PROJECT MARINUS

Project Specification Consultation Report Summary

Additional interconnection between Victoria and Tasmania

July 2018

Australia's electricity sector is changing

The future energy mix in the National Electricity Market (NEM), and how it will be managed to maintain a secure and reliable supply, is the subject of much discussion.

In the past, Australia's electricity needs have predominantly been met by thermal power stations. The main fuel source, coal, is abundant and therefore cheap, and thermal generation can be easily dispatched as required to meet customer demand. A number of coal power stations have closed in recent years, and more than 14,000MW (or 50% of the remaining coal generation capacity) is expected to reach the end of its life within the next two decades.

At the same time, the need to decarbonise the world's energy supply is now well understood. Policy incentives, coupled with the reduction in the capital cost of renewable generation technologies, notably wind and solar, have led to a surge in renewable energy developments.

While these developments are positive from the perspective of reducing emissions, they introduce new challenges in terms of operating a power system. Wind and solar generation have different characteristics from traditional fossil-fuelled or hydro generators, which means the tasks of balancing load and generation, and maintaining stability and security of the power system, become progressively more difficult as the amount of non-dispatchable generation increases. Furthermore, there is a possibility of increased wholesale market price volatility. This is because higher-cost dispatchable generation or storage will be operated to fill the gap left by coal-fuelled generation at times that insufficient renewable generation is available.

Energy storage technology, such as batteries or pumped hydro, will provide part of the solution to these issues. Recent studies, such as the Australian Energy Market Operator's (AEMO's) Integrated System Plan (ISP) have found that storage alone cannot solve these emerging issues. Additional interconnection between NEM regions is needed to make use of the natural diversity of generation.

Tasmania has the potential to provide large quantities of dispatchable renewable generation...

Tasmania's electricity supply is unique in the NEM, in that it is dominated by hydro generation. Hydro generation is dispatchable, non-polluting and provides ancillary services which other renewable generation technologies do not currently provide.

Tasmania also has some of the best wind resources in Australia. Our wind energy potential is largely untapped: currently there is about 300 MW of wind generation installed, but TasNetworks is actively progressing connection applications for 700 MW more, proposed to be installed by the early 2020s. The availability of agricultural land with suitable wind resources located in areas with a low population density decreases the likelihood of community opposition to wind generation development. Whilst Tasmania's solar generation

potential is lower than in other states, we are also processing connection applications for solar generation developments in northern Tasmania.

A general problem inherent in the high penetration of wind and solar generation is the likelihood of excess generation – and possible generation curtailment – when the wind is blowing strongly or the sun is shining. Conversely there is the possibility of generation shortages, which creates the need for high cost peaking generation, when the wind or solar generation drops. Tasmania, however, is able to exploit its hydro storages to "soak up" the excess renewable generation by holding back water when wind or solar generation output is high, and then make use of the stored water to provide hydroelectricity when the wind and/or solar drop.

As identified in the ISP, increased interconnection will allow the geographic diversity of renewable energy resources among regions to be better utilised. For example, a region experiencing windy or sunny conditions can export energy to a region where it is still or overcast.

In addition to the current capability of the existing Tasmanian hydro system there are also significant opportunities to develop pumped hydro energy storage projects in Tasmania. Hydro Tasmania recently released its report, *Battery of the Nation - Analysis of the future National Electricity Market*, which indicates there are opportunities to develop over 4,800 MW of pumped hydro energy storage with a cost to construct in the range of $1.05 million–$1.5 million per megaWatt (MW). This could provide significant low-cost storage which will support greater penetration of variable renewable energy both in Tasmania and mainland Australia.

...but it can't do it without additional interconnection to Victoria

Tasmania's significant potential to assist in the transformation of the NEM cannot be realised unless there is an increased ability to export its energy to other NEM regions. TasNetworks, with funding assistance from ARENA, is therefore investigating the feasibility of additional interconnection between Tasmania and other NEM regions. TasNetworks has registered a business name for this potential new interconnector: Marinus Link.

We are commencing the Regulatory Investment Test for Transmission (RIT-T) process, to assess the market benefits of a new interconnector, and to seek input on our approach to assessing the benefits that additional interconnection could bring.

A fundamental element of the RIT-T process is a statement of the problem to be solved, or the "identified need" to be met. The identified need in this case is:

> *The characteristics of customer demand, generation and storage resources vary significantly between Tasmania and the rest of the NEM. Increased interconnection capacity between Tasmania the other NEM regions has the potential to realise a net economic benefit by capitalising on this diversity.*

Increased Bass Strait interconnection would benefit the NEM

The primary benefit we see from increased interconnection between Tasmania and Victoria is to provide energy arbitrage for mainland NEM regions. i.e. Tasmanian dispatchable renewable energy will assist to meet customer demand when mainland renewable generation is not available, due to absence of wind or sunshine. This will reduce the need for the installation and operation of more expensive peaking generation such as gas turbines, and ultimately reduce the price paid by end-use customers. Conversely, at times of excess renewable energy in mainland regions, this excess can be exported to Tasmania. This will increase the utilisation – and economic benefits – of mainland renewables.

