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**Reinforcing the New South Wales Southern Shared Network to increase transfer capacity to the state's demand centre - Project Specification Consultation Report**

Snowy Hydro Limited welcomes the opportunity to comment on matters raised in the Project Specification Consultation Report (PSCR) from TransGrid on Reinforcing the New South Wales Southern Shared Network to increase transfer capacity to the State's demand centre.

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 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.

Australia's energy system is undergoing a rapid and profound transformation with a critical need to progress transmission upgrades to ensure the timely integration of renewables and large scale storage into the grid so we do not experience load shedding events. 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 15 GW of utility scale storage between now and 2040 which highlights the need for storage in the Southern NSW region. 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 up to 15 GW of utility scale storage which, from the perspective of energy security and low cost to consumers, must include significant amounts of deep storage.

Snowy Hydro is seeking to help address this need by constructing Snowy 2.0, which has progressed past Final Investment Decision in December 2018, and accordingly should be considered committed for the purposes of this Regulatory Investment Test for Transmission (RIT-T). Southern Shared Network will enable NSW to receive the benefits of Snowy 2.0.

Investment in transmission and interconnection will ensure system security and reliability, and will underpin investment in new renewable generation and increase competition in the market to put downward pressure on prices to benefit consumers. The scheduled closure of Liddell power station in 2023 will diminish system security in NSW. The recent ESOO highlights that a combination of high summer demand and unplanned generator outages will leave New South Wales exposed to significant supply gaps and involuntary load shedding if no action is taken<sup>1</sup> with a risk in 2023-24 to between 135,000 and 770,000

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<sup>1</sup> AEMO, 2019, "2019 Electricity Statement of Opportunities", pp4.

households in New South Wales being without power for three hours during an extreme heat event (that is, a 1-in-10 year peak demand event)<sup>2</sup>.

Given the gap left by Liddell Power Station, bringing forward Southern Shared Network will mitigate the impact of this closure by unconstraining dispatchable capacity up to 1200 MW from the existing Snowy Scheme or Victoria. This will be beneficial to both reliability and prices in NSW. The substantial improvement of the transmission network, combined with Snowy Hydro's large scale storage and firming capabilities, will have the dual benefits of improving the economics of generators in the NSW Renewable Energy Zones (REZs), and also ensure that Liddell Power Station can affordably and reliably be replaced. However, for this to occur the Southern Shared Network must be in place by 2023 to enable the additional transfer capacity from Southern NSW to coincide with the closure of Liddell Power Station.

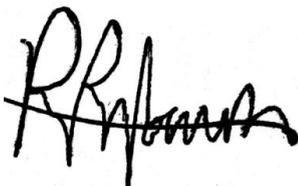
In reviewing the Options presented in the PSCR, Snowy Hydro considers that, given the long-term identified need for storage as the proportion of renewables in the system increases, coupled with the difficulty in developing large transmission assets within the timeframe presented by the acceleration in the renewable energy transformation, there is an immediate need to embrace a longer term view in the Southern Shared Network proposal.

Snowy Hydro's preference from the network options identified in the PSCR is the development that best addresses benefits to all shared network users, allows for staged and early NSW capacity benefits, and which preserves future optionality to enable access to further deep storage locations in southern NSW.

Snowy Hydro therefore considers a staged development of Option 3 or 4 best addresses the broader needs of the shared network users, and allows a scalable option which, if accelerated to be completed by summer 2023/24, would make available up to 1200 MW of additional constrained generation capacity in southern NSW and/or interregional transfers from Victoria. Crucially, this capacity would be available in time for the full closure of Liddell Power Station to be catered for without disruption to the NEM's operation.

Snowy Hydro appreciates the opportunity to respond to the PSCR. Any questions about this submission should be addressed to Panos Priftakis, Head of Wholesale Regulation, by e-mail to [panos.priftakis@snowyhydro.com.au](mailto:panos.priftakis@snowyhydro.com.au).

Yours sincerely,



Panos Priftakis  
Head of Wholesale Regulation  
Snowy Hydro

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<sup>2</sup> Ibid.



