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Daniel Westerman
Chief Executive Officer
Australian Energy Market Operator (AEMO)

Sent via email: ISP@aemo.com.au

Dear Mr Westerman

Re 2023 Transmission Expansion Options Report Consultation

Pacific Blue welcomes the opportunity to make this submission to AEMO's 2023 Transmission Expansion Options Report, which explores conceptual transmission network expansion options that could increase the hosting capacity of Renewable Energy Zones (REZs) and the transfer capacity of the backbone of the interconnected network.

Founded in Australia in 1992, Pacific Blue is one of the pioneers of renewable energy development in Australia. Pacific Blue developed the first commercial wind farm in Victoria and today operates a high quality, diversified portfolio of wind, solar and hydro renewable assets in Australia, with a total generation capacity of over 660 MW and a significant pipeline of over 2 GW across the National Electricity Market (NEM). Pacific Blue also owns two growing energy retail businesses, Pacific Blue Retail and Tango Energy, with over 160,000 customers.

1. South West Victoria and South East South Australia

1.1. Section 5.6.4 – South West Victoria (V4) Renewable Energy Zone

Pacific Blue agrees with the needs as identified in the report that the REZ possesses one of the most excellent wind resources across Australia and has attracted significant interests and investments from the renewable energy sector. According to publicly available information, there are currently over 2.5 GW of wind farms that are operating or under construction, and additional 3.8 GW under active development, as well as the future offshore wind generation zone proposed near Portland. There is no doubt that the REZ has great potential to produce substantial renewable energy, particularly from wind, to support Victoria's energy transition as the aging thermal generators withdraw from the network in the next decade.

As acknowledged by the report, the transmission capacities of the REZ are currently limited by voltage stability. It is foreseeable from the number and the size of the renewable energy projects in the region that the maximum thermal capacities of the 500 kV transmission lines, which act as the backbone of the interconnected network, would soon be reached. It is unlikely that every project currently under development would get its connection until more transmission capacities are made available for everyone.

To accelerate renewable energy implementation and unlock the REZ's full potential by uplifting the network constraints and enabling more projects to connect, Pacific Blue supports AEMO's proposed augmentation Option 1 and Option 3 of building an extra 500 kV circuit between Heywood-Mortlake-Moorabool.

Alternatively, the augmentation may be carried out by building a new 500 kV circuit between Heywood-Mortlake-Bulgana, to connect the REZ with the Western Renewable Link (WRL) and the Victoria-New South Wales Interconnector West (VNI-West). In addition to creating extra transmission capacities, this could further enhance the network's interconnectivity and redundancy and make wind energy output from the REZ more accessible to the rest of Victoria and the NEM.

1.2. Section 5.6.1 – South East South Australia (S1) Renewable Energy Zone

The Heywood-South East interconnector comprises a 500 kV to 275 kV substation at Heywood in Victoria, and 275 kV lines from Heywood to the 275 kV South East substation in South Australia. The current transfer capacity of the interconnector is 650 MW.

As outlined in AEMO's 2022 Integrated System Plan (2022 ISP), under the Step Change scenario the REZ is expected to see an increase in renewable energy with over 750 MW of new generation capacity by 2028-29 and over 1,200 MW by 2038-39. The addition of potential new capacity to the REZ and to the adjacent V4 REZ in Victoria (as discussed in section 1.1. of this paper), is likely to greatly exceed the permitted transfer capacity of the current Heywood-South East interconnector.

Furthermore, there may also be challenges from damage to transmission structures due to extreme weather, and subsequent islanding events due to the unexpected outage of the transmission lines. The Heywood-South East interconnector is one of the most critical transmission assets in the NEM, currently representing 75% of South Australia's inter-state transfer capability (Heywood-South East at 650 MW and Murray Link at 220 MW, totalling 870 MW). It would make sense to allow for sufficient redundancy in the network to minimise any potential risks and mitigate against unexpected circumstances.

As a result, Pacific Blue supports AEMO's proposed augmentation to increase the transfer capacity between South Australia and Victoria, which could be achieved by:

1) building an extra 275 kV or 500 kV transmission line between S1 REZ and V4 REZ as outlined in the report, and/or

2) application of virtual transmission lines supported by two large, long duration BESS, which could be located in S1 REZ and V4 REZ respectively. Ideally, the BESS would have the capability to provide system strength support, inertia support, and/or system restart services.

2. Murray River and Central North Victoria

2.1. Section 5.6.2 – Murray River Victoria (V2) Renewable Energy Zone

The Murray River Renewable Energy Zone (V2 REZ) is known for excellent solar resources and flat, open country. As outlined in AEMO's 2022 Victorian Annual Planning Report (2022 VAPR), there is strong market interest in renewable energy investment into the region, with enquiries of over 2.5 GW of new, predominantly solar generation capacity.

The NEM is undergoing rapid changes with the addition of a significant number of new renewable energy generators, which cover a much wider geographical area and more diverse networks than ever. It is vital for these projects to get grid connection in a timely manner to avoid prolonged development timeframes and substantial development cost, with a view to fast track these existing projects and incentivise new projects.

Pacific Blue has a significant pipeline of renewable energy projects across the NEM, including the approved Prairie Solar Farm within the REZ. While we support AEMO's proposed augmentation between Red Cliffs and Kerang as outlined in the report, we would also like to call for AEMO's consideration of including augmentation to the other half of the 220 kV network within the REZ between Bendigo and Kerang, as part of the upcoming 2024 ISP.

