

20 March 2018

Australian Energy Market Operator  
530 Collins St,  
Melbourne VIC 3000

Submitted electronically: [forecasting.planning@aemo.com.au](mailto:forecasting.planning@aemo.com.au)

### **2019 Planning and Forecasting Consultation Paper**

Snowy Hydro Limited welcomes the opportunity to comment on matters raised in the Consultation Paper from the Australian Energy Market Operator (AEMO) on the 2019 Planning and Forecasting.

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.

#### **Executive Summary**

Snowy Hydro welcomes AEMO's consultation on the planning and forecasting approach for the NEM, including the NEM Electricity Statement of Opportunities (ESOO) and the Integrated System Plan (ISP). A strong coordination between transmission and generation is needed to enable the optimal expansion of the NEM which is why the ISP is vital for the transmission network. The ISP identifies renewable energy zones (REZ) across all NEM regions and the transmission networks routes to efficiently connect the REZ's to the existing transmission infrastructure.

In regards to the ESOO, the increased climate variability and quantification of uncertainty in the growth of certain technologies mean that although AEMO makes every effort to ensure the information is accurate over the long term, the likelihood of being inaccurate is high. AEMO's work will be relied on heavily for decision-making with confidence being gained in the forecasts if industry provides input in the process and AEMO take input on board to make the forecasts as accurate as possible.

Snowy Hydro's key points to the consultation paper are as follows:

- Increased engagement with AEMO through a number of programs on forecasting, modelling, reliability analysis, renewable energy, and other topical items is welcomed.
- Greater focus on understanding the reliability of aging plant instead of only focusing on technical retirement age. We also support further analysis into revenue adequacy for existing thermal plant.
- AEMO should expose more of their forecasting components and categorise errors in forecasting to allow industry to properly improve them.
- AEMO should focus on clearly assessing whether the flexibility and duration of demand response can adequately accommodate the system reliability and security requirements with increasing penetration of variable renewable generation.
- AEMO assess the material levels of storage penetration for a range of short and long storage options. Large storage will increasingly play an important role in system resilience as the NEM transitions to more variable generation and climate changes increase the risk of long

wind and solar droughts. We note pump hydro energy storage is unaffected by water droughts as it recirculates existing water between two reservoirs.

- The High DER scenario is be separated into two different scenarios which include major and smaller loads for distributed rooftop PV generation, battery storage, and Demand Side Participation (DSP) at the consumer level.
- Unless hydrogen can be stored cost-effectively on a large scale and provide the service it proposes then it should not be a standalone scenario in the ESOO forecasts at the current time. If assumptions are made on a technology which we do not understand the risks associated with implementation are high.
- AEMO forecasting approach for targets is consistent with major parties targets allowing for proper analysis against targets.
- AEMO's Integrated System Plan (ISP) incorporates both Federal and State Government policies.
- AEMO's model power system resilience provides a particular emphasis on transmission investments which are low regrets and present high option value to an uncertain future.

Snowy Hydro appreciates the opportunity to respond to the Stakeholder Paper. We look forward to continuing to work and contribute information to AEMO in the development of the Integrated System Plan (ISP) and the Electricity Statement of Opportunities (ESOO). Any questions about this submission should be addressed to Panos Priftakis, Regulation Manager, by e-mail to [panos.priftakis@snowyhydro.com.au](mailto:panos.priftakis@snowyhydro.com.au).

Yours sincerely,

A handwritten signature in black ink, appearing to read 'K Ly', with a stylized flourish underneath.

Kevin Ly  
Head of Wholesale Regulation  
Snowy Hydro

## **Detailed Paper**

The NEM is experiencing unprecedented and transformational changes as we reach an inflexion point that will shape the future of the NEM, being a once-in-a-generation opportunity to secure an orderly transition to truly interconnected, reliable, and lower emission intensive NEM. This makes AEMO's planning and forecasting publications for the NEM, including the NEM Electricity Statement of Opportunities (ESOO) and the Integrated System Plan (ISP) vitally important.

Snowy Hydro agrees with AEMO that *"forecasting in a rapidly changing energy industry is challenging, and understanding and articulating key risks and uncertainties is important to allow for informed decision-making"*<sup>1</sup> which is why Snowy Hydro is willing to provide expertise, insights and critique to ensure AEMO's inputs and assumptions are credible and the information and insights provided through its publications deliver value.

AEMO request to increase its understanding of pumped storage, with specific emphasis on Snowy 2.0 is welcomed by Snowy Hydro. Snowy 2.0 with the transmission noted in AEMO's ISP is key to the energy development for the future of the NEM as the key enabler of an orderly and secure transition to a low emissions economy. The delivery of these transmission augmentations will deliver significant value for the NEM as a whole and ultimately consumers, because it will enable a reliable transition at lowest cost.

