

5 April 2023

Attn: VNI West Options Assessment
AEMO/Transgrid
Via email: VNIWestRITT@aemo.com.au

Subject: VNI West Consultation Report Options Assessment

Jacobs welcomes the opportunity to make this submission in response to the AEMO/Transgrid VNI West Consultation Report Options Assessment.

Jacobs is a global engineering consultancy that serves multiple clients within the energy & power industry. In Australia Jacobs provides renewable developers and distribution and transmission utilities with strategic advisory services, feasibility studies, condition assessments, modelling, master planning, concept and detailed design, and full-scale project implementation.

It is clear that there will be no transition without transmission and Jacobs has been and is well positioned to support transmission development that will provide the required outcomes for renewables, consumers and stakeholders by encouraging a holistic approach to transmission planning.

The attached submission identifies a number of items that warrant further consideration as part of the VNI West options assessment:

- Neither the REZ transfer capacity or interconnection transfer capacities are defined as MCA criteria. Including these criteria will improve the options assessment and ensure the project's identified needs are maximised.
- A \$/MW capacity criteria should be included for each option as part of the MCA in order to improve the options assessment and ensure the project's identified needs are maximised.
- The capital cost information provided does not include a breakdown per substation or for each line type (220kV, 330kV or 500kV). Additionally the WRL incremental cost is not split into substation and lines works costs and no indication as to works shared between VNI-West and WRL or VNI-West and EnergyConnect is provided. It is difficult to compare and understand the differences in scope between each option.
- The Option 1 costs include Bendigo 500/220kV Terminal Station, but Option 5 doesn't. This creates a significant bias in favour of Option 5.
- There is no commentary regarding impact of each VNI West option on the EnergyConnect project.
- Suggested improvements in REZ transfer capacities appear to ignore existing curtailments arising from the limited capacity of the RCTS-KMETS-MRTS-HOTS 220kV line and the RCTS-WETS-KGTS 220kV line. It is suggested that these curtailments should be taken into consideration and the REZ transfer capacities be updated accordingly.
- There is no commentary included to detail the DEECA Stage 1 RDP works. Can AEMO/Transgrid detail how these projects will impact on the VNI-West options.

MCA

The MCA as detailed in section 4.3 of the VNI West Options Assessment does not include criteria for interconnection capacity or REZ capacity although this is detailed within Table 1. It is recommended that the MCA should be updated to include these criteria. Additionally Table 1 should be updated to indicate \$/MW supplied to clearly identify the potential cost benefit in terms of improving REZ and interconnection capacities. It should be understood that a cheaper option that provides less capacity may not lead to appropriate outcomes – some of which were identified in the VNI West PADR. These included enabling more efficient sharing of resources between NEM regions and facilitating efficient development and dispatch of generation in areas with high quality renewable resources, i.e. interconnection capacity and REZ capacity. It is recommended that the \$/MW for each option is a criteria in the MCA.

Costing details and transmission works included

The capital cost information shown in Table 5 of the VNI West Options Assessment does not include a detailed cost breakdown per substation or a cost breakdown for different lines (e.g. 220kV, 330kV and 500kV) for each option. The WRL incremental costs are shown in Table 5 as a single cost item and are also included in the total costs however the WRL incremental costs are made up of both substation works and line works, so it is unclear where these feature in the total costs. This would then allow greater clarity when comparing and understand the differences in scope of each option. For example, if there was a substation and OH lines item by item cost provided, the components that are shared between VNI West and WRL, and between VNI West and EnergyConnect would be transparent.

It is recommended that AEMO/Transgrid provide this breakdown to support a clear comparison.

In Option 5 why are the costs of the substation works in NSW less than the station works in VIC?