We believe the Bendigo-Kerang 220 kV line needs to be augmented for the following reasons:

1) The existing transmission towers are unable to retrofit Optical Ground Wire (OPGW) conductors for the new communication systems, which makes projects wanting to connect to the network must seek alternative solutions to establish individual communications for their own. This adds significant complexity, cost, and delay to the development.

2) There have been several changes to the 220 kV network since the publication of the 2022 VAPR, which the 2023 Transmission Expansion Options Report is based on. Changes that would affect V2 REZ include:

    - 81 MW Yatpool Solar Farm completed commissioning and is now in service
    - 200 MW Kiamal Solar Farm – Stage 1 completed commissioning and is now in service

- 205 MW Campbells Forest Solar Farm progressed to pre-registration
- 74 MW Carisbrook Solar Farm progressed to pre-registration

It is foreseeable that the 220 kV network within the REZ, which covers Red Cliff-Wemen-Kerang-Bendigo, would become much more congested than initially anticipated in the 2022 VAPR by the time when the 2024 ISP is published.

Pacific Blue supports augmentation to the REZ as a whole, which includes:

- Building a new 220 kV double-circuit line between Red Cliffs-Wemen-Kerang, and
- Building a new 220 kV double-circuit line between Kerang-Bendigo.

2.2. Section 5.6.6 – Central North Victoria (V6) Renewable Energy Zone

Pacific Blue agrees with the need, as identified in the report, and would like to make the following comments for AEMO's consideration:

- Option 1

  As outlined in the 2022 VAPR, the solar generation connected in the Central North Renewable Energy Zone (V6 REZ) can currently be accommodated by the existing network without significant constraints. The existing 220 kV Shepparton-Dederang lines comprise three circuits, with one double-circuit via Glenrowan and one single-circuit bypassing Glenrowan, and the combined rating is approximately 1,300 MVA. The solar generation is predominantly located between Shepparton and Glenrowan.

  Based on the above, adding an extra double-circuit line between Shepparton to Dederang via Glenrowan does not appear to be the most critical augmentation needed by the REZ. Option 1 also has the highest dollar per additional MW ratio ($/MW) among the three identified options.

- Option 3

  We note the social and community challenges from the recent WRL project in western Victoria and reasonably believe that establishment of a similar new transmission line corridor, as intended by Option 3, through the Goulburn Valley and the heart of Northern Victoria's irrigated high quality agricultural land, would be likely very difficult.

  Although the 500 kV transmission line may provide a higher MW of additional network capacity, it may also present a challenge to renewable energy projects in terms of the connection cost, especially in Northern Victoria where the predominant form of generation is solar. This means that a solar project must occupy a substantially large area of land for installation of hundreds of MW to achieve the economics of scale which could then make the 500 kV connection economically viable.

  In reality, it may be difficult for developers to find suitable sites for such significant development, and to address the controversy between loss of high-quality agricultural land and solar farming, as well as other associated environmental and social impacts.

In comparison, Option 2 appears to be a more effective and logical solution, for the following reasons:

- The new 220 kV double-circuit line would follow the existing transmission corridor, hence minimising the potential environmental and social impacts.
- The existing 220 kV Shepparton-Bendigo-Kerang line is a single-circuit line and unable to retrofit OPGW to meet the current communications standards. Adding an extra double-circuit line would greatly complement the network in terms of transfer capacity and communications efficiency and enable many existing solar projects to connect and progress further.
- For renewable energy projects, particularly solar, connection to 220 kV network is generally more economically viable and preferred, as compared to connection to network of higher voltages, such as 500 kV.

- New 220 kV terminal stations are often proposed as part of many existing solar projects along the Shepparton-Bendigo-Kerang transmission corridor. There are opportunities for AEMO to work with the developers to explore feasible connection options and potential cost-sharing schemes, which ultimately may be a win-win situation for both parties.

3. Northern Queensland

3.1. Section 5.3.3 – Northern Queensland (Q3) Renewable Energy Zone

Pacific Blue supports the development of the CopperString project by the Queensland Government and Powerlink.

As outlined in the report, the Northern Queensland has good quality solar and wind resources and is situated close to the high-capacity 275 kV network. It is clear from the geographical locations and the load flows that adding the CopperString to the network would enhance the energy security for regional areas, particularly the North-West Mineral Province, and would create opportunities for both development of new renewable generation projects and expansion of existing mining operations.

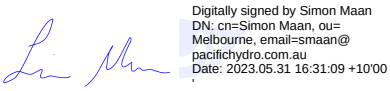
4. Conclusion

As outlined above, Pacific Blue supports and calls for fast tracking development of new transmission infrastructure across the NEM to accelerate renewable energy implementation prior to the closure of aging thermal generators in the next decade, and to ensure Australia is on track of achieving its committed emissions reduction target of 43% and Net Zero Emissions by 2050.

On behalf of Pacific Blue, I wish to thank you for the opportunity to make this submission and look forward to discussing it in more detail if AEMO finds it mutually beneficial.

Should you have any questions, please feel free to contact David Huang via email at dhuang@pacificblue.com.au, or by phone on 03 8621 6000.

Yours sincerely,



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