



9 February 2023

**Attention:** Merryn York

Australian Energy Market Operator (AEMO)

**By Email:** [forecasting.planning@aemo.com.au](mailto:forecasting.planning@aemo.com.au)

Dear Merryn,

**Powerlink Queensland Submission  
Draft 2023 Inputs, Assumptions and Scenarios Report**

Powerlink Queensland (Powerlink) welcomes the opportunity to provide feedback on the Draft 2023 Inputs, Assumptions and Scenarios Report (IASR) and recognises its importance in shaping forecast and planning outcomes of the National Electricity Market (NEM).

Powerlink already has active consultation with AEMO through Joint Planning meetings, various workshops and as a member of the Forecasting Reference Group (FRG). Regarding the IASR, we would like to support but also reinforce several key areas of the document that are integral to capturing and highlighting its breadth and efficacy:

1. Scenario narratives and downside risks.
2. The Queensland Energy and Jobs Plan.
3. Sensitivity analysis of key drivers to scenarios.
4. Near-term calibration of demand components in forecast outcomes.
5. Re-investment cost considerations on transmission augmentation.
6. Network representation in the capacity outlook model.

These matters are addressed in more detail in the attached submission.

If you have any questions in relation to this submission or would like to meet with Powerlink to discuss this matter further, please contact Joe Hemingway.  
Yours sincerely

A handwritten signature in black ink that reads "J. Bridge".

Jacqui Bridge  
**Executive General Manager, Energy Futures**

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## 1. Scenario narratives and downside risks

Powerlink is supportive of the scenario narratives set out in the Draft 2023 IASR. Particularly, the introduction of a scenario that shows an alternative route to how Australia may meet its decarbonisation targets with less reliance on the electricity sector through the 1.8°C Diverse Step Change scenario. We also support a moderated, yet still significant, amount of NEM-connected hydrogen production for export under the 1.5°C Green Energy Exports scenario, which recognises updated views on how this new industry may develop with 50% assumed to be not connected to the NEM.

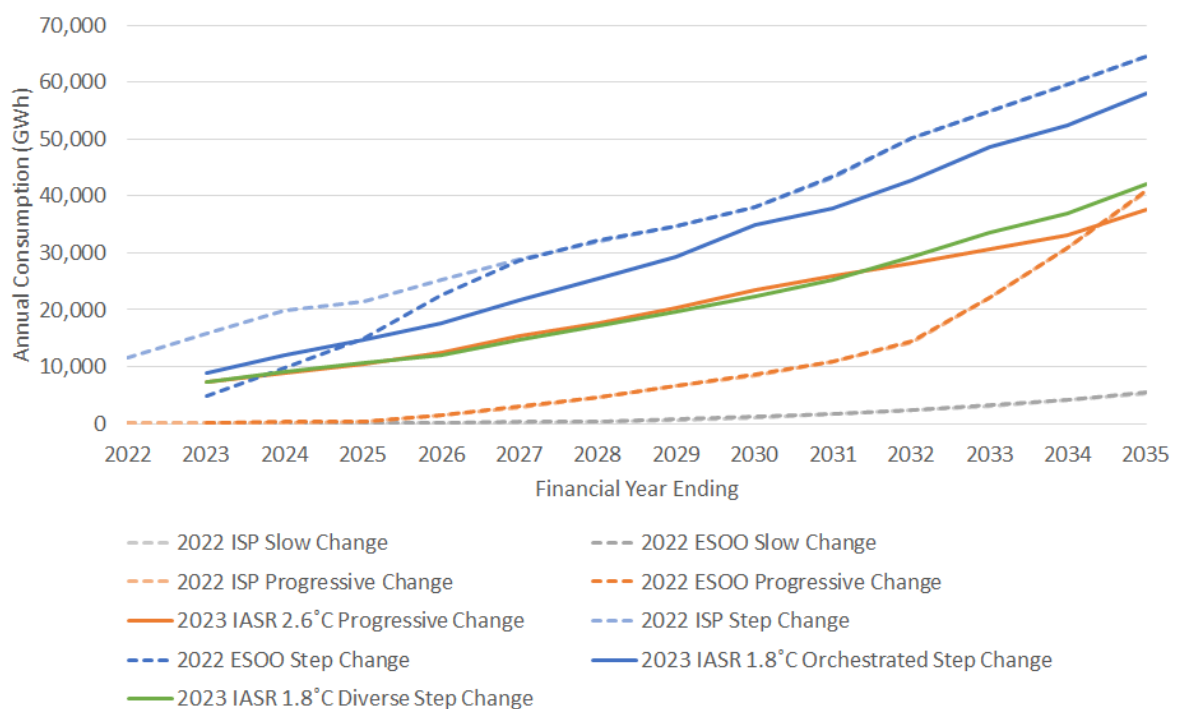
Powerlink acknowledges Australia’s growing ambitions towards a decarbonised economy, and for that reason AEMO has removed the Slow Change scenario, making the 2.6°C Progressive Change scenario the new downside risk case. However, we are concerned that this scenario does not encapsulate enough downside risk to fully explore the range of plausible futures, which is the intention of assessing multiple scenarios.

