6 April 2020

Stephen Clark,
Technical and Economic Leader, Project Marinus
Via email: team@marinuslink.com.au

Dear Mr Clark,

MarinusLink Project Assessment Draft Report (PADR)

Hydro Tasmania welcomes the opportunity to provide a response to the Project Marinus PADR. As stated in our Project Specification Consultation Report submission, we commend TasNetworks for their transparency and engagement through this Regulatory Investment Test – Transmission (RIT-T) process.

Hydro Tasmania supports robust and strategic system planning to ensure the security and reliability of Australia's electricity system. AEMO's Integrated System Plan (ISP) has highlighted the pressing need to strengthen interconnection between National Electricity Market (NEM) states, develop Australia's best renewable energy resources and provide additional system resilience for the NEM. In particular, Hydro Tasmania believes that the NEM must have access to cost competitive resource and project diversity as this can provide risk mitigation and will significantly strengthen the NEM into the future.

This submission addresses the: application of the RIT-T; PADR findings; and additional factors that would further improve net market benefits.

Application of the Regulatory Investment Test - Transmission (RIT-T)

- The **PADR provides a comprehensive discussion** of the challenges facing the NEM and the benefits that additional interconnection between Tasmania and Victoria can provide.
    - In particular, the publication of supporting modelling for the PADR has included data at hourly resolution. Hydro Tasmania considers that high resolution analysis such as hourly modelling will be critical as the share of variable generation rises in

the NEM. We understand this is the first time hourly modelling has been provided as part of a RIT-T and recommend that this becomes the standard moving forward.

- Hydro Tasmania believes that **the Identified Need is appropriately described** and assessed, in particular the net economic benefit that would be provided by linking regions with supply and demand diversity.
- **A range of credible interconnection options have been explored** by TasNetworks. This gives appropriate guidance on the role that Tasmanian interconnection could play and on the comparative benefits of different cable capacities and timings.
- We recognise that **the scenarios used in TasNetworks' analysis are similar to those used by AEMO in its ISP analysis**. The PADR explores a range of credible future scenarios.
- **We support the assessment of market benefits as laid out in section 5.1.** While TasNetworks has not explicitly modelled competition benefits, Hydro Tasmania analysis[1] indicates that inclusion of this would significantly enhance the benefits of Marinus Link. This is because additional competition for flexible supply can cause a disproportionately greater decrease in prices and Marinus Link has the ability to unlock more cost-competitive flexible supply than other options.

