modelling our electricity system, with its various economic, physical, and social drivers is a complex task; especially given the high degree of community and media focus on the energy transition.

Jemena welcomes the evolution of AEMO's approach to preparing this Draft ISP, reflecting extensive stakeholder consultation undertaken to date. In particular we welcome:

- **Increased focus on scenarios consistent with Australia achieving net-zero emissions by 2050:** The selection of *Step-Change* as the most likely scenario and the increasing stakeholder consideration of the *Hydrogen Superpower* reflects increasing stakeholder consensus around the need for Australia to achieve net zero emissions and the opportunities that could arise from it.
- **AEMO's recognition of the role of gas-powered generation as a critical element in least-cost net zero futures:** We see the ability of gas-powered generation—and gas infrastructure more broadly—to deliver huge amounts of energy at times of most need to be absolutely critical to the long-term stability of Australia's energy system.
- **The Hydrogen Superpower scenario placing gas infrastructure at the centre of the energy transition while enabling new export sectors:** Jemena firmly believes that gas and gas infrastructure has the ability to unlock Australia's fastest, most reliable, and highest value transition to net-zero carbon emissions. We welcomed the fact that the scenario with the fastest transition to a stable low level of emissions did not assume large-scale household electrification.
- **AEMO's focus on enabling Renewable Energy Zones (REZ):** We believe REZs will be fundamental to enabling the decarbonisation of Australia's electricity system, and appreciate the Draft ISP's identification of critical actions required to deliver them.

The ISP's purpose in the National Electricity Rules is "... *to establish a whole-of-system plan for the efficient development of the power system that achieves power system needs for a planning horizon of at least 20 years for the long-term interests of the consumers of electricity."*

The remainder of this submission sets out our understanding of how the ISP and the process around it need to continue to improve to better serve this purpose.

The ISP must reflect the technical-economic constraints of the gas system

The long-term interests of consumers of electricity must be understood in the context of the energy system as a whole, of which electricity is one part.

As noted earlier in this submission, we support AEMO's recognition of the value of gas-powered generation in the Step Change scenario, in that it will "*complement battery and pumped hydro generation to support periods of peak demand, particularly during long 'dark and still' weather periods, as well as provide power system services to provide grid security and stability.*"

If AEMO is to assume that gas infrastructure can operate to deliver the 9 gigawatts of capacity required to ensure system security in the Step Change scenario, then it should have a clear idea of how the gas system will be able to operate to deliver this capacity.

We—like AEMO—recognise gas infrastructure's ability to deliver huge amounts of energy across a wide range of time scales cheaply and reliably, at the times it is needed. We further note that the times of peak gas demand tend to be on winter mornings and evenings, when solar generation will not be operating, and wind may not be.

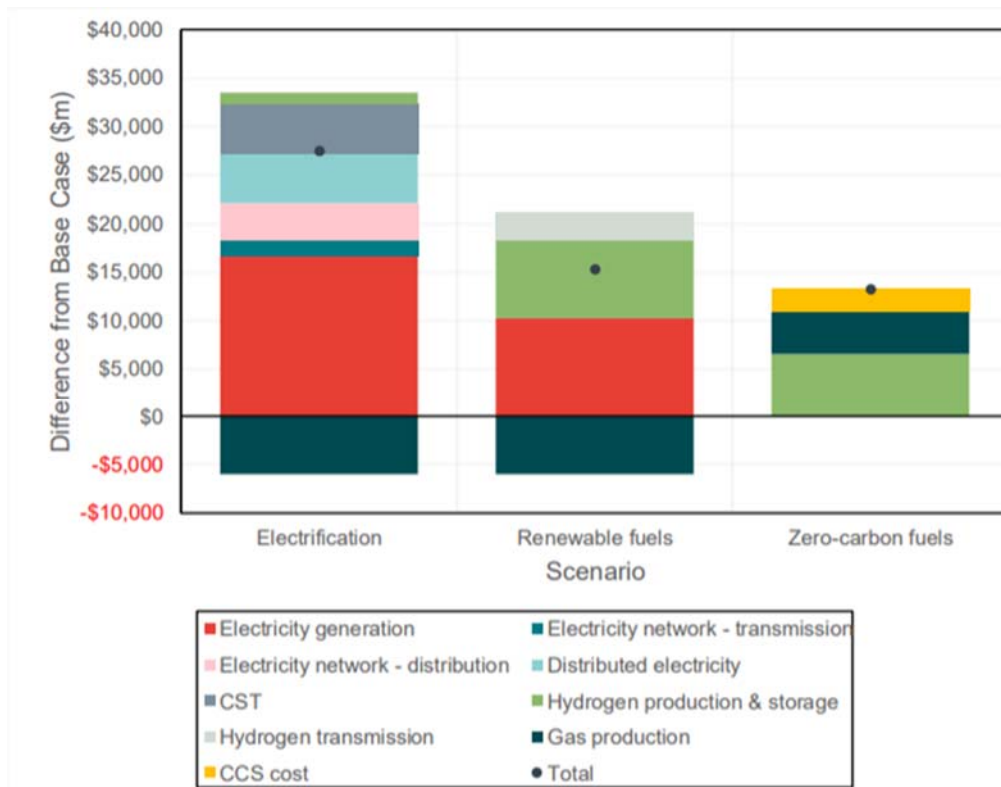
The ability for gas infrastructure to deliver this capacity and volume as and when required is currently achievable due in part to the scale of the current gas industry in Australia.