Increased interconnection will also result in other benefits:

Increasing Victorian summer reliability: Victoria relies on imports from other NEM regions during times of summer peak demand. Tasmania, however, experiences peak demand in winter and is therefore able to supply energy to Victoria during summer peaks. Additional interconnection will increase the capacity and security of electricity supply to Victoria during such times.

Ancillary services such as inertia, system strength and frequency control, have historically been considered abundant. The underlying physics of synchronous generators (i.e. thermal and hydro generators) means these generators provide such ancillary services by default. However as synchronous generators are displaced by renewable generation technologies such as wind turbines and solar photo-voltaic panels – which do not provide the same level of ancillary services – ancillary services may become harder to provide. A second interconnector would allow transfer of ancillary services between regions. This is expected to reduce ancillary services costs, again reducing the final energy cost paid by customers.

Avoiding the need for future network investment: Construction of further Bass Strait interconnection would require the extension, and potential upgrade, of both the Victorian and Tasmanian transmission networks to connect the interconnector to the shared network in each state. Depending on the precise design and route chosen, these network extensions and/or upgrades may also provide opportunities for more efficient connection and power transfer for future generation developments in Tasmania and Victoria.

Increased inter-regional market access: The presence of only one interconnector between Tasmania and mainland regions places constraints on contracting between retailers and generators on opposite sides of Bass Strait. Any unavailability of Basslink would mean that energy trade between Tasmanian and mainland counter-parties is not possible, and arrangements need to be established to allow for this possibility. The presence of a second interconnector would result in increased certainty of being able to meet contractual obligations, reducing the barriers to inter-regional market access between Tasmania and mainland regions.

Increased Tasmanian energy security: an unexpected Basslink outage during the first half of 2016, coupled with low storage levels and low rainfall, highlighted the potential vulnerabilities in Tasmania's long term energy security. Additional interconnection between Tasmania and Victoria, utilising transmission route that is independent of the Basslink interconnector, would

mean energy transfer between Victoria and Tasmania could continue in the event that one of the two interconnectors was unavailable.

We're looking at two broad options

We are currently considering two options to increase the interconnection capacity:

- Option 1: A 600 MW monopole high voltage direct current (HVDC link), including associated alternating current (AC) transmission network augmentation and connection assets.
- Option 2: A 1,200 MW bipolar HVDC link, including associated AC transmission network augmentation and connection assets.

This 600 MW sizing approximately aligns with both the capacity of the largest Victorian generator contingency event and the existing Basslink interconnector. It is the largest capacity that could readily be accommodated by both the Victorian and Tasmanian power systems.

We are in the process of investigating route options and HVDC technology choices.

We need to work closely with others

AEMO's ISP finds that additional transmission capacity between Victoria and Tasmania will be needed, although further refinement of the costs of key items such as pumped storage opportunities is required in order to determine the optimum timing. TasNetworks is working with AEMO to understand the details of AEMO's ISP modelling methodology, and we are using updated information, some alternative scenarios and more detailed modelling to assess the optimal timing of additional Bass Strait interconnection. TasNetworks will continue to work with AEMO and to refine the key inputs and modelling approach.

We are also maintaining a close working relationship with Hydro Tasmania, the proponent of the *Battery of the Nation* concept; the other generation developers; the owners of Basslink; and AusNet Services, to ensure our studies take into account all relevant factors.

We'd like your feedback

Our full Project Specification Consultation Report can be found at:

https://www.tasnetworks.com.au/our-network/planning-and-development/project-marinus/

At this stage we have not undertaken all of the analysis required to assess whether further interconnection will stand up under the present RIT-T. The purpose of releasing the Project Specification Consultation Report now, rather than after we have done the analysis, is to be transparent about our approach and assumptions and allow stakeholders to influence our approach. The full report provides more detail about the need for additional Bass Strait

interconnection, the underlying assumptions, the benefits we believe that additional interconnection will bring, and our approach to assessing these benefits.

We will also be conducting stakeholder forums in Burnie, Hobart and Melbourne during September 2018, which will provide information on these topics. We encourage anyone interested in making a submission to attend. Details about these forums will be advertised on our website.

We would welcome your input on any aspect of the Project Specification Consultation Report by 5pm on Friday 26 October 2018.

For further information, or to make a submission, please contact

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