Specifically, the amount of NEM electrification including the transport sector under the 2.6°C Progressive Change scenario remains much higher than the 2022 Integrated System Plan (ISP) Slow Change scenario over the forecast horizon as well as the 2022 ISP Progressive Change scenario until FY2034-35.

This is exacerbated by a moderation of electrification under the 1.8°C Orchestrated Step Change scenario, and a convergence of outcomes between the 1.8°C Diverse Step Change scenario and the 2.6°C Progressive Change scenario over the medium term, which effectively narrows the range of possible future outcomes.

We also observed a sizeable change to electrification forecasts in the near term when comparing the 2022 Electricity Statement of Opportunities (ESOO) Step Change with the 2022 ISP Step Change to account for slower than expected growth.

Figure 1: NEM Electrification including transportation sector under multiple AEMO scenarios



Sources: AEMO’s Inputs, assumptions and scenarios workbooks version numbers 3.4, 3.5 & 4.0 – [Current inputs, assumptions and scenarios; 2023 Inputs Assumption and Scenarios Consultation](#)

Aside from hydrogen production, electrification of other sectors is one of the largest drivers to future NEM consumption growth, and is contingent on multiple factors covering economic, technical and social considerations that make the future rate of growth highly uncertain. For example, some of these solutions may be behind the meter.

For these reasons, Powerlink suggests moderating NEM electrification including the transportation sector under the 2.6°C Progressive Change scenario, so that the ISP and other publications sufficiently considers the outcomes of a slower rate of growth.

## 2. The Queensland Energy and Jobs Plan

Powerlink is highly supportive of AEMO's consideration of the Queensland Energy and Jobs Plan (QEJP) in their scenarios, in an effort to better align national and regional planning.

The QEJP represents a transformational state plan signalling how Queensland plans to achieve its decarbonisation objectives. This will be underpinned by legislation to legislate the new Queensland renewable energy targets (QRETs) and key enabling mechanisms like the Queensland Renewable Energy Zones (QREZ) framework, as well as funding for key pieces, such as the development of the pumped hydro energy storage (PHES) facilities at Borumba and Pioneer-Burdekin.

Powerlink agrees with the inclusion of QRET expansions and QREZ establishments in all scenarios, supported by legislation.

Powerlink also agrees with efforts to include the key firming PHES facilities that support the QEJP to ensure that network needs and REZ development can be holistically considered. Powerlink acknowledges that AEMO plans to assess these PHES facilities against project commitment criteria and anticipates that sufficient budgeted funding will be confirmed in a similar timeframe. In the event that either PHES does not meet the project assessment criteria to be included in the scenarios, Powerlink strongly suggests that a 'QEJP' sensitivity is assessed with both PHES projects included since they represent foundational assets that are key to the outcomes of the QEJP.