The Step Change scenario assumes near-complete electrification of households and industry. It also assumes gas-powered generation capacity roughly the same as it is today, yet total gas demand across the system would be a tiny fraction of what it is today.

Reshaping the gas system to meet demand under the Step Change scenario would present serious economic and engineering challenges. Major challenges would include maintaining the economic and financial viability of gas distribution infrastructure for residual users, maintaining pressure and safety as capacity remains high but volumes decline drastically, and adding instantaneous storage to meet peak demand capacity.

If these challenges are overcome the gas infrastructure may well be able to deliver the capacity required in the Step Change scenario, however research from the gas industry presented in [Gas Vision 2050 Update](#) from September 2020 suggests that greater benefits to society are created from using gas infrastructure in a more fulsome way, rather than just reserving it for gas powered generation. Our research suggests that decarbonising the existing gas network through renewable gases is likely to create \$12 billion of economic benefits per year from 2050 for consumers compared to the cost of full electrification.

Figure 1: Cost benefit analysis of Australian net zero energy futures enabled by electrification gas versus zero carbon gas pathways



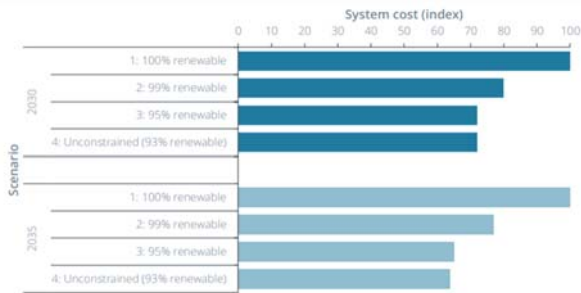
Source: Energy Networks Australia (2020), Gas Vision 2050

We also endorse the Australian Pipeline and Gas Association’s submission to the Draft ISP process and the attached report *Pipelines vs Powerlines: A Techno-economic Assessment in the Australian Context*, which finds that energy transport via hydrogen pipelines costs significantly less than HVAC or HVDC powerlines, and that energy storage in hydrogen pipelines costs less than energy storage in battery or pumped hydro storage. Consideration of the role of hydrogen pipelines will be critical to understanding the electricity system that will create the most benefits for Australian energy users.

While we understand the task of the ISP is to identify least-cost scenarios, we could encourage the inclusion of a scenario in which gas infrastructure, and gas-powered generation is not available to support the electricity system as it does today. While we understand this is likely to be unfeasible, some stakeholders explicitly advocate for exactly this future. We believe it would be useful to assist the broader market in understanding likely least-cost pathways for Australia’s energy transition going forwards.

The Australian Pipeline and Gas Association commissioned Frontier Economics in 2021 to study the question of the role of gas powered generation in unlocking least-cost electricity generation fleets. It found that “total resource costs are reduced by as much as 36% when gas-powered generation is used to support a renewable electricity system” looking at the South Australian electricity system in 2030 and 2035. See Figure 2 below for an illustration of these results.

