PROJECT MARINUS

RIT-T Project Assessment Draft Report

Summary Document

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A rapidly changing sector requires new investment

Electricity markets around the world are changing rapidly as economies decarbonise in response to global warming. In Australia, the rapid growth in renewable generation together with the growth in distributed energy resources and the closure of coal plant are creating significant challenges for market participants, network companies, and customers.

In its role as the national transmission planner, the Australian Energy Market Operator (**AEMO**) has highlighted that the retiring coal plants can be most economically replaced with a portfolio of utility-scale renewable generation, storage, distributed energy resources, flexible thermal capacity, and transmission.[1] The projected portfolio of new resources involves substantial amounts of geographically dispersed variable renewable generation, placing a greater reliance on the role of the transmission network.

In this context, Project Marinus was established in December 2017 to undertake a detailed Feasibility and Business Case Assessment of a second Bass Strait electricity interconnector, known as Marinus Link. The *Initial Feasibility Report*, which was published in February 2019, considered a number of different routes and capacity options for Marinus Link. The *Initial Feasibility Report* showed that Marinus Link is technically feasible and economically viable under a number of plausible scenarios.

With the possibility that Marinus Link may be built as a regulated asset, a decision was made to subject Marinus Link and supporting transmission to the Regulatory Investment Test for Transmission (**RIT-T**). As a comprehensive cost-benefit analysis, the RIT-T would determine whether Marinus Link and supporting transmission would result in a net benefit for consumers in the National Electricity Market (**NEM**) and, if so, its optimal timing and capacity.

This document summarises the results of the Project Assessment Draft Report (***PADR***), which is an important milestone in the RIT-T process. In preparing the *PADR*, AEMO provided invaluable assistance, particularly in relation to the analysis, scenarios, and assumptions that have informed our market modelling, which has been conducted on our behalf by Ernst & Young. We acknowledge the significant work AEMO has undertaken in progressing the 2019-20 Integrated System Plan and we continue to work with AEMO as it works to finalise this plan.

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[1] AEMO, *Integrated System Plan*, July 2018, p. 4.

Marinus Link provides a cheaper supply option for mainland NEM regions

Our analysis has concluded that Tasmania's existing hydro capacity is a significant source of value to mainland electricity customers, given the forecast coal plant closures and the projected growth in renewable generation. In particular, the existing hydro capacity in Tasmania is able to provide benefits to the mainland regions of the NEM by:

- Displacing expensive gas fired peaking generation that would otherwise be required to meet electricity demand; and
- Providing lower cost, higher capacity, energy storage to provide 'firm' capacity from variable renewable generation.[2]

Whilst these benefits can be provided by Tasmania's existing hydro capacity, they can only be unlocked by investing in additional network capacity to transfer energy across the Bass Strait. This is why Marinus Link and supporting transmission are required; so that the NEM is able to make best use of Tasmania's existing resources.

Our modelling also shows that significantly more dispatchable generation and storage will be required to support the mainland NEM than could be provided by Tasmania's existing hydro capacity. Therefore, an important second role for Marinus Link is to enable Tasmania to exploit its natural advantages in topography, existing water storages, and weather to provide additional, lower cost, storage capacity and wind generation to mainland Australia.

Figure 1 shows the different sources of benefits that Marinus Link and supporting transmission would provide over the planning horizon for the preferred interconnector capacity and timing, which we will explain below. It also shows the gross benefits and the net benefits from Marinus Link and supporting transmission.

[2] Due to the topography in Tasmania and the presence of existing hydro storages, 1 megawatt (**MW**) of pumped storage capacity can typically be provided for 24 hours, compared to six hours on the mainland.

