



Ref. A4833958

11 February 2022

Mr Daniel Westerman
Chief Executive Officer & Managing Director
Australian Energy Market Operator
GPO Box 2008
MELBOURNE VIC 3001

Via email: ISP@aemo.com.au

Dear Mr Westerman,

SUBMISSION ON DRAFT 2022 INTEGRATED SYSTEM PLAN

Powerlink Queensland (Powerlink) welcomes the opportunity to provide input on the Australian Energy Market Operator's (AEMO's) Draft 2022 Integrated System Plan (ISP).

Our submission reflects our commitment to continue to provide safe, secure, reliable and cost-effective transmission services to our residential, business and directly-connected customers. Powerlink also continues to build its social licence to develop Queensland's transmission network as Queensland transitions to a cleaner energy system.

In progressing its analysis from the Draft to the Final 2022 ISP, Powerlink considers AEMO should:

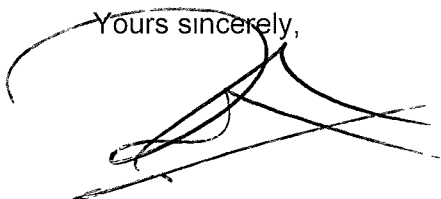
- identify windows of opportunity where individual major transmission projects could be delivered to manage transmission constructability risks while reasonably preserving the Optimal Development Path (ODP);
- recognise the potential for a material shift in the overall supply-demand balance in the Gladstone area, including the potential for major industrial loads to electrify in support of the move to net-zero emissions by 2050;
- extend loss modelling from a sole focus on inter-regional interconnectors to account for losses on major intra-regional connectors; and
- include the Borumba Dam Pumped Hydro Project (Borumba Project) as a known pumped hydro storage site.

33 Harold Street ,Virginia
PO Box 1193, Virginia, Queensland 4014, Australia
Telephone: (07) 3860 2111 Facsimile: (07) 3860 2100
Website: www.powerlink.com.au

These and a number of other matters are discussed in more detail in the attachment

If you have any questions regarding this submission or would like to meet with Powerlink to discuss this matter further, please contact Paul Ascione

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Paul Simshauser', with a large, sweeping flourish extending to the left.

Paul Simshauser
CHIEF EXECUTIVE

Enquiries Paul Ascione, General Manager, Asset Strategies and Planning
Telephone (07) 3860 2049 Email paul.ascione@powerlink.com.au

ATTACHMENT: DETAILED FEEDBACK DRAFT 2022 ISP

Future Projects

The Draft 2022 ISP identifies a number of future ISP projects, many of which are in Queensland, which will be needed later in the planning horizon. Given the acceleration of global infrastructure and renewable energy investment, supply chain risks could challenge the ability of network businesses to deliver all of the projects at the optimal time and at an efficient cost. It is also important to note that supply chain risks affect all transmission projects, not just those identified in the ISP. Further, as the Draft 2022 ISP acknowledges, all network businesses are impacted by supply chain risks.

The earliest theoretically optimal time for any given transmission investment project is the year in which the overall benefits of the project first exceed the annualised cost of the project. If a transmission investment that is on the ODP is delivered slightly in advance of this timing it is expected that there will still be net benefits over the life of the project but they will be slightly reduced from the maximum available. Similarly, a slightly deferred delivery of the transmission investment will mean that not all available benefits will be realised over the life of the project, though the net benefits will still be positive.

We encourage AEMO, in the Final 2022 ISP, to identify a window of opportunity within which major transmission projects could be delivered to manage transmission constructability risks across the National Electricity Market (NEM). This could involve either small advancement or deferral of some projects from their theoretically optimal timing, where the expected 'regret costs' to electricity consumers of these shifts is not material.

Withdrawal of Coal Capacity

The Draft 2022 ISP states that current announcements by thermal plant owners suggest that 5.4 gigawatts (GW) of existing coal-fired generating capacity will withdraw by 2030, but that ISP modelling suggests that 14 GW is likely to withdraw by 2030 in the Step Change scenario. To provide greater clarity on the triggers for transmission investment, we request that the Final 2022 ISP include a breakdown of the timing and location of the announced closure and the modelled withdrawal of coal capacity in the NEM by 2030.

We also suggest that the Final 2022 ISP provide more analysis on the robustness of ISP project selection and timing to changes in anticipated closures (including the sequence of anticipated closures) of existing thermal generation resources.