Figure 2: Indexed electricity system costs for South Australia in 2030 and 2035



Source: APGA (2021), [Potential for Gas-Powered Generation to support renewables](#)

The ISP must identify no-regrets policies, alongside no-regrets transmission investments

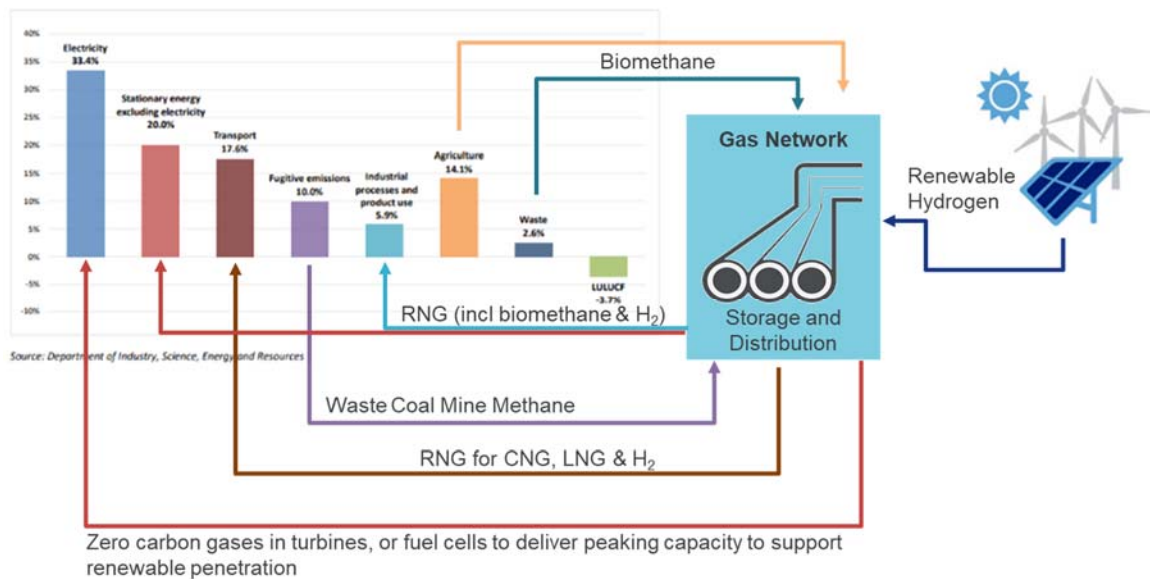
The ISP identifies least regret transmission investments. We believe the ISP would better serve its aims if it also identified the least regret policies to enable the futures that would best serve Australia’s energy users.

The ISP already makes some significant assumptions about the policy landscape, some explicit and some implicit. For example, it explicitly includes the policy-driven roll-out of distributed energy resources (DER) without commenting on the potential costs or benefits to the system as a whole, and it implicitly assumes that policy reform will be undertaken to enable 30 gigawatts of vehicle-to-grid demand response from households. We believe that, where policies potentially have a material impact on the long-term interests of energy consumers, the ISP should clearly identify them.

Jemena believes that a renewable gas target (RGT) aiming for at least 10% renewable gas—green or renewable hydrogen, or biomethane—in Australia’s gas market by 2030 would be a no-regrets policy. We believe that adopting an RGT now has the potential to open the pathway to the Hydrogen Superpower with all of the benefits it affords.

By contrast, we believe policy-driven electrification of gas demand is likely to harm Australia’s energy consumers in the long term if pursued today. We believe the gas network can create a wide range of sector coupling benefits that would be foregone if large-scale electrification was pursued as a policy goal. These potential benefits are depicted in Figure 3.

Figure 3: Sector shares of Australia’s emissions in 2020, and potential opportunities for sector coupling



While we appreciate the complexity of wading into an already-polarised policy debate around energy and the energy transition, AEMO is well-placed to understand the whole-of-system costs and distributional impacts associated with key policies and to credibly communicate about them.

AEMO must consider risks to the development of transmission infrastructure

Augmenting the capacity of the transmission network is critical to enabling Australia's energy transition, yet AEMO must consider risks to its development and how they may impact on the likely path of the scenarios in its Draft ISP.

Transmission projects are large, complex investments with a wide range of stakeholders, and a history of exceeding costs and time deadlines. The cost of the South Australia-New South Wales interconnector increased from \$1.53 billion at the start of its Regulatory Investment Test for Transmission (RIT-T) to \$2.28 billion at the approval. A number of projects considered committed and anticipated are currently delayed due to social licence concerns, which are not likely to reduce with time.

We believe it would be prudent for AEMO to model a range of contingencies for the capital costs and timelines of transmission projects in the development of its scenarios and identification of the Optimal Development Path.

AEMO must be mindful of how the ISP influences the national conversation around the energy transition

While AEMO prepares the ISP for a specific purpose, it has broader impacts on the national conversation about the energy transition and how it is likely to play out.