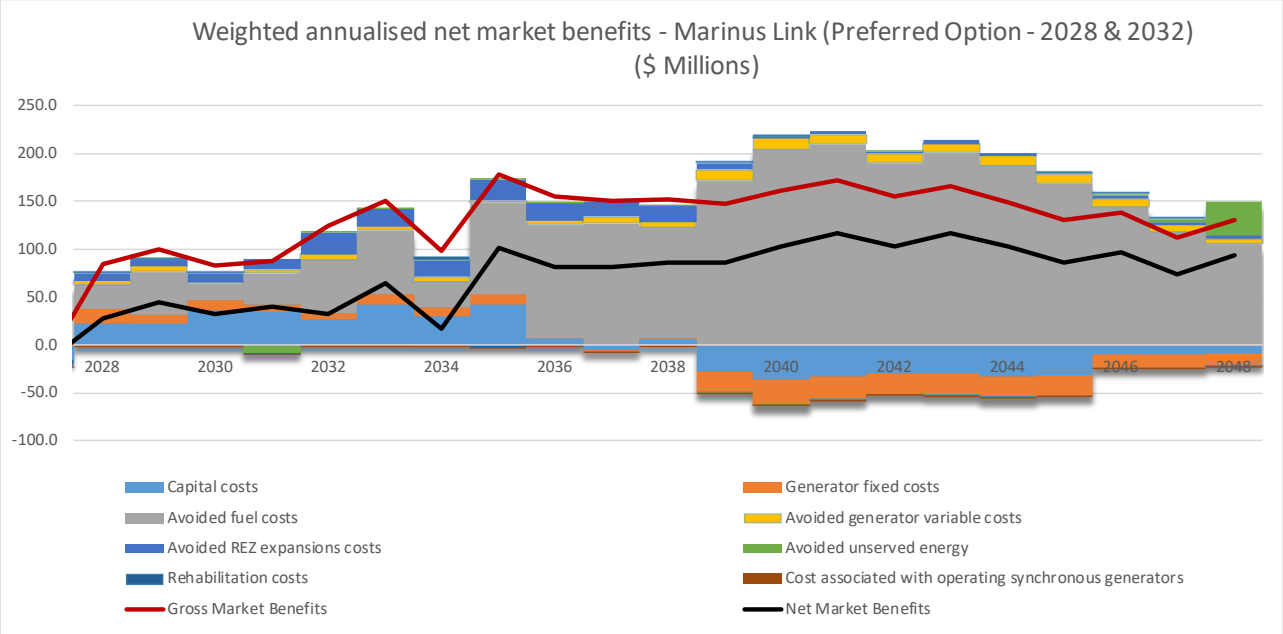

Figure 1: Categories and size of benefits from Marinus Link

Figure 1 highlights that avoided fuel costs dominate the different sources of benefits from Marinus Link and supporting transmission.

Testing Marinus Link against alternative options

The cost-benefit analysis that is central to the RIT-T examines the outcomes for the NEM for a range of credible options against a base case. For Marinus Link, we identified four credible options:

A. 600 megawatt (**MW**) high voltage direct current (**HVDC**) interconnector and associated alternating current (**AC**) network upgrades;

B. 750 MW HVDC interconnector and associated AC network upgrades;

C. 1200 MW HVDC interconnector, consisting of two 600 MW interconnectors, plus associated AC network upgrades; and

D. 1500 MW HVDC interconnector, consisting of two 750 MW interconnectors, plus associated AC network upgrades.

For options **C** and **D**, a further choice can be made in relation to the timing of the second interconnector, with the possibility of a staged construction.

In order for Marinus Link and supporting transmission to satisfy the RIT-T, it must achieve a lower cost solution in present value terms than the base case across a range of scenarios.

Our market modelling examines the total integrated system costs of meeting customers' future electricity needs to 2050. Under the base case, the model selects the lowest cost combination of generation, storage, and demand-side response across the NEM, on the assumption that Marinus Link and supporting transmission do not proceed. Committed and anticipated generation and transmission projects are also included in the base case.