Treatment of Bendigo 500kV Terminal Station

The VNI West Options Assessment states that Option 5 does not require a new terminal station near Bendigo and that total costs are lower than for the alternatives. In the VNI West PADR it is stated that a new terminal station near Bendigo is required as the existing Bendigo terminal station is physically constrained and cannot be expanded, however the actual rationale and benefits for connecting the new 500kV lines via a new Bendigo terminal station in either Option 1, 2 or 3 is unclear. Can AEMO/Transgrid advise what the need for switching the 500kV lines and connecting into the existing Bendigo 220kV terminal station is? If it is not required then the proposed 500kV Bendigo terminal station costs should be excluded from Option 1, 2 and 3 to ensure that the options are treated on an equal basis.

EnergyConnect

There is some uncertainty regarding EnergyConnect arrangements at Dinawan. Is there going to be a 330kV connection between Darlington Point and Dinawan? The arrangements for 220kV connection between Buronga and RCTS are also unclear. Will there be a new 220kV switching station at RCTS? If so, will it be using a new double circuit 220kV (using twin Sulphur) in addition to the existing circuit or will the new lines be replacing the existing 220kV circuit. Can AEMO/Transgrid provide a commentary regarding the impact on EnergyConnect's export capacity due to each VNI West option? (i.e., impact on SA export curtailment)

Alternate connection sites

In Appendix A1 an alternative connection point via Donnybrook instead of a new terminal station north of Ballarat is noted as having been ruled out in the 2020 ISP. No other alternative connection sites for the western renewables link 500kV appear to have been considered. Alternative connection options could include new Cressy 500kV terminal station or existing Moorabool 500kV terminal station.

Has AEMO/Transgrid considered any benefits to the Portland REZ of connecting Bulgana via either Haunted Gully 500kV terminal station or Moorabool 500kV terminal station?

Western Victoria 220kV upgrades

RCTS-Kiamal-Murra Warra-KMTS-MRTS-HOTS and RCTS-WETS-KGTS 220kV circuits will act to limit capacity from either the Murray Valley REZ or from interstate (i.e., from EnergyConnect or Southern NSW). These circuits use Twin Panther conductors (equivalent to Twin Lemon conductors) and have a rating of 417 MVA each. The predictions relating to increased REZ capacity are therefore flawed.

If the capacity for Murray River REZ is to be accommodated, then these two circuits would need to be upgraded and included in the costs. An initial development stage would be to build a new double circuit 220kV line from Bulgana to Murra Warra with a capacity of 800MW/circuit. These circuits should bypass Horsham and avoid the cost of augmenting the Horsham Terminal Station. It is noted that such a project was listed in the Victorian Renewable Energy Zones Development Plan Directions Paper, February 2021 however it is unclear whether DEECA will be progressing this as a stage 2 RDP project and such a project is not listed in AEMO's 2022 ISP.

There are various alternatives for combining Western Vic upgrades with VNI West. One example would be Double circuit 500kV Bulgana-Murra Warra-Buronga augmentation (together Double circuit 500kV Buronga-Dinawan) without a Kerang connection. This would provide the following benefits:

- Allow for EnergyConnect to export to NSW/Victoria during the day.
- Allow for development of further Solar farms around Buronga.
- Allow for upgrades to Kiamal SF and Murra Warra WF
- Allow for further development of both Wind and Solar in the Horsham and Red Cliffs areas respectively.

A holistic approach should be taken to consider export curtailment on EnergyConnect, additional generation in the Murray Valley REZ in Victoria and the South-West REZ in NSW, power transfer capability between NSW and Victoria and future development of the transmission network.

Requirement for 500kV series compensation near Kerang

The Option 5 presented includes the installation of 500kV series compensation near Kerang with claimed benefits of better sharing of power flows. The descriptions for Options 1 – 4 do not include any reference to series compensation, can AEMO/Transgrid advise if series compensation should be included for all options.

In general given the total length of the proposed 500kV circuits, the effective 500kV line length will be reduced from ~657 km to ~572 km (13% reduction). The claimed benefits should be carefully assessed before committing to the proposed series compensation.

The impact of series compensation hasn't been included in the MCA. Can AEMO/Transgrid detail which options require the series compensation and provide the cost estimates for this (as a separate item to modular power flow controllers)?

Yours sincerely,

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