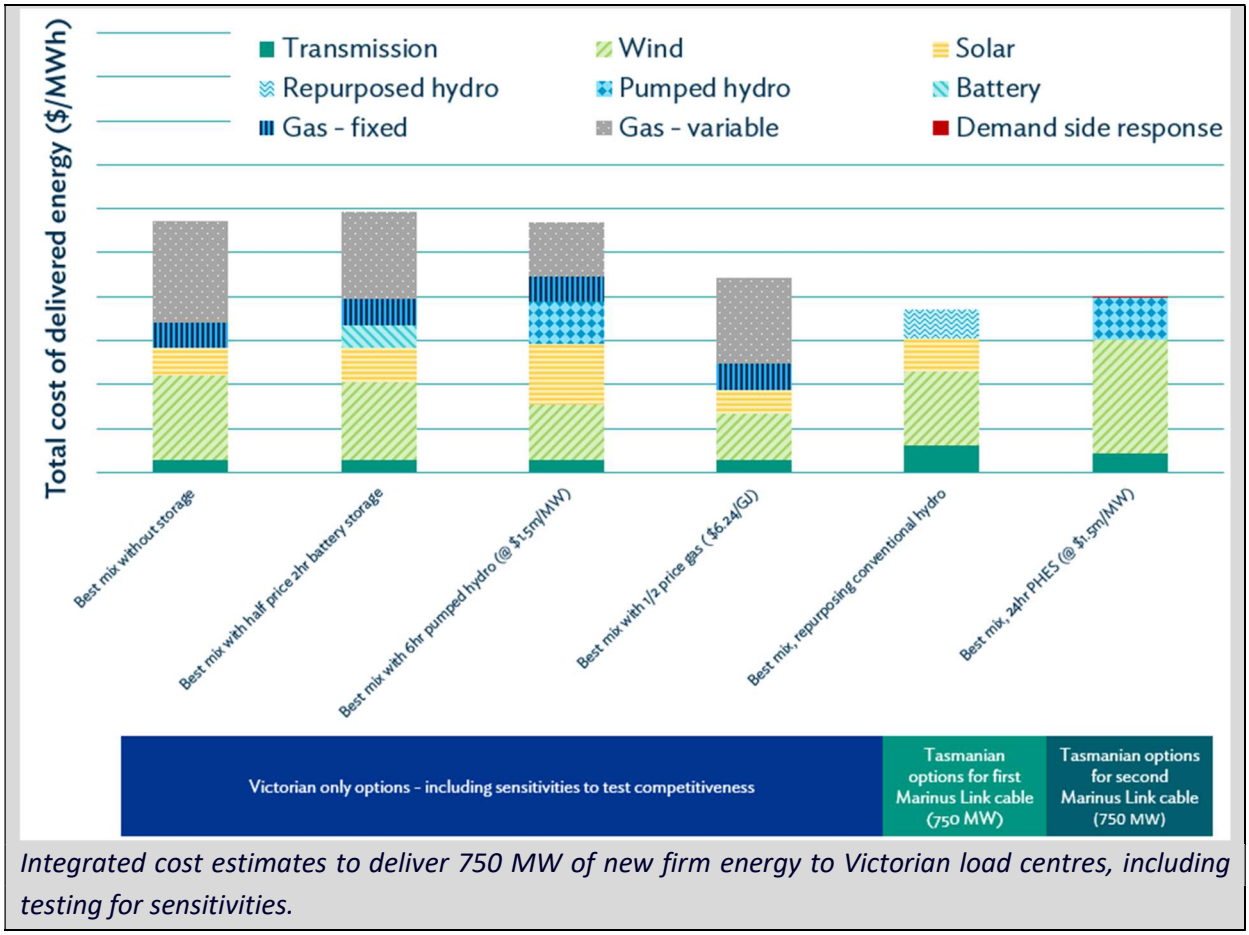
PADR findings

- The delivery of 1500MW of additional interconnection between Tasmania and Mainland Australia, **completed in the 2020s will provide material benefits** to energy customers in Tasmania, Victoria and throughout the NEM.
- **Utilising Tasmania's existing hydropower base** and enhancing this through modernisation and upgrade can provide flexible renewable generation, long-duration energy storage (> 12hrs) and low cost firming for additional wind and solar energy development.
    - As the PADR notes on page 7: *"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."*

[1] *How Battery of the Nation can contribute to Victoria's energy needs and objectives,* available here: https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/how-botn-can-contribute-to-victoria-august-2019.pdf?sfvrsn=de409a28_4

- **Tasmanian pumped hydro development will be lower cost than mainland alternatives** due to Tasmania's favourable topography, existing reservoirs and access to established transmission corridors.
    - **Hydro Tasmania continues its feasibility assessments on three potential pumped hydro sites** to narrow down options to one site to be commissioned concurrently with the commissioning of the second tranche of Marinus Link. This work, including geotechnical investigations and deep drilling, has re-confirmed the technical and economic advantages of Tasmanian pumped hydro development. Capital costs for pumped hydro development are materially in the same range as previously stated[2] by Hydro Tasmania after completion of pre-feasibility assessment ($1.5M/MW to $1.8M/MW).
    - This relative (and increasing) competitive advantage of Tasmanian pumped hydro development opportunity **must be accurately reflected in the next round of Marinus Link and ISP modelling**. Further, confidential evidence can be provided to both TasNetworks and AEMO if necessary.
- **Flexible renewable energy generation and energy storage will be needed under a wide range of potential future energy scenarios.** These are investments that should be supported and accelerated now to ensure that they are available and can be delivered as the NEM needs. Delayed or late delivery of critical transmission, energy storage and additional flexible capacity represents a significant and uncontrollable risk for energy consumers.
- Pumped hydro combined with on-island wind will provide flexible renewable energy to the mainland and can increase competition, providing benefits for energy consumers. Hydro Tasmania's internal analysis indicates that this mix of **Tasmanian resources will be lower cost than a comparable mainland energy mix** (such as wind/solar firmed with gas and batteries) even when the cost of additional interconnection is included. This is illustrated in the figure below which represents Hydro Tasmania analysis. The magnitude of the cost findings are confidential to Hydro Tasmania but could be shared with AEMO, AER and TasNetworks on request.