## 3. Sensitivity analysis of key drivers to scenarios

Given the level of uncertainty during this transformation period of the energy sector, Powerlink is interested to understand and highlight key assumptions that drives a scenarios outcome, accompanied by sensitivity analysis around the level of risk, associated costs and alternate outcome/s that would occur if there was an absence or stark deviation from that assumptions outcome.

A recent example of this would be the level and coordination of Distributed Energy Resource (DER) storages assumed under the Central scenario (Step Change) in the [2022 ISP](#). The 2022 ISP describes how distributed storage plays a key role in managing intra-day load variability and firming renewables, but the level of risk of this not eventuating and the counterfactual outcomes and costs are not clear. Although considering a range of scenarios is a way to capture uncertainty in future developments, scenarios are a collection of many inputs and the sensitivity of a particular input to a scenario is not clear from comparing across scenarios. Sensitivity analysis is even more important given that one scenario is given the status of a "central scenario" which is used by industry and other stakeholders as *the* view of the future. It would be very helpful to understand how robust that scenario's outcomes are to critical inputs and assumptions.

This could be performed in a similar way to counterfactual cases of transmission developments, but focusing on a single assumption that AEMO considers to be of paramount importance to driving a scenario's outcome, and highlighting these differences, risks and costs compared to the chosen highest probability scenario in the final publication.

These could include, but are not limited to:

- DER components including the orchestration of these assets;

- Choice and/or sequence of weather reference years;
- Generator capital costs, or more broadly the components that drive a blanket change in the majority of chosen technologies (such as the price of steel and concrete);
- Utilisation of generation assets, particularly those that provide large firming capacity.

Powerlink is happy to provide further consultation on this sensitivity analysis.

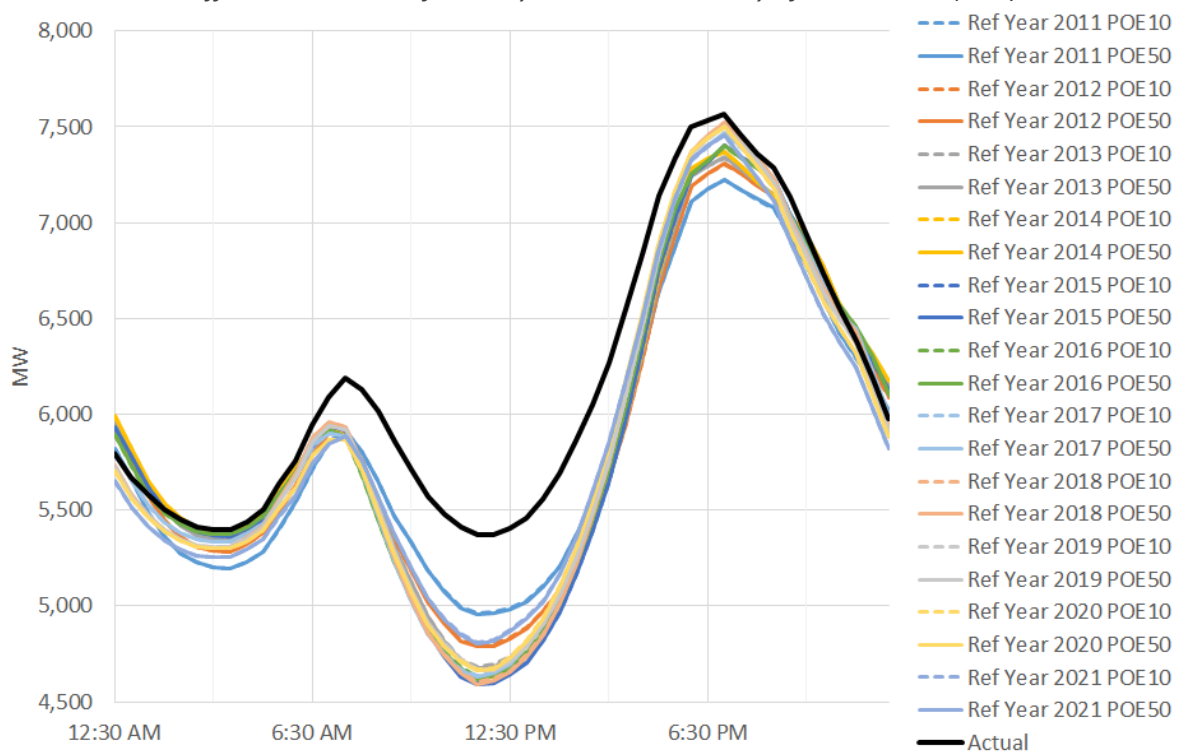
#### 4. Near-term calibration of demand components in forecast outcomes

