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VNI West PSCR Submission

13 March 2020

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Regulatory Consultation
AEMO/TransGrid

Submission to the AEMO VNI West Project Specification Consultation Draft

Smart Wires is pleased to make this submission in response to the AEMO VNI West Project Specification Consultation Report (PSCR). As the leading provider of modular power flow control (MPFC) solutions, we welcome the opportunity to provide our unique and valuable perspective on how state-of-the-art power flow control technology can be used to improve the capability and utilisation of the Victoria to New South Wales transmission network, in particular with regard to maximising the benefits provided by the network augmentations proposed within the VNI West PSCR. In doing so we aim to contribute towards the development of a more effective and efficient solution to address the future electricity supply needs of Victoria and New South Wales and to enable the early connection and integration of greater quantities of renewable energy as the National Electricity Market (NEM) transitions to a low emission renewable energy future.

Recognising the need to provide a substantial increase in the transmission capacity between the Victoria and New South Wales regions, and the role of the VNI West RIT-T process to identify the option that represents the most economic and technically feasible solution, we would like to present the advantages of the use of modular power flow control (MPFC) equipment as an integral part of the VNI West solution. In doing so, we see the potential for MPFC to enhance the capability of the existing transmission system, while maximising the capacity to be provided by the proposed transmission augmentations both economically and with greater flexibility.

Advantages of modular power flow control equipment

Modern modular power flow equipment provides several distinct and unique advantages over traditional solutions. The modular SSSC technology that Smart Wires has developed allows power flow along transmission paths to be controlled by effectively modifying the series reactance of the line, either increasing it or decreasing it as required. The modular and controllable nature represents a flexible solution that can be scaled over time and can respond to changes in network needs both in real time, or over the longer planning horizon. Easily reconfigured due to its modular nature, it represents a 'least-regrets' approach to network investment and optimisation.

In comparison to other tradition solutions, such as phase-shifting transformers and series capacitors, the FACTS based MPFC solution avoids a number of problems, such as lumpiness of investment, oil handling, risk of SSR and SSCI, and commitment to a fixed solution size, while providing the advantages of being readily expandable, re-deployable, speed of installation, lower capital cost, reduced maintenance requirements, and flexibility of control.

Application to the VNI West project

The PSCR has identified the potential for power flow control to be utilised on the Murray to Upper Tumut and Murray to Lower Tumut lines to relieve potential constraints following the construction of the VNI West project. We propose that *modular* PFC equipment should be specifically considered as part of the options analysis that will be performed in preparation of the VNI West PADR.

The improvements to network capability that are provided by installing MPFC equipment can be substantially lower on a $/MW cost than are provided by new line builds or other traditional power flow solutions. The considered application of power flow control can provide substantial benefits for a modest cost. To identify these opportunities, the incremental cost and benefit of an MPFC solution needs to be individually assessed, as assumptions of the costs and benefits that would apply to other traditional solutions are not necessarily representative of what could be achieved with an optimal MPFC solution.

The PSCR has also noted that there is potential for the need for power flow control on the other parallel routes between Victoria and New South Wales that will be established under the VNI West project. Such a need would be partially driven by the location of new renewable generation developments. The uncertainty in the magnitude and timing of these developments, as well as the daily and seasonal variation in their output, create a level of uncertainty in the exact requirements for optimising network utilisation through the use of power flow control equipment. Modular power flow control equipment allows a flexible and responsive approach to be taken in solving this issue.

Realisation of early benefits

A number of options in the VNI West PSCR utilise PFC solutions as part of the overall solution and it is assumed the PFC is delivered in the same timelines as the major transmission lines proposed in this project. We believe that additional market benefits can be gained by installing PFC *prior to* the development of these major transmission lines. Examples of this could include relief of present constraints on the Murray to Upper Tumut and Murray to Lower Tumut lines, the Murray to Dederang lines, or the Bannaby to Sydney West line following the completion of the HumeLink project. It is therefore important to assess the cost-benefit of early deployment of part or all of the final PFC solution if selected. It should be noted that modular PFC equipment is very easy and fast to install and can be expanded over time or even redeployed if needed, making it ideal for early deployment. MPFC can be used in different modes of operation (capacitive or inductive) and therefore is able to adapt to the changes in power flow direction that occur as network augmentation projects are completed delivering ongoing market benefits over its lifetime in an ever-changing power system.

Alignment with other ISP projects

A key objective of the AEMO Integrated System Plan (ISP) is to enable the greater sharing of renewable energy across geographically diverse areas through increased interconnection capability. The VNI, Energy Connect, HumeLink, Western Victoria (Ballarat), and VNI West projects all combine to provide the necessary interregional connection capability to serve that purpose. We therefore suggest that the use of power flow control should take into account the impact and benefits it could produce across the combined suite of ISP projects.

Based on our knowledge of the transmission network and our experience working with similar networks around the world, we believe that supplementing the proposed investment in these other projects with a relatively small investment in modular power flow control can provide a significant amount of additional transfer capacity across the existing and new networks over above that proposed by these projects. This additional capacity can provide substantial benefits to consumers and make more network capacity available for the connection of renewable generation.

We hope that this submission has provided useful insights into how the deployment of MPFC technology could be used to economically improve the benefits provided by the VNI West project through increased utilisation of the proposed network augmentation. We would welcome the opportunity to discuss our ideas and provide any further information or support that would be helpful in developing and assessing power flow control options for the VNI West project, and look forward to continuing to work with AEMO and TransGrid as the RIT-T progresses.

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