Gladstone Grid Reinforcement

Gladstone is a major industrial load hub and home to economically significant export industries, including smelters, refineries, and coal and gas export terminals. Many industrial loads could look to electrification as Australia transitions to net-zero emissions by 2050. This would increase electricity demand in the Gladstone area and could significantly shift the supply/demand balance in that area. Industrial loads tend to exhibit high load factors so additional supplies need to be able to satisfy this characteristic.

We also note that Gladstone Power Station is the oldest operating coal-fired power station in Queensland. Any changes to its operating regime in the future will further influence the supply/demand balance in the Gladstone area.

We suggest AEMO note that significant transmission network investment into Gladstone could be triggered in the future

Hydro Storage and Batteries

The locational differences between utility-scale / Distributed Energy Resource (DER) batteries and pumped hydro storage create very different transmission needs. There are also potential synergies (such as minimising transmission build) in Renewable Energy Zones (REZs) being developed around pumped hydro projects. For the Final 2022 ISP, we encourage AEMO to provide further detail on the modelled locations (and capacities) of batteries and pumped hydro storage sites.

The quantity of DER storage (including coordination/orchestration), which is a non-optimised input, is forecast in the Draft 2022 ISP to increase significantly over the study period. The Draft 2022 ISP also indicates that consumer adoption of smart technologies – supported by retailers, networks and other market participants – will be necessary to coordinate DER. Significant quantities of DER storage, which assumes optimal charging profiles, has material impacts on the modelled outcomes for more centralised forms of storage. We consider it would be prudent to perform sensitivity analysis (on the Step Change scenario) to observe the impact varying levels of DER storage would have on the ODP.

Adequacy of Investments with 100 per cent Renewables Penetration

The Draft 2022 ISP notes that AEMO's Engineering Framework describes the initial roadmap to inform preparation of the NEM for operation under six operational conditions, including

100 per cent instantaneous penetration of renewable energy by 2025. We suggest that the Final 2022 ISP consider the adequacy of ISP investments and other investments (such as system strength) in operational conditions including 100 per cent instantaneous penetration of renewable energy by 2025.

Loss Modelling

We request AEMO extend loss modelling analysis in the Final 2022 ISP from a sole focus on inter-regional interconnectors (e.g. QNI) to account for marginal losses on intra-regional connectors (e.g. Central to Southern Queensland).

The proposal to include a risk rating metric for REZs falls short of addressing a shortcoming that likely impacts the ODP and/or urgency for REZ Design Reports. The Draft 2022 ISP outlines over 3,000 MW of utility-scale wind generation across the Far North Queensland REZ ('Q1') and North Queensland Clean Energy Hub ('Q2') in the next 12 years. Although these new generation opportunities would assume associated REZ infrastructure is developed, they will share the common 275 kV backbone transmission network where minimal augmentations are proposed in the ODP over the same time period. This level of development would be unlikely in practice given the worsening marginal loss factor under which each investment decision would be made.

The proposed risk rating may communicate a potential issue to investors/bankers, but it will not provide industry with the efficient development path, and may prematurely trigger REZ Design Reports. The proposal of modelling intra-regional losses in a similar way to interregional losses weighs up the burden of extra computing requirements with greater fidelity to partway address this issue. This issue may also be present in other jurisdictions where favourable renewable energy sources (high capacity factors) may be developed.

without recognising the losses associated in transferring the energy to consumers hundreds or thousands of kilometres away

Borumba Project

We recommend that the Final 2022 ISP includes the Borumba Project as a known pumped hydro storage site

The Queensland Government has commissioned Powerlink to complete detailed investigations of the Borumba Project. This work has progressed considerably over the last six months and Front End Engineering Design (FEED) will commence in early 2022. The reference project (which is the key input for the FEED) defines a 1,500 megawatt (MW) proposal, with a 2,000 MW option to be assessed. Storage durations of 18 to 24 hours are also being assessed for both MW options. For the Final 2022 ISP, we recommend 1,500 MW, 24 hours storage be referenced as the current specifications for the project.

Borumba Dam is close to the existing transmission network and Powerlink has commenced community engagement in the area that reflects the advancing state of the project. We consider it important that the Borumba Project be referenced in the Final 2022 ISP. It is understandable if the project cannot be fully incorporated into the ISP modelling until it has reached a final investment decision, and we expect that this will occur in time for the 2024 ISP. However, for the purposes of transparency to the market it is important that the project is described in the narrative (particularly the equivalent of section 4.2 of the Draft 2022 ISP) in the Final 2022 ISP.

Powerlink is happy to provide a briefing to AEMO on the project, and provide any necessary documentation to support the proposed positioning of the Borumba Project in the Final 2022 ISP.