Powerlink understands the imperative for establishing key themes and assumptions that drive long-term outcomes through scenario developments in the IASR, and recognises that these assumptions are still important and utilised heavily across industry in short to medium term forecasts for various purposes.

Powerlink has observed ongoing disconnect between actual and forecast demand outcomes in the near term, which are seemingly pointed to key assumptions underpinning scenarios under historical publications.

For example, comparing the first year of the Queensland’s 2021 ESOO Central scenario forecast under the Central scenario against actual outcomes (FY2021-22), we can see that average demand outcomes during the middle of the day were considerably under forecast, which could point to an overestimation to the penetration of Rooftop PV and/or build rate assumptions.

Figure 2: FY2021-22 QLD Daily Average Operational Demand vs 2021 ESOO Central (Net Zero) forecasts<sup>1</sup> under different weather reference years and Probability of Exceedance (POE)



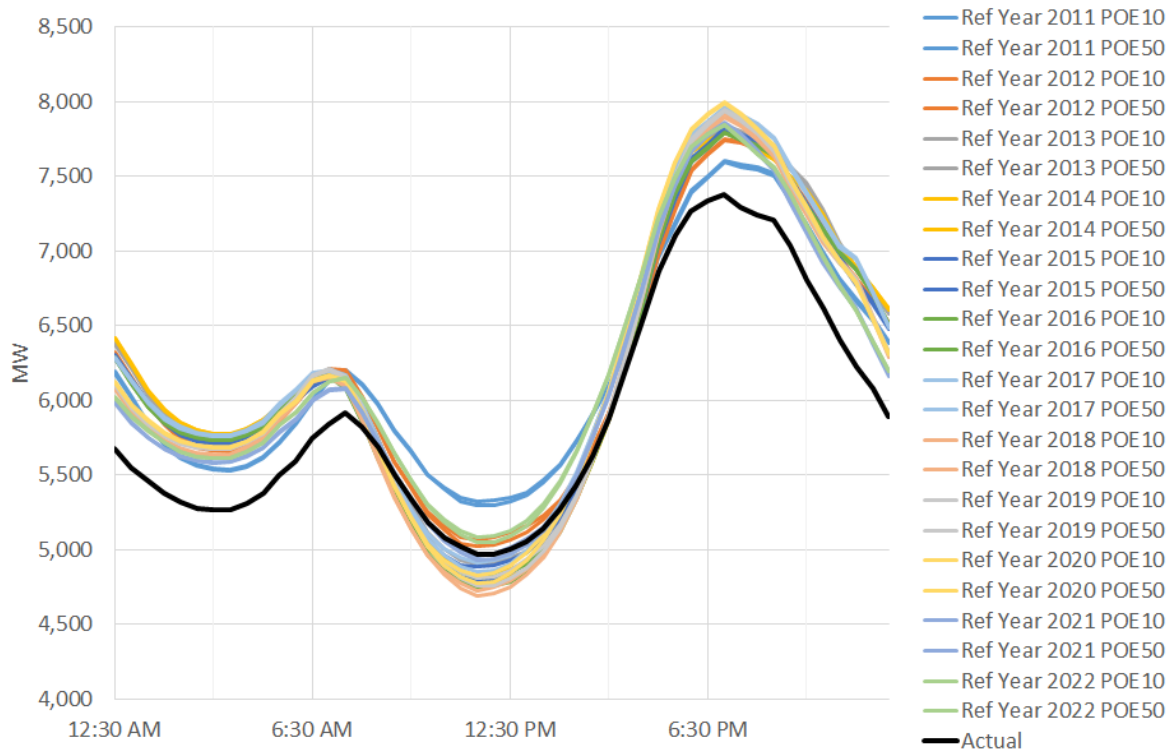
Sources: AEMO Market Data NEMWEB Operational Demand (as generated) Actual Half Hour – [Market Data NEMWEB](#); AEMO 2021 ESOO Model – [2021 NEM ESOO](#)