The Snowy 2.0 pumped hydro-electric storage facility will increase the pumped hydro-electric capacity within the existing Snowy Scheme by 2,000MW and 350,000 MWh by linking the existing Tantangara and Talbingo reservoirs with tunnels feeding a new underground power station. When combined with appropriate augmentation of the transmission networks, Snowy 2.0 will underpin the transition to a low emissions future by both physically and financially firming and de-risking existing and new variable and intermittent renewable generation coming online across the NEM. We welcome providing appropriate information to AEMO required to understand pumped hydro and Snowy 2.0.

## **Stakeholder feedback**

Snowy Hydro welcomes increased engagement with AEMO through a number of programs on forecasting, modelling, reliability analysis, renewable energy, and other topical items. We regularly attend the Forecasting Reference Group (FRG) and welcome regular one-on-one engagements. In return we encourage AEMO to expose some of their forecasting components so commentary can be received from the industry. Further to this, AEMO could categorise errors in forecasting to allow industry to properly improve and comment on them.

## **Distributed Energy Resources (DER) Forecasting**

Demand response is likely to play an increasingly important role in the future of the National Electricity Market (NEM). Snowy Hydro understands that demand response will improve through technological advancements however we believe that AEMO should focus on clearly displaying the flexibility and duration of demand response if it is to accommodate the increasing penetration of variable renewable generation.

Snowy Hydro believes the High DER scenario should be separated into two different scenarios. The High DER scenarios groups both major and smaller loads for distributed rooftop PV generation,

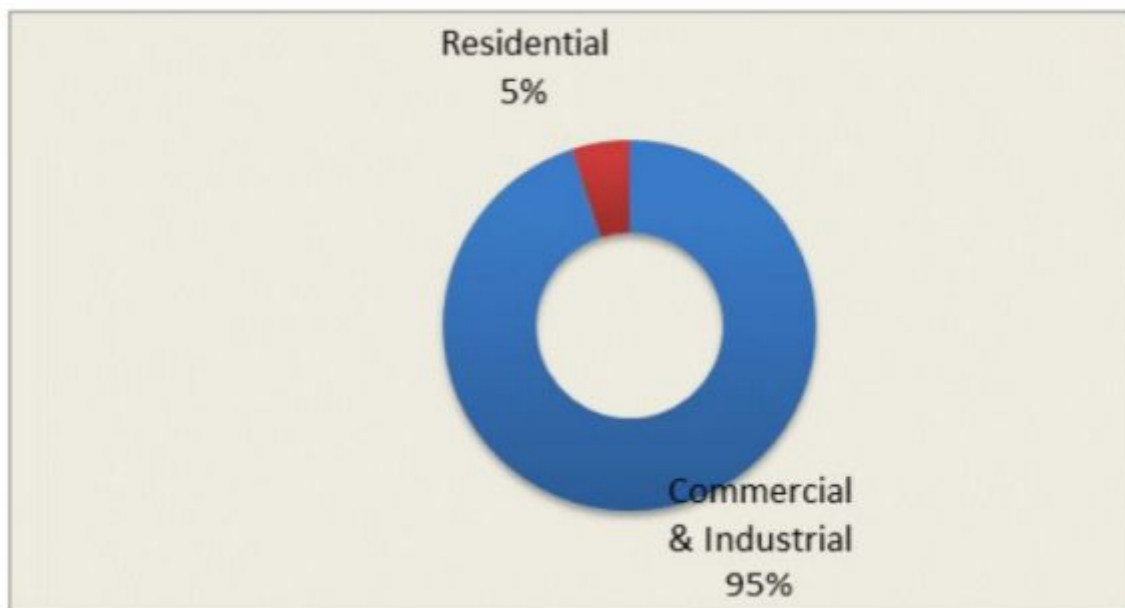
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<sup>1</sup> AEMO, 2019, "2019 Planning and Forecasting Consultation Paper", pp8

battery storage, and Demand Side Participation (DSP) at the consumer level. We are concerned that grouping all the DER into one category would be misleading especially at a time when there are rule changes being consulted on in wholesale demand response and the inclusion of demand response in the Retailer Reliability Obligation(RRO).

The flexibility, duration and performance is the most important for the reliability and security of the NEM. There is a significant difference in firmness and flexibility on small and large scale demand response and therefore it should not be grouped into one scenario. This is evident across the Asia-Pacific, commercial and industrial (C&I), shown in Figure 1, where the most attractive sectors for demand response implementation are highly energy intensive in nature, compared to the residential segment, shown in the chart below. AEMO should therefore separate the High DER scenario into major loads and smaller loads.