It is important to note that our modelling considers a complete range of investments and operating expenditure options in order to minimise the total costs in present value terms of meeting customers' future electricity requirements. This includes generation, storage, and interconnection upgrades across the NEM, and non-network solutions. The model also allows for unserved energy, if this results in a lower total cost.

Marinus Link should proceed in two stages

Our modelling shows that the following timing for option **D** above satisfies the RIT-T:

- **Stage 1**: An initial 750 MW HVDC link between Burnie in Tasmania and Hazelwood in Victoria, with supporting network augmentations in Tasmania, should be commissioned in 2028; and
- **Stage 2**: The commissioning of a further 750 MW HVDC link in 2032.

In aggregate, this combination of Stage 1 and Stage 2 investments in Marinus Link and supporting transmission maximises the net market benefit across a range of scenarios. The total expected net market benefit is $1,674 million, expressed in net present value terms.[3]

In broad terms, Stage 1 enables customers on the mainland of Australia to benefit from the spare capacity that already exists in Tasmania's hydro system. Stage 2 is delayed until 2032, at which time our modelling shows the NEM on the mainland of Australia would require additional peaking gas-fired generation and storage in the absence of an increase in interconnector capacity. By staging additional interconnector capacity in 2032, investment in lower cost storage capacity and wind generation in Tasmania will provide further savings to the NEM on the mainland of Australia by alleviating the need for more expensive alternatives.

The central estimate of the capital costs for the preferred option as identified by the RIT-T, including transmission network augmentations, is $2.76 billion.[4] The estimated costs include supporting network augmentation in Tasmania to ensure that the planned transfer capacity can be delivered. The required augmentations (illustrated in Figure 2) are:

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[3] Unless otherwise stated, market benefits are expressed in present value terms discounted to 1 July 2019. All values are expressed in 2019 dollars.

[4] $2.76 billion is the expected capital expenditure excluding allowances for accuracy and contingencies. This cost estimate is also subject to change as better information becomes available through the tender process.

- Construction of new 220 kilovolt (**kV**) switching stations in the Burnie area adjacent to the converter stations;
- Construction of a new double-circuit 220 kV transmission line from Burnie to Sheffield, and decommissioning of the existing 220 kV single-circuit transmission line in this corridor;
- Establishment of a new 220 kV switching station at Staverton;
- Construction of a new double-circuit 220 kV transmission line from Staverton to Burnie via Hampshire; and
- Construction of a new double-circuit 220 kV transmission line from Palmerston to Sheffield.

No transmission augmentations would be required in Victoria because the DC converter station would be located adjacent to the existing Hazelwood substation, which has sufficient spare capacity.