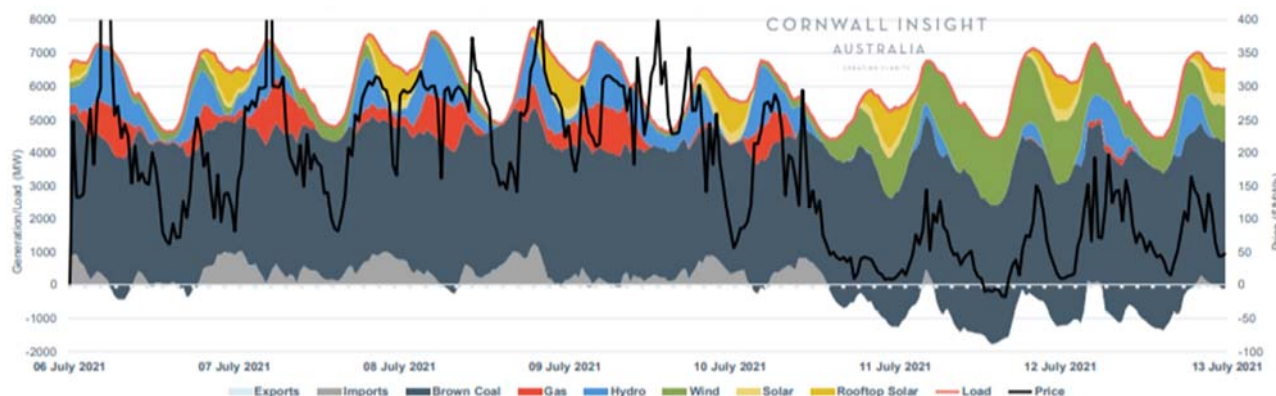
AEMO is clear in Draft ISP that it is using a perfect foresight methodology, where it knows exactly what the supply and demand balance will be on any half-hour period between now and 2050. This methodology has its uses, but it will systematically underestimate the need for "insurance" firming technologies, necessary to respond real life variation, like batteries, pumped hydro, and gas-powered generation.

Yet, despite AEMO's clarity, some actors in the media and a range of other stakeholders seem to use the scenarios in the Draft ISP for broader purposes, such as to predict the likely amount of gas-powered generation likely to be required (or not required) through Australia's transition to net zero emissions.

Today, natural gas provides critical flex and insurance in Australia's electricity system at the minute-by-minute, day-by-day, and year-by-year time-scales by being able to ramp up to deliver large amounts of energy in short time periods, then ramp down again. These gas plants stand ready to provide system strength and resilience and critical peaking capacity as renewables fluctuate and other forms of generation or transmission may be interrupted.

We can see an example of this with the wind drought that the Victorian system experienced from 6-10 July 2021, when Victorian wind farms experienced a capacity factor of 7 per cent—coincident with outages in the Callide and Yallourn coal power stations. Figure 4 below shows the generation by technology and electricity price for the week in question.

Figure 4: Generation by technology and electricity price in Victoria, July 2021



Source: Cornwall Insight Australia (2021). Chart of the week, Issue 92.

Gas-powered generation was able to ramp up to help meet the load over several days, then ramp down again as wind returned. Yet these unforeseen—and unforeseeable—events regularly drive significant portions of both the capacity and output of gas powered generation in any given year.

Given the potentially catastrophic consequences of underinvestment in “insurance” technologies, we believe AEMO should inform the market and the media of the relationship between the electricity systems seen in the ISP and the electricity system it will be prudent to develop in the real world.

A stable, affordable transition to net zero emissions will be of most benefit to all Australians

Like AEMO, we have a responsibility to our customers and to all energy users to “keep Australia’s lights on—and its water hot—now, and in the future” by maintaining electricity and gas reliability and keeping prices affordable so that no one is left behind through Australia’s transition to net zero emissions. Managing the reliability and affordability points of the energy trilemma effectively will give us the strongest social license to deliver the transition.

We have appreciated AEMO’s engagement on the Draft ISP to date and will continue to engage to represent our views and those of our customers. This collaborative approach will be critical going forward to bring all stakeholders along as we navigate the profound transformation of our energy system in the coming decades.

If you would like further information on Jemena’s views about the Draft ISP, please contact John Cheong-Holdaway at john.cheong-holdaway@jemena.com.au.

Yours sincerely,

Shaun Reardon
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