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Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centres (HumeLink) - Project Assessment Draft Report

Snowy Hydro Limited welcomes the opportunity to contribute to the discussion on the Project Assessment Draft Report (PADR) from TransGrid on Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centres (HumeLink).

Snowy Hydro Limited is a producer, supplier, trader and retailer of energy in the National Electricity Market (NEM) and a leading provider of risk management financial hedge contracts. We are an integrated energy company with more than 5,500 megawatts (MW) of reliable, firm generating capacity. We are one of Australia's largest renewable generators, the third largest generator by capacity and the fourth largest retailer in the NEM through our award-winning retail energy companies - Red Energy and Lumo Energy.

To accommodate the energy mix of the future in the NEM, the timely and appropriate decisions made on HumeLink, an augmentation to reinforce the New South Wales Southern Shared Network, will determine the direction, cost effectiveness and sustainability of the NEM for decades. AEMO recently identified the need for over 30 GW of new grid-scale renewables to replace the approximately 15 GW of Australia's coal-fired generation that will reach the end of its technical life. HumeLink will connect renewables required to replace conventional generators, coupled with energy storage will harness the most cost effective way to add capacity and balance variable resources across the whole NEM.

The replacement of large-scale coal-fired power stations involves large-scale investments and deployment of new infrastructure with HumeLink expected to enable NSW to receive the benefits of Snowy 2.0 and renewables from Victoria and Southern NSW. The construction of Snowy 2.0 continues to progress through key milestones since the PSCR submission.

Snowy 2.0 is being built to provide longer-term energy storage and replace retired assets. With AGL Energy expected to close Liddell Power Station by April 2023 and aggressive decarbonisation forecast to lead to significant quantities of dispersed variable renewable energy (VRE) across the grid, HumeLink must be in place by 2023 to enable the additional transfer capacity from Southern NSW to Sydney, to coincide with the closure of Liddell Power Station.

It is for this reason that Snowy Hydro strongly supports the PADR preferred option. The preferred option addresses the benefits to all shared network users and provides the greatest net benefit of all credible options across all the four scenarios.

Most importantly TransGrid's benefit analysis has shown that HumeLink is justified in the preferred configuration even without the Snowy 2.0 project, thereby clearly showing the substantial benefits of: releasing existing constrained generation capacity in the southern NSW zone, creating connection and transmission capacity for southwest NSW renewable energy zones, and facilitating a step change

in inter-regional transfers, and therefore the availability of renewable generation to the NEM, within the 3-state interconnected network.

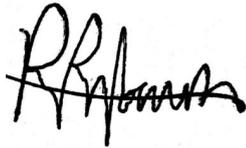
Given the long-term identified need for storage as the proportion of renewables in the system increases, the preferred option will make available firm capacity of 2,570 MW¹ to NSW when the committed Snowy 2.0 project is complete.

TransGrid should also continue to investigate the possible future reinforcement of the southern and western Sydney transmission network to ensure the critical southern supply route meets future demand requirements through diversified lateral feeders into the greater Sydney metro load centre.

All options in the PADR are expected to be commissioned in 2024-25. With existing coal-fired generators retiring progressively from 2022 however and the pressing need for new sources of supply to meet the growing energy demand, accelerating completion to 2023/24 is preferred. This would make available additional, currently constrained generation capacity in southern NSW and/or interregional transfers from Victoria.

Snowy Hydro appreciates the opportunity to respond to the PADR and any questions about this submission should be addressed to me by e-mail to panos.priftakis@snowyhydro.com.au.