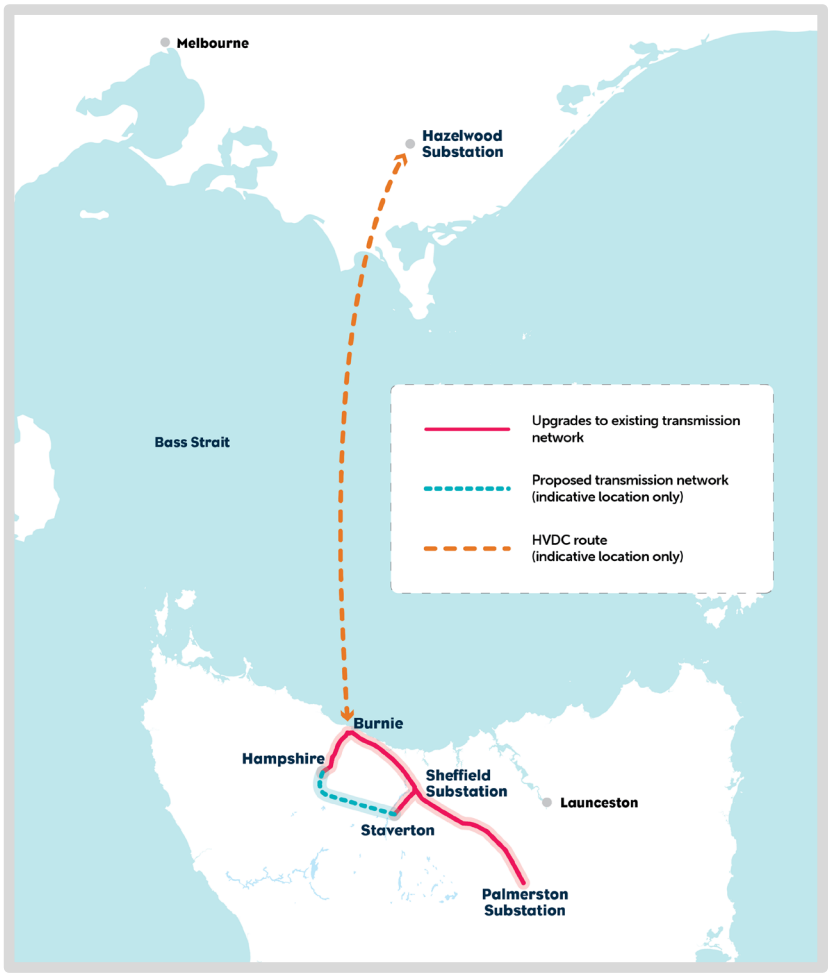

Figure 2 Overview of Marinus Link and supporting transmission (approximate locations only, not to scale)

Early project delivery

Whilst our economic cost-benefit analysis has identified that Marinus Link should proceed in two 750 MW increments commissioned in 2028 and 2032, a case can be made for delivering Marinus Link and supporting transmission earlier. Depending on the scenario used, the timing of the second 750 MW of capacity is between 2030 and 2032. Furthermore, delivering the first stage in 2027 and the second stage in 2028 would have the following advantages compared to the optimal timing identified in this report:

1. Marinus Link and supporting transmission would provide additional protection against unexpected events, such as: earlier than expected coal project plant closures; significant generator outages; a prolonged Basslink outage; or extreme heatwaves; and
2. Earlier construction will bring forward the jobs and investment stimulus that are expected to be provided to the Victorian and Tasmanian economies.[5]

Our economic cost-benefit analysis indicates that a later, staged, timing delivers a higher net market benefit as defined by the RIT-T. However, Marinus Link and supporting transmission could proceed earlier if it is supported by an external source of funding (e.g. government grant funding).

TasNetworks continues to work with AEMO as it prepares its draft and final 2019-20 Integrated System Plan, which considers future transmission investment needs for the NEM. Recognising that differences in modelling assumptions may result in different timings between TasNetworks and AEMO analysis, it is nevertheless clear that Marinus Link will play a role in the future NEM, and that the project should proceed through the Design and Approvals phase.

What does Marinus Link mean for customers?

As explained above, the RIT-T analysis shows that if the preferred option for Marinus Link and supporting transmission proceeds, it will provide an expected net market benefit of $1,674 million in net present value terms. Nevertheless, it is important for electricity customers to understand what Marinus Link and supporting transmission would mean for them.

Our analysis shows that Marinus Link and supporting transmission are expected to reduce wholesale electricity prices compared to what they would be without Marinus Link and supporting transmission, across the NEM regions over time,[6] as shown in the figure below. Tasmania is shown to be unaffected, which reflects the

[5] It is important to note that the benefit of the project in terms of jobs is not included in the RIT-T analysis, which is only concerned with costs and benefits to the electricity sector.

[6] The analysis shows the impact on the marginal costs of supply, which over time should be reflected in wholesale generation prices in each region.

Tasmanian Government commitment that prices in Tasmania will not increase as a result of Marinus Link and supporting transmission.

