

## SUBMISSION

Submission to the Australian Energy Market Operator

# Submission to the draft Integrated System Plan Consultation

16 February 2024

**The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.**

The draft Integrated System Plan (ISP) is a significant shift from the previous plan. The strong focus on building a path to a renewable-led energy system is to be highly commended. As ATSE has previously argued, Australia should get to net-zero emissions by 2035 (ATSE, 2023) and the National Electricity Market will be a central aspect of that transition. Nonetheless, it is important to ensure that this transition be managed to maintain a consistent supply to consumers and manage emerging risks. Many of these risks are typical for any large infrastructure project, but unique risks such as the impacts of climate change on hydro generation and pumped hydro storage, and the competition for hardware as all nations push towards net-zero emissions, need to be managed. Building a clear social licence for new generation, storage and transmission infrastructure will be essential to ensuring projects are not delayed or prevented by local communities who have not been engaged in the energy transition.

ATSE makes the following recommendations to strengthen and support implementation of the ISP:

**Recommendation 1:** Ensure contingencies for cost increases, operational delays and changing climate are built into planning for reaching emissions reductions targets.

**Recommendation 2:** Maintain a technology neutral approach and engage with emerging technologies as they become commercially viable.

**Recommendation 3:** Target the development of renewable energy zones in locations where the development of renewable energy, and its associated transmission infrastructure, can provide positive social impact to local communities.

**Recommendation 4:** Integrate new energy generation with local industries to help articulate the benefits to local communities.

**Recommendation 5:** Establish clear market mechanisms and investment plans for the development of firming technologies like medium-/long-term storage and firming gas generation.

## Managing risks to meeting the ISP's goals

While achievable, meeting the goals outlined in the ISP will require the management of significant risks. As mentioned in the ISP, projects risk major delays and cost blow-outs. As the world moves towards decarbonisation, there is likely to be robust global competition for key hardware which, barring a massive scaleup in local production, will require sourcing overseas. This introduces vulnerabilities into the planning that need to be accounted for if Australia is to meet its emissions reductions targets on time.

Accounting for future possibilities must also account for the impacts of climate change itself. In Tasmania (the only state to have reached 100% of annual demand being sourced from renewables), more than 80% of power is produced from hydro-electric systems (Department of State Growth, 2023). Changes to the amount and variability of annual rainfall as the climate continues to warm may put pressure on stored water supplies, potentially restricting hydro power generation. The use of pumped hydro for energy storage may also be at risk, as a potential decline in rainfall is combined with increased evaporation as the climate warms (Helfer et al., 2012). This has already happened internationally (Davidson, 2022). Planning must therefore account for the possibility of the reduced utility of hydro power and pumped storage as the climate warms.

To manage these risks, a mix of technologies will be needed. This approach should take a technology neutral stance, where a mix of commercially viable options are used, and emerging technologies are supported. This will be particularly necessary post 2030, as the National Electricity Market seeks to go beyond the 82% renewables target on the road to net zero. Adopting a mix of technologies over a large geographical area will also produce a more stable grid, capable of dealing with variable local weather conditions.

**Recommendation 1:** Aim to reach 82% renewables prior to 2030 to ensure that contingencies for cost increases, operational delays and changing climate are built into planning for reaching emissions reductions targets.

**Recommendation 2:** Maintain a technology neutral approach and engage with emerging technologies as they become commercially viable.

## Developing a social licence for the energy transition

Developing a social licence for change will be crucial to AEMO meeting its renewable energy goals. Failing to bring communities along with the transition will result in delays at best and risk the future of projects at worst. This can already be seen with offshore wind projects in the Hunter and Illawarra regions, where misinformation and perceptions of poor engagement with the local communities has led to large protests and the politicisation of energy projects (Wilson, 2023). Similar issues with transmission lines have seen farmers' groups refuse access to transmission lines along vital transmission routes (Kelly & Morton, 2023). It cannot be assumed that local communities will support projects that deliver negative local outcomes for the wider positive benefit of others.

Renewable energy projects and the associated transmission infrastructure need to deliver real benefits to local communities, and not just the landowners on whose property the development occurs. Consultations need to be open, constructive and genuine to build trust in projects, combat misinformation and allow adaptation of projects to meet community expectations. Adopting the best practice of wind developers represents a key model.

Consultation will also need to be sensitive to cultural practices and decision-making structures of these communities. This is particularly important in remote Aboriginal and Torres Strait Islander communities and other communities. Ensuring that communities see economic benefits from projects, either through compensation or local investment in projects, will be a part of this. Projects should align with community needs and be targeted in locations where they can provide positive impacts on the local community.

Engaging with local industries is one way this can be achieved. Cheap, renewable local power could help mining communities to expand into adding value through the processing of ores into green metals, while petrochemical processing could be linked with the necessary firming gas extraction. Local energy projects supporting communities to build new diverse industries will make taking on renewable projects more attractive to communities. Leadership on building social licence will need to extend beyond AEMO, incorporating the efforts of state and federal governments, as well as local government leaders who can use their trusted position in local communities to help promote the benefits of projects.

**Recommendation 3:** Target the development of renewable energy zones and its associated transmission infrastructure in locations where the development of renewable energy can provide positive social impact to local communities.

**Recommendation 4:** Integrate new energy generation with local industries to help articulate the benefits to local communities.

## Supporting consistent supply

With current technologies, a renewable-led energy system will need to rely on storage and firming capacity to deal with dips in generation and ensure a continuous supply of energy to consumers. As noted in the draft ISP, there is a strong need for medium length storage (4-12 hours) to help ensure supply is available to meet demand instantaneously, as well as long generation storage such as pumped hydro to address renewable variability. The draft ISP further notes that 16GW of gas-powered generation is needed by 2030 – an approximately 45% increase in generation (not accounting for current generation that is due to retire). The market mechanisms to support this pattern of generation are not yet clear. Investors will need certainty around the financial viability of gas generation in a renewable-based network before investing in new gas generation projects. AEMO needs to be a leader in developing this framework and supporting investments in new gas generation and in energy storage systems.

**Recommendation 5:** Establish clear market mechanisms and investment plans for the development of firming technologies like medium length storage and firming gas generation.

*ATSE thanks the Australian Energy Market Operator for the opportunity to respond to the draft Integrated System Plan. For further information, please contact [academypolicyteam@atse.org.au](mailto:academypolicyteam@atse.org.au).*

## References

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