# Detailed Submission

## The 'Identified Need'

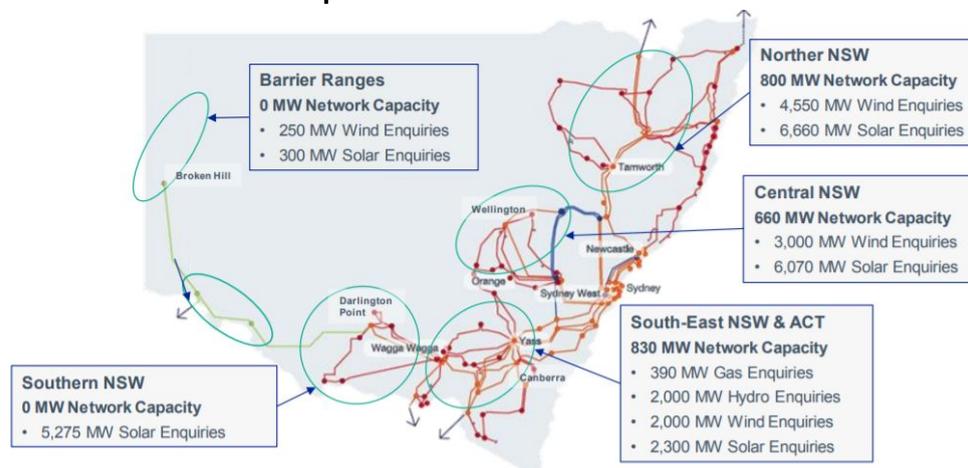
New transmission is critical to ensure energy security in the future and will bring new generation and competition into the market, including Snowy 2.0, which puts downward pressure on prices for consumers. Snowy Hydro believe upgrades need to be made to the shared network so firm capacity that is currently constrained can reach the major load centre of Sydney at times of peak demand.

To enhance the resilience of the NEM against the growth of systemic risks during the energy transition the Southern Shared Network transmission infrastructure will deliver important reliability and resilience benefits.

The scheduled closure of Liddell power station in 2023 will diminish system security. Following the closure of Liddell power station, the recent ESOO noted that in 2023-24 AEMO forecasts a risk to between 135,000 and 770,000 households in New South Wales being without power for three hours during an extreme heat event (that is, a 1-in-10 year peak demand event). Bringing forward the Southern Shared Network will mitigate the impact of this closure by unconstraining up to 1200MW of dispatchable capacity from the existing Snowy Scheme, substantially plugging the gap left by Liddell. This will also avoid the need for costly new interim capacity that would otherwise be required if it were delayed.

There is a significant amount of variable renewable energy projects being developed and more are planned, as noted by TransGrid in Figure 1 below. Some of the very best renewable resources in the NEM are located in NSW and these are the areas most affected. 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<sup>3</sup>**



<sup>3</sup> TransGrid, 2019, "Coordination of generation and transmission investment implementation – access and charging – consultation paper"

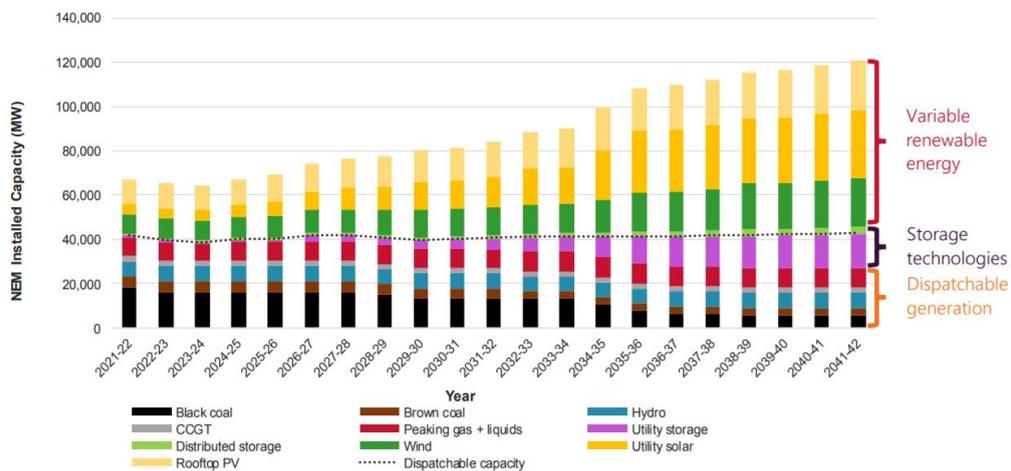
The current transmission network was designed for another era. If we do not change course, and if nothing is done to disrupt the status quo, the result will be higher prices. In the longer term, underinvestment will destabilise system reliability.

