



Draft ISP Consultation Response

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Smart Wires Response

Introduction

Smart Wires are pleased to provide a response to the Draft 2022 Integrated System Plan (ISP) published in December 2021. We would like to acknowledge that the draft ISP published by AEMO represents the culmination of a significant body of work, resulting in a comprehensive and invaluable guiding resource. As such, we welcome the opportunity to contribute towards the development of a robust, flexible, and efficient investment plan to meet the future electricity supply needs of the National Electricity Market (NEM).

As the leading provider of Modular Power Flow Control (MPFC) solutions, we continue to see the benefits that can be realised from the prudent application of MPFC on both new and existing transmission assets, increasing the capability of the power system by balancing power flows to improve the utilisation of existing networks, as well as for new network augmentations.

MPFC installations are able to provide value in a number of different ways, notably:

- Providing an alternative to traditional solutions, often at a greatly reduced cost and lead time
- Enhancing project benefits, increasing the network capacity provided by an augmentation
- Enabling projects that would otherwise not be technically feasible without the inclusion of power flow control.

The modular nature of MPFC solutions, being readily staged and flexible in deployment, allow them to inherently mitigate the risks of over or under-investment that arise when trying to address the increasingly uncertain needs of the evolving power system. They allow for a high degree of flexibility in operation and can therefore support the grid's needs today, while being adaptive enough to continue to do so tomorrow and into the future.

The practical and economic benefits of MPFC solutions have been recognised by several TNSPs in Australia, with MPFC projects currently being installed and commissioned in New South Wales, Victoria and South Australia¹. With the ongoing need to develop the transmission network to facilitate the energy transition, the imperative to leverage the advantages of integrating modular power flow control into the grid to provide cost-effective increases in network capacity is more timely than ever before.

Opportunities to realise the benefits of MPFC

We welcome the inclusion of MPFC as a part of the ISP methodology, published August 2021, are pleased that AEMO is considering the potential benefits that the technology can provide and note that MPFC has been included in various options for the ISP projects, Marinus Link and VNI West. We appreciate the enormous task that the ISP presents and understand that in the development of the Optimal Development Pathway (ODP), it is not possible to investigate every possible permutation of solution.

¹ TransGrid VNI 330 kV project, AusNet Jindera-Wodonga 330 kV project, ElectraNet Templers-Waterloo 132 kV project.

With that in mind, we would like to take the opportunity to highlight a number of opportunities where we believe MPFC could assist in the efficient delivery of a transmission network with greater renewable energy dispatch capacity for a relatively low incremental cost.

Bulgana-Ballarat

The additional renewable connection capacity created by the construction of a new double-circuit line from Bulgana to Ballarat is potentially limited by the thermal rating of the existing 220 kV network. We estimate that an increase in renewable connection capacity of around 700 MW, in addition to that provided by the new double-circuit line, could be achieved by installing MPFC to balance flows between the old and new lines. This could be achieved for a cost of around 5% of constructing the new lines, thereby providing a very attractive \$/MW ratio for the power flow control solution.

HumeLink/Sydney Ring

An initial assessment of using MPFC in conjunction with the HumeLink project showed that while the incremental increase in network MW capability came at a much lower \$/MW cost, the additional network capacity wasn't required solely for the HumeLink project. However, it was noted that it may provide a real benefit to the Sydney Ring project, subject to which of the project options is chosen. In the case where MPFC does provide a positive network benefit to this project, it may be economic to then bring its installation forward to gain the benefits that would result from including it as part of the HumeLink works.

Queensland – New South Wales Interconnector

The proposed future QNI augmentations are described that include staged developments of QNI 'medium' and QNI 'major'. The need and timing of each stage is dependent on the cost and capacity improvement provided by each stage. Considering the use of power flow control to optimise the capacity provided at each stage of development could ensure maximum utilisation of investment and valuable deferral of capital expenditure. Again, it is underlined that assumptions of the cost of providing power flow control based on traditional solutions, may limit opportunities provided by alternate technologies being missed.

VNI West

A number of options are under consideration for the VNI West transmission corridor, potentially in operation by 2028/29. The options include the use of power flow control to optimise flows on the proposed developments, with deployments suggested for the Upper Tumut-Murray, Lower Tumut-Murray, and Wodonga-Dederang lines. It is likely that there are benefits to be gained from installing power flow control on one or more of these lines prior to the completion of the VNI West linework so that an installation in the short term that is compatible with the longer-term objectives could begin to accrue benefits within a year of progressing the project.

Other applications

Numerous other minor applications present themselves throughout the NEM for the economic application of MPFC. For example, forecasts constraints for lines approaching Melbourne, as outlined in the 2021 VIC TAPR, would appear to be good candidates for considering an MPFC solution. Similarly so for other minor constraints across the NEM that may not justify investment in traditional transmission infrastructure.

Renewable Energy Zones

More generally, MPFC can be used to improve the benefits provided by other projects that could otherwise be reduced by operational constraints. This is expected to include the development of renewable energy zones (REZs) where new 330 kV line builds would occur in parallel with low capacity 132 kV subtransmission networks. Controlling the flow of power on the lower capacity network could not only allow the capacity of the new lines to be better utilised but if power flow control is considered in the planning of the new 330 kV lines, higher-capacity lines could potentially be installed.

For this reason, we feel it would be useful for REZ design reports to be produced that outline the proposed topology of the REZ network and connections. This would allow market participants to provide more relevant comments on solution options and enhancements.

Lastly, we would once again like to thank AEMO for running a very transparent and highly consultative process. AEMO has demonstrated an openness to investigating traditional and non-traditional solutions to maximize the benefit for the NEM and ultimately for all consumers. We continue to view the AEMO ISP and consultation process as the benchmark amongst the market segments within which we work around the world.

Best Regards,

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