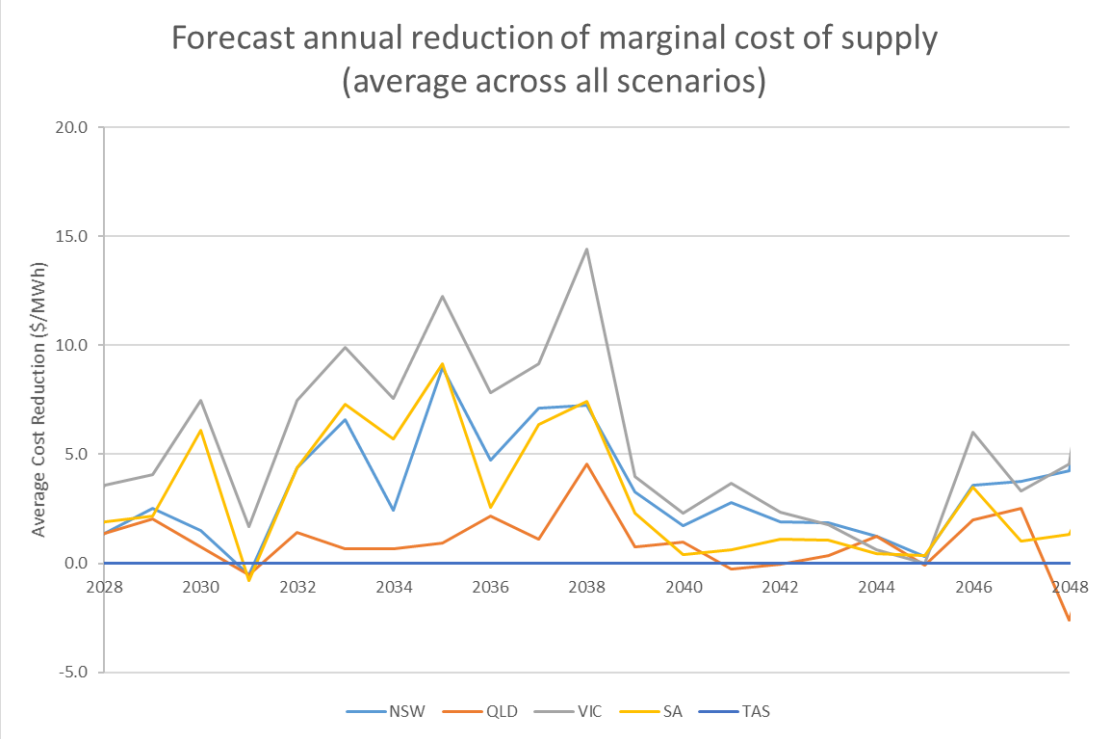

Figure 3: Expected reductions in regional wholesale generation prices as a result of Marinus Link

Whilst wholesale prices are expected to reduce across the NEM as a result of Marinus Link and supporting transmission, the costs of constructing and operating Marinus Link and supporting transmission must also be met by customers through higher transmission prices. This is a complex issue, which has been the subject of extensive debate in recent years.

TasNetworks has received feedback from customers regarding the transmission network pricing impact of Marinus Link and supporting transmission, particularly in Tasmania. In response to this feedback, we have expressed the view that all customers in the NEM should pay for interconnector augmentations in proportion to the benefits they receive. We are proposing that this principle should apply to all new interconnectors, not just Marinus Link and supporting transmission.

To formalise our views, we have consulted with the Tasmanian Government and other stakeholders to prepare a discussion paper about possible changes to the National Electricity Rules (**NER**) to deliver network pricing outcomes for interconnectors that reflect the benefits that those interconnectors provide across the NEM. This discussion paper is available on our website with our *PADR*. We welcome stakeholders' views on the discussion paper, which will inform our submission to the Energy Security Board's anticipated consultation on this important issue.

Further engagement

TasNetworks welcomes submissions and feedback from stakeholders, which should be provided to:

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All enquiries relating to this document or requests for information should also be directed to the person named above. For further information, the *PADR* may be downloaded from our website:

https://www.marinuslink.com.au/rit-t-process/