



1 February 2021

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Australian Energy Market Operator (AEMO)

Submitted via email: forecasting.planning@aemo.com.au

Dear Ms Falcon,

AEMO'S DRAFT 2021 INPUTS, ASSUMPTIONS AND SCENARIOS REPORT (IASR)

Origin Energy Limited (Origin) welcomes the opportunity to comment on the draft IASR. We welcome the holistic approach AEMO has taken in developing the scenarios and provide some comments aimed at improving the reasonableness, consistency and transparency of the draft inputs, assumptions and scenarios.

Scenarios

Origin broadly supports the more comprehensive approach that AEMO has taken in developing the 2021 draft scenarios. The scenarios represent a broader range of plausible futures given what we know today. We provide some comments in the table below on the reasonableness and consistency of some scenario inputs and assumptions.

Scenario	Comments
Diversified technology	<ul style="list-style-type: none">• AEMO states that this scenario reflects a world in which affordably priced and secure gas supplies are achieved as part of the Federal Government's plan to lead Australia out of the COVID-19 recession.• It is unclear if this scenario is internally consistent and plausible enough given the underlying inputs and assumptions:<ul style="list-style-type: none">○ Based on the cost assumptions in the draft IASR, it appears that decarbonisation would still occur primarily through solar with storage rather than carbon capture and storage (CCS) technology as assumed by the scenario, due to relative cost advantages.○ It is therefore not clear that there can be outcomes where there are higher levels of CCS technology but lower levels of solar generation as assumed by the scenario.• If the scenario cannot be made internally consistent, AEMO could capture this potential future through sensitivities. These could include sensitivities for decarbonisation occurring through low-emissions technologies (due to aggressive cost reductions), or lower gas prices driven by government intervention.
Sustainable growth & export superpower	<ul style="list-style-type: none">• The inputs and assumptions for this scenario are similar to those used in the export superpower scenario. It is not clear from the descriptions of the scenarios that the outcomes would be sufficiently different.• While we agree that it is worth including a hydrogen market scenario as well as a separate scenario for sustainable growth, AEMO should more clearly differentiate between the two scenarios and explain the likely differences in outcomes.
Export superpower	<p>As noted, we support the inclusion of a hydrogen scenario and provide some comments aimed at improving plausibility and consistency:</p> <ul style="list-style-type: none">• We agree that a step change in hydrogen production as envisaged by this scenario would be largely consistent with greater cost reductions and uptakes in renewable energy and battery storage.

	<ul style="list-style-type: none"> • Greater levels of electrification are likely to help drive hydrogen growth, rather than being a hindering factor: <ul style="list-style-type: none"> ○ Specifically, battery-based electric vehicles (BEVs) are likely to be a complement to hydrogen penetration. ○ The exception might be if there are shortages of battery materials or if fuel cell production costs fall at a much higher rate than expected, which are unlikely to occur. ○ AEMO should therefore not alter BEV forecasts or assume limited growth in BEVs as a result of hydrogen adoption. ○ On the other hand, fuel cell vehicle forecasts appear high. EVs are likely to be the preferred option for cars while fuel cell vehicles are likely to be more common in the heavy vehicle and high utilisation sectors only. • The assumption of 100% hydrogen gas networks by 2045 does not seem plausible. This would require significant and costly asset replacement including for appliances and distribution networks. It would instead be more plausible to assume other green gas products, such as biogas and synthetic methane, are part of the mix. • The scenario assumes that domestic hydrogen consumption is approximately equal to export until 2040, at which point domestic demand is largely saturated and export becomes the dominant growth driver. A more plausible assumption would be for domestic demand to be consistently lower but driven by export markets. In addition, domestic demand being saturated by 2040 is not internally consistent with the assumption of 100% hydrogen gas networks by 2045 as this would keep driving up domestic demand past 2040. • In terms of electrolyzers, both proton exchange membrane (PEM) and alkaline technologies are likely to play a role, with the latter more likely to become the predominant technology in the future. The assumption that electrolyzers have a fixed minimum baseload of 4.5% of total capacity appears to be low – 10% would be a more plausible assumption for alkaline electrolyzers. • AEMO should also consider the potential needs of the different types of downstream processing, such as ammonia or liquefaction plants. These plants could add a significant amount of inflexible load to the grid, which should be captured in inputs and assumptions. • On water availability, AEMO proposes to screen “fresh water” availability. It is not clear if “fresh water” would meet social licence requirements. Sustainable water (e.g., through desalination) would be a more appropriate measure. • The cost of storing hydrogen at ports is likely to depend on the downstream processes used. Some downstream processes may have more significant storage needs to capitalise on the responsiveness of the electrolyzers.
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Inclusion of government policies

We note that AEMO has included committed government policies across all scenarios. We agree that this approach is practical to the extent that the policies included are legislated and budgeted for. The inclusion of government policies should be transparent. AEMO should clearly explain how government policy is expected to affect the market in its modelling. In the case of policies with uncertain implementation timeframes or plans, AEMO should include sensitivities to promote an understanding of the risks associated with delays or changes to these plans.

As an example, while the Tasmanian Renewable Energy Target (TRET) has been recently legislated, it is unclear how the target would be met if MarinusLink does not proceed. It would therefore be appropriate to include a scenario for this eventuality. We note that AEMO has proposed “Central –

MarinusLink funding arrangements not resolved” as a possible risk scenario, which we support. AEMO should explore whether other government policies would be subject to similar risks.

Inputs and assumptions

We provide a couple of comments on gas price forecasts and pumped hydro maintenance assumptions:

- Pumped hydro: AEMO assumes 0% maintenance on pumped storage which appears to be optimistic. AEMO should consider modelling some outages for more realistic planning.
- Gas-powered generation (GPG): The draft GPG projections presented to the Forecasting Reference Group do not appear to incorporate the NSW roadmap and seem inconsistent with IASR assumptions (e.g., the commissioning date for VNI West). The assumptions should be consistent and the roadmap incorporated as it is likely to affect GPG forecasts.

Should you have any questions or wish to discuss this submission further, please contact Sarah-Jane Derby at Sarah-Jane.Derby@originenergy.com.au or by phone, on (02) 8345 5101.

Yours sincerely



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