[2] Available here - https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/botn-phes---prefeasibility-studies-summary-report-aug19.pdf?sfvrsn=2b089a28_2



Integrated cost estimates to deliver 750 MW of new firm energy to Victorian load centres, including testing for sensitivities.

Additional factors that would further improve net market benefits

- There are a number of factors that would further strengthen the case for progressing with Marinus Link. These issues are discussed in the Attachment to this submission but include:
    - **Competition benefits of further interconnection** and additional price setters during peak times – noting these are hard to capture through modelling yet will have significant impacts on customer outcomes.
    - The **assumption of perfect foresight which underpins modelling** of future generation and transmission build-out. Using imperfect forecasting would be more representative of real-world outcomes and will typically require more capacity and a preference for longer duration energy storages.
    - Access to **Tasmania's long-duration energy storage (>12 hrs)** will enable the NEM to be more robust and provide greater system benefits than the same MWh of storage being provided through shallow (<6hr) storages.
    - **Understanding the cost of social risk and climate-based risk to transmission corridors** (bushfire and extreme winds) may increase the relative attractiveness of developing undersea transmission cables.

- **Marinus Link provides effective insurance for Victoria against key uncertainties** outlined in the ISP (coal retirement schedules, technology and project costs or delays etc.). These risk-mitigation and system resilience benefits would be valuable under a wide range of scenarios.
- **If the NEM is to transition towards net-zero emissions then there will be clear advantages in moving earlier to pumped-hydro** in order to firm variable renewable generation. This is because the alternative – reliance on building conventional gas generation as a transition fuel – will cause higher emissions through this period and will establish capital plant that may need to retire before end of asset life. In addition, future supply challenges noted in the most recent GSOO, suggest that gas costs may rise further.

- We note that since the PADR was released, the Tasmanian Government has announced a 200% renewable energy target for Tasmania. This sets out a clear direction for the State's energy sector and the opportunities this can present. The concurrent development of interconnection, further on-island renewables, pumped hydro and hydrogen electrolysis and export will provide an integrated energy future for the state. This can be developed to the benefit of Tasmanian and mainland energy customers and will provide significant economic stimulus and opportunity.

Conclusions

It is of paramount importance that TasNetworks, the AER and AEMO continue working together so that these benefits can be realised. Hydro Tasmania strongly supports maintaining current progress and optionality for MarinusLink (targeting delivery of 1500MW by 2028) and examining an appropriate cost-allocation methodology for this strategic interconnection.

MarinusLink will complement the other strategic Group 1 and 2 investments outlined in the ISP including those currently going through the RIT-T process. It is Hydro Tasmania's view that MarinusLink will enhance the energy security of the NEM, particularly the Victorian region; increase competition; and support the development of wind and solar resources both in Tasmania and Victoria. TasNetworks should continue to progress the RIT-T, design work and approvals for Marinus Link to ensure that it can be available as soon as is technically feasible. Maintaining current momentum will be critical to ensure optionality and can provide additional resilience to AEMO NEM-wide planning processes.

The points above represent Hydro Tasmania's key views on TasNetworks' PADR. Supporting information is provided as Attachment A and is structured as follows:

1. Hydro Tasmania's pumped-hydro feasibility studies;
2. Importance of deep-storage;
3. Competition;
4. Cable capacity and timing;
5. Cost allocation; and
6. NEM advantages of further Tasmanian interconnection and development.

Hydro Tasmania hopes these responses are valuable to TasNetworks and interested stakeholders. For further information, please contact Cameron Potter (cameron.potter@hydro.com.au).

Yours sincerely

Andrew Catchpole
Chief Strategy Officer

Attachment A – Additional Hydro Tasmania comments

1. Hydro Tasmania's pumped-hydro feasibility studies (including updated cost estimates)

Hydro Tasmania continues to undertake feasibility on three pumped hydro sites. These sites are Rowallan, Cethana and Tribute in North-West and Western Tasmania (further information available on the Battery of the Nation website). Hydro Tasmania will continue to undertake feasibility on these three options during 2020 with the intention that the preferred site would be taken forward to be commissioned concurrently with the commissioning of the second tranche of Marinus Link. Work to date, including geotechnical investigations and deep drilling, has re-confirmed the technical and economic advantages of Tasmanian pumped hydro development. Capital costs for pumped hydro development are materially in the same range as previously stated[3] by Hydro Tasmania after completion of pre-feasibility assessment ($1.5M/MW to $1.8M/MW).