AEMO’s Integrated System Plan recognises at least some of these concerns despite the timing being too late. Recently the AEMO Insights Paper to the ISP noted the important role that pumped storage and strategic transmission developments can play in improving the efficiency of the system, lowering costs to consumers and increasing the resilience of the NEM. The paper notes the following:

- *“Increased transfer capability between the Snowy area and Sydney (HumeLink) would maximise the reliability and resilience benefits from Snowy 2.0 at lowest cost for New South Wales consumers.*
- *Advancing augmentations between Snowy Mountains and Bannaby is projected to help support Sydney under peak load conditions.*
- *One week’s storage in Snowy 2.0 in 2030-31 saves approximately \$86 million more on average in fuel costs (ultimately benefiting consumers), compared with equivalent storage capacity with only six hours storage, across weather years modelled.*
- *Deep pumped-hydro stations (Tumut 3 and Snowy 2.0) are projected to be able to take advantage of spare energy during the shoulder seasons and use this for pumping, particularly during spring, and then generate to meet high demand periods throughout the year. “*

Further to this the AEMO Insights Paper notes that as the NEM transitions from thermal generation to more renewables, new transmission links are needed to connect renewable energy zones, improve interconnectivity between NEM states and ensure new projects have access to the shared network<sup>4</sup>. Figure 2 from the Insights Paper highlights the rate of coal-fired power station retirements is expected to accelerate requiring new sources of firm and flexible capacity.

**Figure 2: Forecast NEM generation capacity in the ISP insights development plan, Neutral scenario<sup>5</sup>**

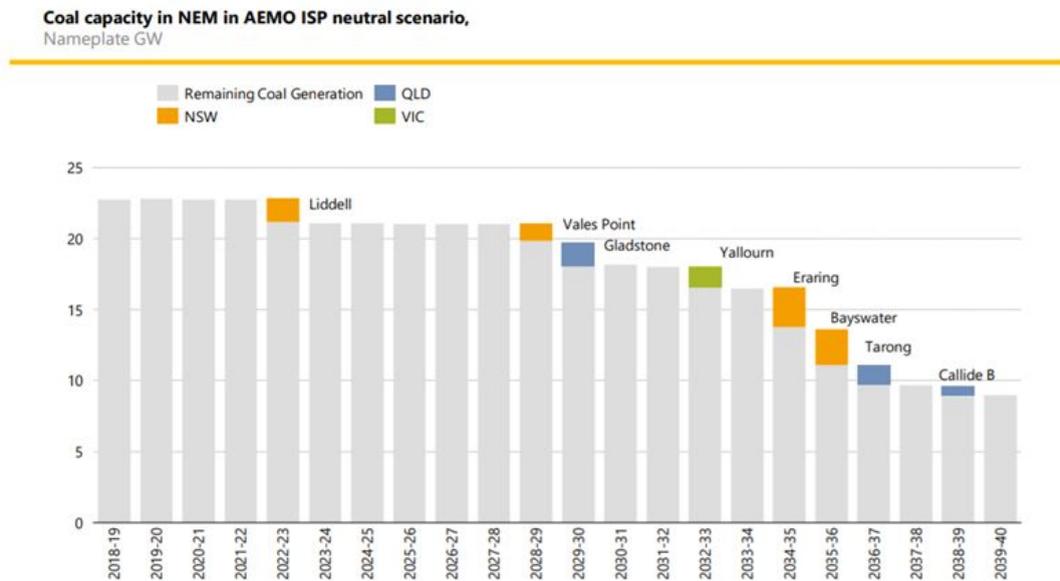


<sup>4</sup> AEMO, 2019, “Building power system resilience with pumped hydro energy storage: An Insights paper following the 2018 Integrated System Plan for the National Electricity Market”, pp7

<sup>5</sup> Ibid

Snowy Hydro notes the increased recognition of the benefits of interconnection and hydro storage to the extent that the Issues Paper identifies the development of up to 15 GW<sup>6</sup> of utility scale storage between now and 2040. Further to this, in analysing the coal closure timeline, Aurora Energy Research noted AEMO estimates 61 percent of coal capacity will close in the NEM between 2020 and 2040 as shown in Figure 3. It is therefore vital that the Southern Shared Network is future-proofed as it is not going to be an easy task to find 15 GW of any type of storage or firm capacity to connect.