Yours sincerely,



Panos Priftakis
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Snowy Hydro

¹ TransGrid, 2020, "Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centres (HumeLink), pp3



Detailed Submission

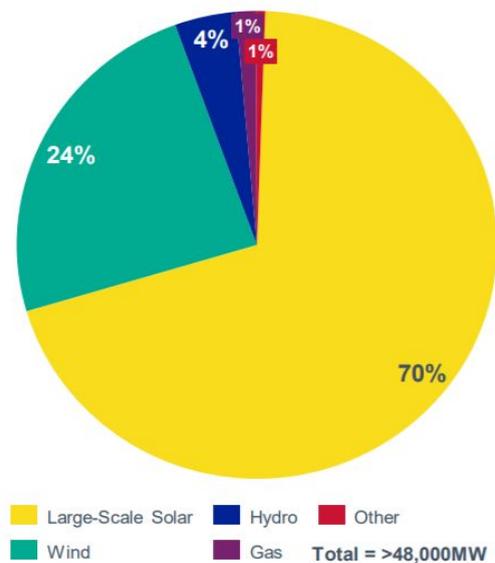
The 'Identified Need'

The NEM is past the tipping point of firmed renewables being the most economic form of new generation, with AEMO identifying the need for up to 21 GW of utility scale storage between now and 2040, which highlights the need to replace 63 per cent of Australia's coal-fired generation that will reach the end of its technical life². This long term view must therefore seriously consider not only the immediate and growing need for storage, but must also address the long-term requirement for connecting the forecast volumes of utility scale storage which, from the perspective of energy security and low cost to consumers, must include significant amounts of deep storage.

Recently the NSW Electricity Strategy Plan noted that the NEM needs to modernise the grid so businesses and investors can build the next wave of generators before ageing coal-fired generators close³. Snowy Hydro believes Humelink would increase investor confidence supporting the NSW Government's plan to unlock private sector investment in Renewable Energy Zones⁴. This will modernise the transmission grid and reduce any future overcrowding so that new generators can connect to the grid.

There is a significant amount of variable renewable energy projects being developed and more are planned, as noted by TransGrid in Figure 1 below from 2019. Some of the very best and cheapest renewable resources in the NEM are located in NSW and these are the areas most affected by the absence of transmission, and conversely have the most to contribute to the NEM as a result of building the ISP. The key to unlocking this low cost energy, as well as harnessing the complementary capabilities of the Snowy region, is efficient transmission links.

Figure 1: Current connection enquiries to TransGrid network % (2019)⁵



² AEMO, 2019, "Draft 2020 Integrated System Plan"

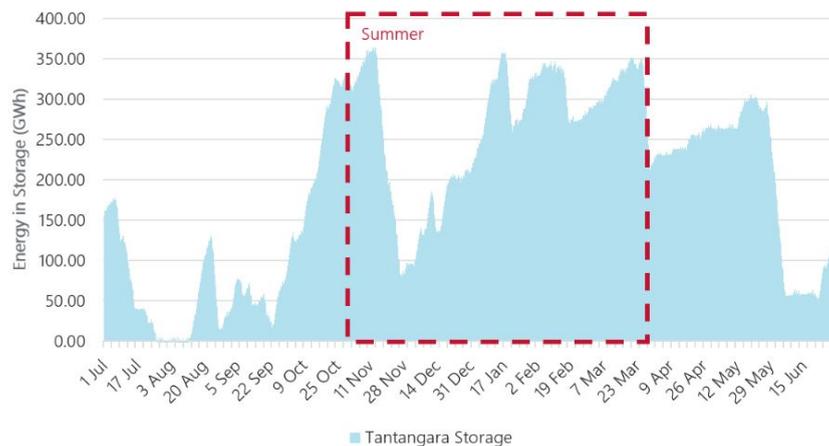
³ NSW Department of Planning, Industry and Environment, 2019, "NSW Electricity Strategy: Our plan for a reliable, affordable and sustainable electricity system", << <https://energy.nsw.gov.au/media/1926/download> >>

⁴ NSW Government, 2019, "Transmission Infrastructure Strategy", << <https://energy.nsw.gov.au/renewables/clean-energy-initiatives/transmission-infrastructure-strategy> >>