The advantages of Tasmanian pumped-hydro over mainland sites typically comes from:

- utilisation of existing hydropower reservoirs for the lower storage;
- the Tasmanian topography (steep valley sides with flat hillside tops);
- short-tunnels and low energy losses;
- existing transmission corridors; and
- known or understood local geology.

The competitive advantage of Tasmanian pumped hydro development opportunity must be accurately reflected in the next round of Marinus Link and ISP modelling. Further, confidential evidence can be provided to both TasNetworks and AEMO if necessary.

2. Importance of deep-storage

Each energy technology will bring different characteristics to the future NEM. The increasing role, dependence and focus on energy storage means that it is critical to accurately represent this technology class in analysis and modelling. There are significant differences between shallow and deep storage including how it will operate and contribute to secure and reliable

[3] Available here - https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/botn-phes---prefeasibility-studies-summary-report-aug19.pdf?sfvrsn=2b089a28_2

NEM operation. As we seek to better understand the challenges of operating a high renewables grid, the value of deep storage will continue to grow.

The following graphic is an adaptation of insights from the International Energy Agency's *Status of Power System Transformation* reports from 2018 and 2019.

To fully understand future system needs it will be critical to consider the propensity for storage to be available coincident with supply shortages/peak demand. The availability of storage and likelihood of it being available for dispatch at critical periods is reflective of the storage duration of the resource.

Long-duration pumped hydro storage will be hard to find in Australia and sites identified through desk-top studies can experience significant challenges when progressing to full feasibility, mainly due to geological challenges.

AEMO's ISP has identified the strong future system demand for deep energy storage. Sites in later stages of development, with studies confirming competitive-cost with technically and environmentally feasible outcomes should be prioritised. Investments in such sites should be brought forward to ensure the assets are available as the NEM needs them. It is this underlying market trend and the potential challenge of future industry and resource constraints that drives Hydro Tasmania's belief that Marinus Link and the *Battery of the Nation* projects should be advanced now and recognised as strategic NEM infrastructure projects.