**Figure 1: Total Demand Response Market: Percent Revenue Split by End Users, Asia-Pacific, 2017<sup>2</sup>**



AEMO previously noted in their ESOO that the lack of granularity in a changing energy environment make it difficult to detect and understand key trend especially in DER<sup>3</sup>. One example is the battery storage technology and the impact this has on the change in the demand forecasts. In 2017, AEMO's ESOO projected business and residential behind-the-meter battery systems by the end of the 20-year period forecast was at 5.7GW while in the 2018 projected update it was less than half at 2.6 GW<sup>4</sup>. Although AEMO notes this has to do with lower forecast retail electricity prices and different assumptions around tariff structures and technology costs it makes it very difficult to rely on long-term forecasts that can change significantly<sup>5</sup>. The chart below shows the scenarios for battery growth which differ significantly .

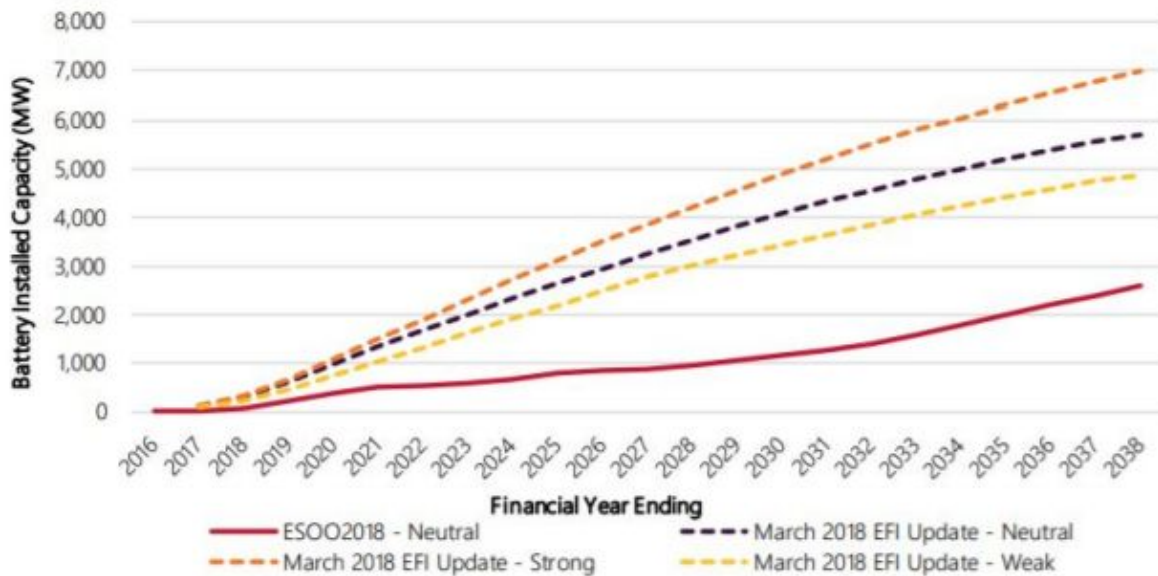
<sup>2</sup> Is the Asia-Pacific Region Demand Response Ready?, << <https://ww2.frost.com/frost-perspectives/asia-pacific-region-demand-response-ready/> >>

<sup>3</sup> Australian Energy Market Operator (AEMO), 2018, "2018 Electricity Statement of Opportunities", << [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/NEM\\_ESOO/2018/2018-Electricity-Statement-of-Opportunities.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2018/2018-Electricity-Statement-of-Opportunities.pdf) >>, pp28

<sup>4</sup> ibid

<sup>5</sup> ibid

**Figure 2: NEM battery installed capacity forecast, 2015-16 to 2037-38, Neutral scenario compared to March 2018 EFI Update, all scenarios<sup>6</sup>**



With the introduction of the RRO, AEMO’s DSP forecasts will have implications on the long-term planning of firmness and flexibility to meet the gap whole the forecasts will also have implications on the ISP. Snowy Hydro welcomes AEMO’s note that “the method for assessing the current level of DSP may vary to align with guidelines on firmness that will be developed by the AER as part of the RRO”<sup>7</sup> which we believe is necessary.

### Hydrogen Scenario

Snowy Hydro understands that the hydrogen scenario has been proposed as AEMO has been asked to consider the implementation, or consideration of an expanded hydrogen industry and the impact on variable renewable generation development and supplementing/ complementing gas supplies. However unless it is proven that hydrogen can be stored cost-effectively on a large scale and can provide the service it proposes then it should not be a standalone scenario in the ES00 forecasts.

