

19 October 2018

Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Submitted by email to aemc@aemc.gov.au

Project number: EPR0052

Coordination of generation and transmission investment Options Paper

Snowy Hydro Limited welcomes the opportunity to comment on matters raised in the Options Paper from the Australian Energy Market Commission ('the Commission') on the coordination of generation and transmission investment.

Snowy Hydro Limited ('Snowy Hydro') 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 5500 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.

Making the Current ISP Actionable

Snowy Hydro is proposing to build and operate the Snowy 2.0 pumped hydro-electric storage facility ('Snowy 2.0'). Snowy 2.0 will increase the pumped hydro-electric capacity within the existing Snowy Scheme by 2,000MW and 350,000MWh by linking the 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 new variable and variable intermittent renewable generation coming online across the NEM.

The transmission augmentation required to complement Snowy 2.0 has been identified by AEMO in its Integrated System Plan ('ISP') as being part of a set of transmission investments which can best unlock the value of existing and new resources in the system, at the lowest cost, while also delivering energy reliably to consumers. Specifically, the ISP includes the following project:

- A link between Tumut, Wagga and Bannaby as a "Group 2" Project ('BannabyLink'); and
- Strengthening interconnection between NSW and Victoria as a "Group 3" Project ('KerangLink'). Snowy Hydro is advocating for KerangLink to be recognised as a Group 2 project.

Snowy Hydro is strongly of the view that Group 2 Projects, which include BannabyLink and KergangLink, identified in AEMO's current ISP should not be subject to the RIT-T, or an amended version of the RIT-T which is integrated into the ISP process. Instead, the regulatory framework should be amended so that these projects which are nationally significant and strategic are subject to an alternative approvals process, which simply requires the relevant TNSP to competitively source the most efficient means to deliver the project. This goes beyond the options identified in the

Commission's Options Paper, however, in Snowy Hydro's opinion, these Projects are urgently required to support the orderly transition of the NEM, in particular BannabyLink and KerangLink for the reasons outlined in this submission.

In the long run (ie. future versions of the ISP), Snowy Hydro considers that Option 3 set out in the Commission's Options Paper would be most suitable to make future versions of the ISP actionable, and to improve the regulatory investment process for transmission, while providing appropriate accountability and regulatory oversight. However, these options may require significant regulatory change and take some time to implement, and are therefore not suitable to the Group 2 Projects identified in the current ISP.

Pump hydro energy storage must not be required to pay for TUOS

The current cost recovery regime for prescribed and common transmission services collectively Transmission Use of Services (TUOS) was put in place on the basis that application of sunk costs to consumers is unlikely to impact consumption and utilisation of the network whereas the same charge applied to upstream market participants would distort efficient energy consumption and dispatch. Upstream market participants include all entities engaged in the wholesale electricity market including generators, and pump hydro energy storage.

There is a strong case that can be made that the pump hydro energy storage is only temporarily storing the energy before it is transmitted to the final consumer, and therefore the TUOS charges should be applied only to the final consumer of the power and not 'double charging' for the same units of electricity. We advocate for redefining the purpose and allocation of TUOS charges from "those who are supplied electricity by means of the grid" to "those who end-consume the electricity provided by the grid."

Access Arrangements

The current degree of uncertainty regarding future patterns and drivers of investment requires a coordinated approach for transmission and generation across the NEM. However with the current poorly integrated energy and climate change policies, recommending the Optional Firm Access (OFA) model, is not addressing the root cause of the problem but merely addressing the symptom of the lack of integrated energy and climate policy.

The OFA would greatly increase the complexity and risk of trading in the NEM. The implementation of the OFA would destroy the liquidity of the Contracts market by introducing basis pricing risk for generators contracting in their own region. We support the current status quo of open access supplemented by more strategic planning of the transmission network to ensure transmission is built in the most efficient manner as the NEM transitions to a more variable generation mix.

Other Broader Issues

It can be inferred that the recent perception of over investment in both transmission and distribution assets have heightened resistance to more network investment. This is unfortunate given the importance of making the ISP actionable to safeguard a secure, reliable, and orderly transition away from thermal generation. Broader consideration should be given to an appropriate level of return for network businesses given their risk profile. Key financial return parameters such as asset beta and gamma may need to be revisited using different input assumptions ie. a longer than five year revenue reset period.

Another relevant and related issue is, cross subsidies for residential customers with rooftop PV. That is, this cross subsidy is increasing cost pressures on those without rooftop PV and hardening general public resistance to network investment to support the future generation mix.

Snowy Hydro appreciates the opportunity to respond to the Options Paper. Any enquiries should be addressed to me by e-mail to kevin.ly@snowyhydro.com.au