⁵ TransGrid Transmission Annual Planning Report 2019

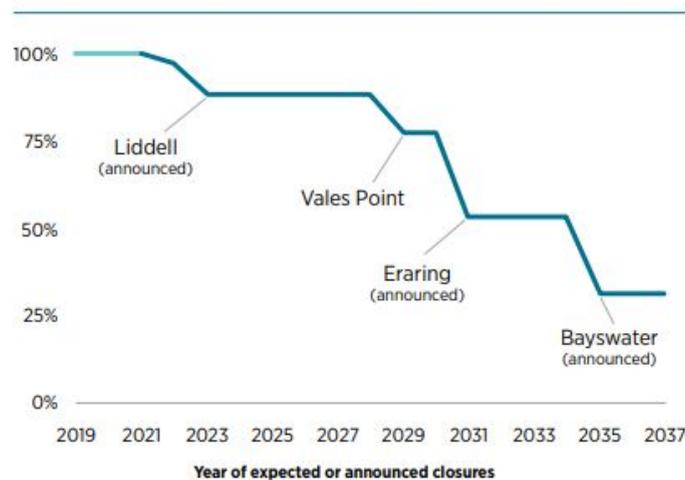
Large volumes of VRE are forecast to be required to achieve the aggressive carbon reduction targets to address climate risks across the NEM with Snowy 2.0 expected to complement the growth in VRE. The technical appendices to the 2020 draft ISP model Tantangara under the 'central' scenario in Summer 2039/40⁶. The scenario shows how indispensable deep storage capability of Snowy 2.0 is during renewable energy droughts. Over a two week period, Tantangara is run down from 350GWh to 78GWh in order to manage a generation deficit in the NEM.

Figure 2: Hourly energy in storage in Tantangara in 2039-40⁷



New transmission is critical to ensure energy security in the future and will bring new generation and competition into the market, including Snowy 2.0, so as to put downward pressure on prices to benefit consumers. Humelink is needed to connect renewable energy zones, improve interconnectivity between NEM states and ensure new projects have access to the shared network⁸. Figure 3 highlights the rate of coal-fired power station retirements in NSW, with four of the NSW's five remaining coal-fired generators set to reach the end of their technical lives and close by 2035, starting with the Liddell Power Station in April 2023.

Figure 3: NSW's coal-fired electricity generation⁹



⁶ AEMO, Draft 2020 Integrated System Plan Appendices, pp68

⁷ AEMO, Draft 2020 Integrated System Plan Appendices

⁸ AEMO, 2019, "Building power system resilience with pumped hydro energy storage: An Insights paper following the 2018 Integrated System Plan for the National Electricity Market", pp7

⁹ NSW Department of Planning, Industry and Environment, 2019, "NSW Electricity Strategy: Our plan for a reliable, affordable and sustainable electricity system", << <https://energy.nsw.gov.au/media/1926/download> >>

Option moving forward

Preferred Option

Snowy Hydro supports the preferred option as identified in the PADR assessment. The preferred option provides a long-term solution, important route diversity and network related benefits with Snowy 2.0 connected for NSW to obtain the benefits of the NSW Southern Shared Network. We therefore welcome the analysis which notes that the preferred option is expected to:

- deliver net benefits of approximately \$1.1 billion over the assessment period to 2044/45 (in present value terms); while there is a negligible net cost associated with the preferred option in the slow change scenario.
- lower the aggregate generator fuel costs required to meet demand in the NEM going forward;
- reduce the need for new dispatchable generation investment to meet demand going forward;
- avoid capital costs that would otherwise be required associated with enabling greater integration of renewables in the NEM; and
- generate sufficient benefits to recover the project capital costs three years after the option is commissioned.¹⁰

Snowy Hydro welcomes the route diverse paths. In our PSCR submission we noted that as the renewables transition progresses with larger power transfers, and the effects of climate change become more apparent (bushfires and extreme weather events) it is essential to power system security and reliability that the integrity of these lines are maintained during high impact low probability events. We therefore support the new circuits under this option which contain more route diverse opportunities providing greater risk reduction.