In contrast, comparing the current financial year to date of Queensland’s 2022 ESOO Central scenario forecast against actual outcomes (FY2022-23YTD), we can see that while average demand during the

<sup>1</sup> Operational demand sent-out forecasts have been converted to as-gen by including auxiliary load as a flat adjustment for comparison. The average auxiliary load applied is based on AEMO corresponding forecast from the 2021 ESOO Central Scenario – [AEMO forecasting portal](#)

day does fit within the range of possible outcomes, the overnight and evening peak are now considerably over forecast, potentially due to an overestimation on the rate of load growth.

Figure 2: FY2022-23YTD<sup>2</sup> QLD Daily Average Operational Demand vs 2022 ESOO Central (Step Change) forecasts<sup>3</sup> under different weather reference years and POE



Sources: AEMO Market Data NEMWEB Operational Demand Actual Half Hour – [Market Data NEMWEB](#); AEMO 2022 ESOO Model – [2022 NEM ESOO](#)

These examples are not intended to scrutinise AEMO’s level of forecast accuracy, but to highlight that as we move further into a period of transformation and uncertainty in the energy sector, we still need to be mindful of present outcomes so that stakeholders can make value judgements in the near to medium term based on the reasonableness of forecast outcomes.

On demand components and overall demand for each NEM region, Powerlink suggests that a near term calibration is performed e.g. up to the first five years of the forecast, to better reflect what is occurring against recent observed actuals and historical outcomes. This would likely only need to be undertaken against a chosen Central scenario, which we appreciate would need updating relatively close to a publication date. Powerlink is willing to be an active participant in providing further consultation on this process.

## 5. Reinvestment cost considerations on transmission augmentation

Powerlink recognises the significant costs associated with developing new or replacement transmission infrastructure, but comparatively modest incremental costs to develop assets with larger power transfer capacity.

This means that there may be significant economic benefit in aligning, where viable, additional capacity expansion when reinvesting in transmission assets in existing major flow paths when these are aligned to the optimal development pathway.

<sup>2</sup> Up to Dispatch Interval 0:00 8 February 2023

<sup>3</sup> Operational demand sent-out forecasts have been converted to as-gen by including auxiliary load as a flat adjustment for comparison. The average auxiliary load applied is based on AEMO corresponding forecast from the 2022 ESOO Central Scenario – [AEMO forecasting portal](#)

Additionally, the synergies with existing reinvestment should be considered when developing the optimal development pathway. The transmission cost associated with the augmentation should take account for the avoidance of near term asset reinvestment, where these are material (i.e. augmentation may only involve an advancement of expenditure by a few years rather than the full capital cost of the augmentation).

Powerlink, as the Jurisdictional Planning Body in Queensland, is eager to explore these opportunities further with AEMO and provide the necessary information through Joint Planning activities.

## 6. Network representation in the capacity outlook model

Powerlink is highly supportive of AEMO's proposal to split the Central & North Queensland (CNQ) sub-region in two sub-regions, Central Queensland (CQ) and Northern Queensland (NQ). We agree this has the potential to capture the impact of network losses on the optimal development path.

Powerlink continues to support an ongoing collaborative approach to consulting with AEMO on Queensland's transfer capabilities, augmentation options, loss equations and constraint formulations.