



Submission to Transgrid PSCR
Increasing capacity for generation in
the Molong and Parkes area

26 October 2022

Smart Wires Submission to the Transgrid ‘Increasing capacity for generation in the Molong and Parkes area’ RIT-T PSCR

Introduction

Smart Wires are pleased to respond to the Transgrid ‘Increasing capacity for generation in the Molong and Parkes area’ RIT-T PSCR. The project represents a modest but important step in integrating additional renewable generation sources into the NEM during the energy transition that is presently underway, thereby contributing to the future reliability and sustainability of the Australian power system. We, therefore, welcome the opportunity to provide our perspective and ideas on possible solutions to assist in improving generation connection capacity in the area.

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 electricity networks.

Smart Wires MPFC solutions have now been recognised by several TNSPs in Australia and overseas, with projects currently being installed and commissioned in New South Wales, Victoria and South Australia¹ as well as in Europe and the Americas. This submission will provide details of the equipment being discussed and its application with reference to the needs of this project.

Modular power flow control equipment overview

The Smart Wires ‘SmartValve’ is a modular static synchronous series compensator (SSSC). Installed in series with the conductor, it is used to produce a controllable reactance in series with the line allowing the total series reactance of a transmission circuit to be increased or decreased in real-time as desired. In doing so, it allows power flow on transmission lines to be controlled, performing the same function as a series reactor or series capacitor, but with additional flexibility and control and without some of the negative aspects of those devices.

Key features of SmartValve are:

- Produces a controllable series reactance that can be operated as either capacitive or inductive;
- Can be remotely controlled and varied in real-time by SCADA or EMS to produce the desired level of reactance, future-proofing the installation from possible changes to the network;
- Modular design that allows for incremental installation, with units available in 1 MVAR or 10 MVAR blocks, allowing an installation to be readily adapted to meet future network needs;
- Nominal current ratings of 1800 A and 3600 A, suitable for system voltages up to 550 kV;
- Typical project time of 12 months from placement of a purchase order.

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

Power flow control project impact and costs

The economics of the benefits and costs relating to any given application of modular power flow control equipment are a function of the characteristics of the network within which it is installed. Increases in the capacity of a transmission corridor due to the installation of MPFC equipment can range from tens of MWs to many hundreds of MWs, with a cost-benefit ratio that is generally very favourable in comparison to the construction of new transmission infrastructure due to the leveraging of existing latent network capacity.

Transmission capacity increases arising from the installation of SmartValve MPFC equipment can have a \$/MW ratio around five times lower than the network capacity provided by installing new transmission assets and can be installed in a fraction of the time it takes to construct new lines, making the benefits gained by MPFC both economic and timely.

Application of MPFC to increasing generation connection capacity in the Molong and Parkes area

Renewable generation in the Molong and Parkes area is primarily constrained by the thermal rating of the 94T Molong to Orange North 132 kV transmission line. The PSCR identifies an increase in the thermal rating of the line as a potential solution to be considered under the RIT-T.

We would like to propose the consideration of MPFC as either an alternative or complementary technology to improve the benefits of the proposed solution.

Early realisation of benefits

It is well understood that the market costs of the 94T constraint are substantial and ongoing. An MPFC solution is expected to be deployable in less time than the proposed line uprating, delivering significant and timely economic market benefits.

Compatibility with proposed solution

The solutions proposed within the PSCR, namely an increase in the thermal rating of 94T, are not expected to fully relieve the generation constraints in the area, particular when it is recognised that additional generation is being developed in the area. An MFPC solution that is installed prior to the 94T thermal uprating could remain in-service following the 94T thermal uprating, working in unison with the increased thermal line rating to provide even greater constraint relief.

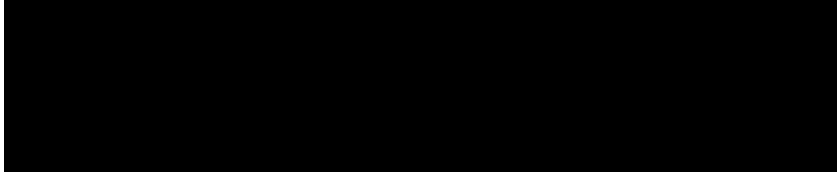
MPFC options

There are potentially a couple of options for using MPFC to assist with the Molong and Parkes area generation constraints. Using MPFC to increase the series reactance of the 94T Molong-Orange North 132 kV line presents the most evident opportunity, however, installing and operating MPFC devices in capacitive mode on 947 Wellington-Orange North 132 kV line may also be worth considering.

The flexibility of MPFC in terms of the ability to adjust the value of series reactance produced by the devices, as well as the adaptability due to the modularity of the equipment means that the solution can allow for future changes in the local network topology, take full advantage of a DLR system, or respond to changes in local generation patterns due to the installation of new renewable generation.

Smart Wires would welcome the opportunity to assist in assessing the cost and benefit of implementing a power flow control solution to improve the renewable generation hosting capacity in the Molong and Parkes area. If any further information is required in assessing the benefits that would result from the application of MPFC in this project, please do not hesitate to contact us.

Best Regards,



Company information

Smart Wires head office is based in the USA, with staff located in the UK, continental Europe, North and South America, and the Asia Pacific region. Smart Wires is a publicly listed company trading on the NASDAQ First North stock exchange. Smart Wires have installed and commissioned power flow control projects in the UK, continental Europe, North and South America, and Australia. Further company information is available at www.smartwires.com.