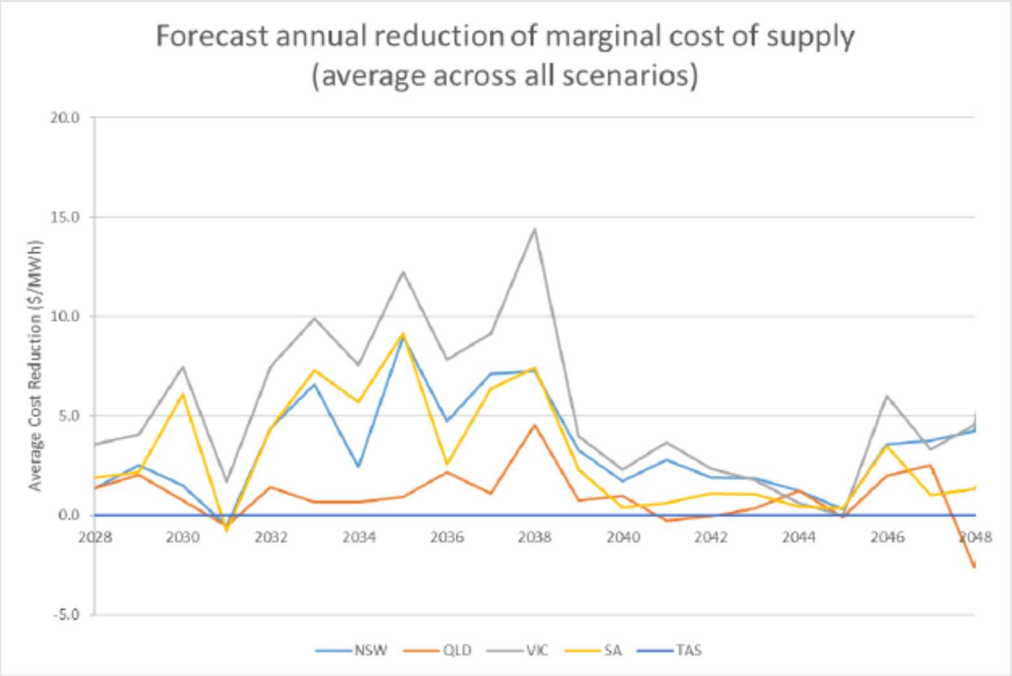
3. Competition

Hydro Tasmania believes that competition impacts are an important part of any RIT-T as it is an impact keenly felt by energy consumers. Noting that there is great complexity in modelling these benefits, Hydro Tasmania has consistently argued that it should be considered as part of the RIT-T, at least qualitatively. This will be particularly important when considering other options which may meet the defined system need but will not increase competition, particularly for flexible supply.

The paper *How Battery of the Nation can contribute to Victoria's energy needs and objectives*[4] provided some analysis on the relative impact of price setting behaviour in Victoria. It found that in 2018 flexible supply options set the price 25% of the time, and yet this accounted for 60% of the total cost in the NEM. The following graphic is an extract from that paper. Increasing competition for flexible supply will likely have a large benefit to the customer.

As shown by the closure of the Hazelwood power station, while each NEM region has its own supply/demand balance and pricing outcomes, changes in one State can significantly increase or decrease prices across the NEM. Investment in Marinus Link would offer some protection against future supply changes (capacity withdrawals), price impacts and through increased competition, ensuring that electricity costs to end-use customers, as much as possible, is based upon the efficient cost of supply.

[4] Available here - https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/how-botn-can-contribute-to-victoria-august-2019.pdf?sfvrsn=de409a28_4



Source: Page 102 of PADR

The analysis presented by TasNetworks (shown above) is based on resource costs and demonstrates that further interconnection would introduce additional low cost supply options. However, even this analysis likely underestimates the consumer benefits of additional competition for flexible, peaking supply which is a key driver in annual electricity supply costs. On this basis, Hydro Tasmania believes that the consumer benefits of further interconnection exceed those shown by the analysis.

4. Cable capacity and timing

Hydro Tasmania supports a 1500MW Marinus Link delivered progressively as two cables in 2027 and 2028. This provides the greatest resilience to the NEM and in particular to the Victorian region. It will support the development of further wind and solar by providing a customer for this energy during high generation periods. The additional flexible generation will support the reliability and security of the mainland states while providing competition benefits for consumers.

Hydro Tasmania understands that the projected difference in net-benefits between different cable timings are relatively small, and may be less than the uncertainties in the model. Given the challenges faced in the NEM over the next couple of decades we believe there are strong reasons to favour earlier deployment due to the significant benefits and resilience this will provide. If later information suggests that 2027 and 2028 are not the optimal timing for

delivery of Marinus Link then this could be accommodated through an extended build and commissioning timeline. However, the possibility of this occurring should not slow the current works, which provide the maximum optionality through continuing to work towards the earliest feasible commissioning dates.

5. Cost-allocation

Hydro Tasmania understands that the COAG Energy Council has tasked the Energy Security Board with considering this issue further. If Marinus Link is to be progressed on schedule and produce the net-benefits to customers outlined in the PADR, then this issue will need to be resolved. We look forward to future consultation and analysis of this issue – which will need to include understanding the risks presented to the NEM if an appropriate solution cannot be found for strategic interconnection projects.

6. NEM advantages of further Tasmanian interconnection and development

Marinus Link's primary benefit is resource sharing and efficient generation development and dispatch.

- Marinus Link will provide access to existing surplus hydro generation capacity which is currently not able to be utilised due to the capacity limits of current interconnection via Basslink.
- It will further connect Tasmania's winter-peaking load with the rest of the NEM's summer-peaking load. Additional interconnection will provide efficient gains and will allow better utilisation of surplus capacity and increase reliability benefits. This represents valuable load-sharing even when considering that Tasmania's demand is only 5% of the total NEM.
- Will provide efficient access to develop the NEM's least-cost wind resources that are also diverse with the wind resources in South Australia and Victoria – where most of the development has occurred to date.
- Marinus Link will provide customers access to additional high quality solar in Victoria, allowing for efficient development of that resource. It is highly likely that NSW will also develop cost-effective solar resources and there will be limited opportunity to develop solar resources for the purpose of sharing between Victoria and New South Wales.