Any proposed scenario by AEMO should be on a proven technology that works on mass market across the NEM or around the world. If assumptions are made on a technology which we do not understand the risks associated with implementation are high. It is for that reason Snowy Hydro supports AEMO’s view that “further research and development is required before hydrogen can be included as an ISP scenario”.<sup>8</sup>

### Treatment of emissions and coal retirements

Snowy Hydro believes that AEMO should publish coal retirement dates however we would also support AEMO also publishing and consulting on and applying explicit emission trajectories whether for the whole economy or electricity.

<sup>6</sup> Australian Energy Market Operator (AEMO), 2018, “2018 Electricity Statement of Opportunities”, << [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/NEM\\_ES00/2018/2018-Electricity-Statement-of-Opportunities.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ES00/2018/2018-Electricity-Statement-of-Opportunities.pdf) >>, pp28

<sup>7</sup> AEMO, 2019, “2019 Planning and Forecasting Consultation Paper”, pp26

<sup>8</sup> AEMO, 2019, “2019 Planning and Forecasting Consultation Paper”, pp16

In the scenario policy setting AEMO's new and preferred approach treats emissions as an output of the changing resource mix and does not make presumptions on future policies. Snowy Hydro is unclear about this proposed approach to remove national emissions targets as both major political parties have agreed that Australia should aim to reduce its greenhouse gas emissions and have targets. We believe the models AEMO undertakes remain consistent with major parties targets as the closure of just coal fired generation will unlikely give the desired outcome and will be difficult to compare against political parties policies.

Snowy Hydro understands that certain generators will need to be retired in the medium term due to economic age and increased competition from lower-emissions sources of power generation. The focus should therefore be on understanding the reliability of aging plant instead of just focusing on technical retirement age along with further analysis into revenue adequacy for existing thermal plant.

Transmission will play a fundamental role in ensuring power system reliability and security by managing the orderly transition and the provision of any required new infrastructure to support new generation in other areas of the grid. The earlier identification can be the vehicle for informing emerging transmission investment. To maintain reliability it is important this is done in an orderly and timely manner.

### **Hydro generator modelling**

Large storage will increasingly play an important role in system resilience as the NEM transitions to more variable generation and climate changes increase the risk of long wind and solar droughts. Snowy Hydro welcomes AEMO's proposal to enhance the understanding of pumped storage, with specific emphasis on the Snowy 2.0 project. We agree with AEMO that *"storage can play a key strategic role in systems with renewable generation developments"*<sup>9</sup>. The power system is undergoing a transformational change, with increases in renewable generation, changing consumption patterns, and the pending retirement of thermal generation across the NEM. These changes collectively will require flexible and dispatchable generation and/or additional interconnector capacity to enable more efficient sharing of generation resources between states. It is also important to note that pumped hydro energy storage is unaffected by water droughts as it recirculates existing water between two reservoirs.

Snowy Hydro strongly supports the modelling of power system resilience with particular emphasis on transmission investments which are low regrets and present high option value to an uncertain future. AEMO's assessment of coal plant retirement highlights the significant increase in the net market benefits of the transmission upgrades needed for the key development for the future NEM as the key enabler of an orderly and secure transition to a low emissions economy. Transmission investment will also support other new projects, in particular the new renewable energy zones across the NEM. The current RIT-T may be unable to fully assess large strategic investments in the NEM because the process may fail to undertake assessments in a timely manner. For instance, it has a lengthy process and can be delayed by individual interests through the dispute process. The timeliness of strategic storage initiatives for the NEM is vital.

Snowy 2.0 will underpin the transition to a low emissions future by both physically and financially firming and de-risking existing and new variable and intermittent renewable generation coming online across the NEM. Snowy 2.0 however requires timely transmission upgrades which is why

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<sup>9</sup> AEMO, 2019, "2019 Planning and Forecasting Consultation Paper", pp34

AEMO's Integrated System Plan (ISP) should incorporate both Federal and State Government policies.

The firmness of qualifiable contracts is central to the effectiveness of the retailer reliability guarantee (RRO). Hence we note the importance of recognising the quality and duration of the supply and/or demand response source. AEMO assessing the material levels of storage penetration for a range of short and long storage option is considered vital in the ISP 2019 planning studies and RRO.

The improvements to AEMO's modelled storage and generator topologies are welcome, which include:

- Utilising historical hydro inflow data for historical years to better capture the variability in production from Snowy Hydro and Hydro Tasmania.
- Revising the cascaded topology of the Snowy Hydro scheme to better reflect actual operation and to improve the interaction between the existing scheme and the Snowy 2.0 development.