TransGrid should continue however to keep open the possible future transition to extend Humelink transmission paths all the way to Sydney West. The feeds to power straight into Sydney West would connect the long term southern supply to the Sydney metro load centre. The most robust long-term solution allows for staged development, maximum route diversity, maximum network related benefits to users of the shared network and provides much needed new line capacity into the greater Sydney load centre.

A learning from the recent bushfires is the national importance of transmission lines. In the long term it is important in future proofing Australia against natural disasters. In the recent bushfires, transmission links from Snowy linking NSW and Victoria were shut down due to damage from bushfire smoke, leading to a temporary loss of reserve capacity for the NSW and Victorian markets. It is therefore important that the preferred option provides more opportunity for route diversity, which as noted by the PADR provides a greater risk reduction in terms of 'high impact low probability' events (such as lightning strikes, bushfires or extreme wind events).

The bushfires demonstrate the compelling need for new transmission links and diversity of transmission paths. New transmission lines will bolster the diversity of supply, from both systemically-important projects like Snowy 2.0 as well as from geographically-diversified sources of variable renewable energy.

¹⁰ TransGrid, 2020, "Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centres (HumeLink)

Maragle 330kv substation

Snowy Hydro strongly believes that the recent summer bushfires demonstrated the need for a separate substation along with the proposed route diversity. Although TransGrid notes that the share network component is not covered by the RIT-T¹¹, we submit that the Maragle 330 kV substation and the cut in line to Line 64 should be captured in the process.

This sensitivity presented in section 8.7.2 finds that the preferred option is still expected to deliver strongly positive expected net market benefits. Maragle 330kV substation would allow access to existing Snowy and Victorian generation which is currently constrained out of the NSW market. This would be in addition to the connection of Snowy 2.0 which would also connect into the existing Maragle substation by extending the 330 kV bus and installing dedicated 330 kV connection bays for the Snowy 2.0 connecting lines. This clearly demonstrates that Maragle 330 kV is required for the shared and dedicated asset mix in the NEM.

The addition of the Maragle 330 kV substation would capture all of the market benefits (including access to existing Snowy and Vic generation currently constrained out of the NSW market) and avoid another event like the 4th of January 2020.

Timing

In the recent NSW Electricity Strategy, the NSW Department of Planning, Industry and Environment noted that one of the options to enhance firm supply was to fast track the development of the Humelink interconnector. The Strategy highlights that that fast tracking Humelink would *“unlock up to 1200MW of existing capacity, of which 500MW would be available during periods of peak demand, and 2000MW of new reliable capacity following the completion of Snowy 2.0”*.¹²

Snowy Hydro understand that the construction for all options is expected to take 3-4 years, with commissioning in 2024-25 requiring time for necessary environmental approval. Existing coal-fired generators however are retiring progressively from 2022 and along with the pressing need for new sources of supply, as noted by the NSW Government, to meet the growing energy demand an accelerated completion date of 2023-24 is preferred.

Priority should be given to bring Humelink to the Sydney West load centre. This could be undertaken through a staged approach which Snowy Hydro believes could be technically possible. This could be achieved through a further stage of "powering Sydney's Future" with parallel pathing of the approvals and route selection process. It is important that the path to the Sydney load centre is undertaken so as to maximise customer reliability.

TransGrid should assess the establishment of transitional arrangements expected to be implemented through the Actionable Integrated System Plan (ISP) rules. TransGrid should choose whether to apply the new streamlined RIT-T process, when the rules are implemented, and if possible shorten the commissioning date of Humelink. Failure to facilitate the timely completion of strategic transmission projects could amount to a gamble on the reliability of the NEM.

¹¹ TransGrid, 2020, "Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centres (HumeLink)

¹² NSW Department of Planning, Industry and Environment, 2019, "NSW Electricity Strategy: Our plan for a reliable, affordable and sustainable electricity system", << <https://energy.nsw.gov.au/media/1926/download> >>