**Figure 3: Coal Capacity in NEM in AEMO ISP neutral scenario<sup>7</sup>**



Transmission is currently the single most important issue in the NEM and beyond. The timely decisions made today will determine the direction and sustainability of the NEM for decades.

## Option moving forward

### Network Options:

The consultation report has identified four network options to address the identified need. In reviewing these options Snowy Hydro has considered the following factors:

- Opportunities for NSW capacity benefits from early or staged completion
- Increasing market access to existing underutilised southern NSW generation
- Increasing security and reliability in the NEM
- Connecting Renewable Energy Zones in South West NSW
- Connecting committed and future interconnection developments (Project Energy Connect, and Keranglink)

<sup>6</sup> 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

<sup>7</sup> Aurora Energy Research, 2019, "Aurora Energy Research Analysis of AEMO's ISP Part 2: Economics of coal closures"

- Not precluding future opportunities to connect readily available deep storage in southern NSW

**Option 1:** Snowy Hydro notes that Option 1 does not realise the broader market benefits that arise from connection to the Wagga load centre and future SW-NSW REZ, and long-term interconnection expansion.

Option 1 is sufficient to capture the benefits of Snowy 2.0 storage and firming capacity, and allows an opportunity for staged/early completion of one line in order to facilitate capacity benefits in NSW in the case of an earlier than expected exit of coal fired plant. However Option 1 does not capture the committed and future interconnection or SW-NSW REZ connections.

**Option 2:** Option 2 is similar to Option 1 in terms of where it starts and finishes and so remains a suitable option to capture Snowy 2.0 storage and firming capacity and includes the additional benefits of integrating with committed and future interconnection options, and SW-NSW REZ zones.

Whilst Option 2 will show increased market benefits over Option 1 it does reduce the possibility of staged/early completion of one line to augment NSW capacity, mainly because the overall route lengths are longer and will take longer to construct.

**Options 3 and 4:** Following from the Snowy 2.0 Feasibility Study, Snowy Hydro has adopted either of these options as a preferred development to address the reinforcement of the NSW Southern Shared Network. Options 3 and 4 (noting they share the same basic topology) were also identified in the 2018 ISP and 2019 ISP Insights as Group 2 Projects (ie Complete for 2025).

Snowy Hydro notes that Options 3 and 4 address all of the factors noted above, including in particular the possibility of staged development to provide earlier capacity benefits in NSW. One possible detractor for these options is the opportunity for exploiting readily available deep storage which is available in the Southern NSW region may require more extensive work to duplicate the topology (ie more line km).

Snowy Hydro notes that Option 3 does rely on PST technology to optimise line utilisation in the spans between Bannaby and the Sydney load centre. Snowy Hydro considers that in the long term Option 4 (which includes rebuilding a line into the Sydney load centre) will be the more robust option.

**General Comment on Line Construction Types:**

Snowy Hydro strongly recommends that lines proposed in all of the above options are constructed as single circuit single tower types built on sufficiently route diverse alignments in order to ensure the possibility of double circuit trip and single contingency reclassification is minimised/eliminated.

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. The disruption caused by reclassification or multiple line tripping during high demand periods is not acceptable.

**General Comment about the Maragle Substation:**

In respect of all network options Snowy Hydro considers that the shared network component covered by the RIT-T should include the Maragle 330 kV substation and the cut-in to Line 64 in order to capture all of the market benefits (including access to existing Snowy and Vic generation currently constrained out of the NSW market). Snowy 2.0 would then 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.

**Options Summary:**

Overall Snowy Hydro recognises the shared network benefits of Options 2, 3 and 4. In terms of providing the most comprehensive coverage of those factors identified at the start of this section Snowy Hydro believes Option 4 provides the most robust long-term solution because it 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.