Yours sincerely,

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

Kevin Ly
Head of Wholesale Regulation

DETAILED SUBMISSION

CURRENT MACRO ENVIRONMENT

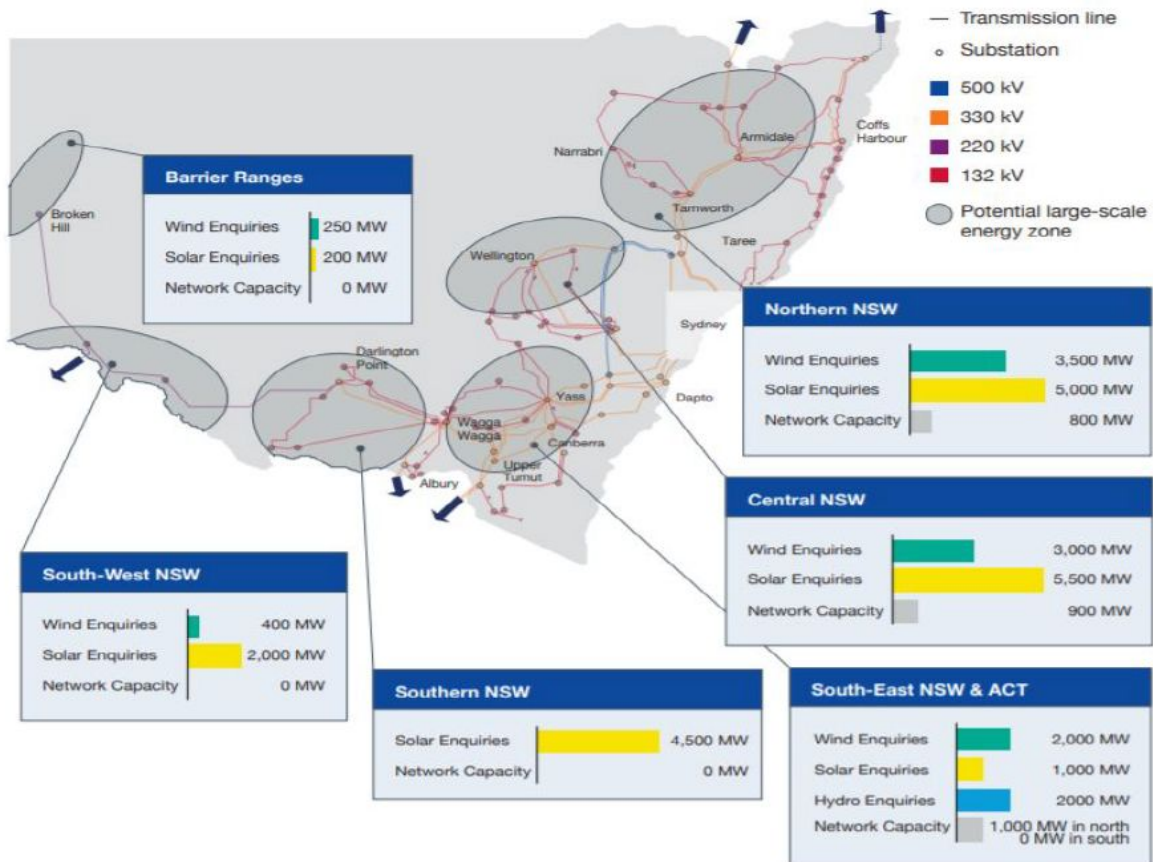
Snowy Hydro supports the Commission's view to make the ISP actionable is appropriate. The NEM is transforming from a market dominated by, fossil-fuelled generation to one where a far greater role will be played by renewable generation and major storage responding to more active and responsive demand. This is where the ISP is able to show the economic benefits under all scenarios including the timing of some elements under different assumptions, particularly relating to the rate of change and the progress of proposed major energy storage initiatives. The ISP complements the intentions of market rule and policy changes that have been accepted by the COAG Energy Council as the core foundations of a smooth transition in the NEM.

The growing number and types of generator connections will change the dynamics and location of new transmission investments. The timelines of interconnection for strategic projects is now vital with numerous baseload generators reaching their end of technical life by the mid-2020s requiring the need for storage development. Strengthening interconnection between Victoria and New South Wales will improve resource sharing across the NEM and deliver fuel cost savings along with facilitating connection of new renewable energy zones.

The challenge for long-term efficiency in transmission lines stems from the fact that transmission assets take a long time to site and build, are very long-lived and economically disruptive investments. TransGrid noted in their ISP submission that there has been an unprecedented volume of generation connection enquiries with over 30,000 MW of potential solar, wind and hydro projects at various stages of development. Worryingly TransGrid believes that only a fraction of these projects can be accommodated in the spare capacity of the current network¹. Figure 1 shows the current connection enquiries to the TransGrid network.

¹ TransGrid, 2018, Integrated System Plan submission, <<
<https://www.transgrid.com.au/news-views/publications/Documents/TransGrid%20Submission%20to%20Integrated%20System%20Plan.PDF> >>

Figure 1: Current connection enquiries to TransGrid network²



Interaction between the ISP and government policies

Snowy Hydro supports the Commission’s note that “one way of addressing this uncertainty would be for the COAG Energy Council to provide formal advice to AEMO as part of a regular annual process, in order to make sure that AEMO is able to effectively incorporate government policies into its ISP modelling”.³ Transmission will largely be driven by public policy established by state and federal laws or regulation requiring firm generation to be connected to the NEM. The timelines of interconnection for highly strategic projects will be vital.

Strengthening interconnection will improve resource sharing across the NEM and deliver fuel cost savings along with facilitating connection of new renewable energy zones.

Snowy Hydro believes there is merit in looking closer at the US Federal Energy Regulatory Commission approach under Order 1000 suggested by AEMO. Unlike the AER’s RIT-T process this mechanism requires local and regional transmission planning processes to consider transmission needs driven by public policy requirements established by state and federal laws or regulation. With public policy requiring firm generation to be connected to the NEM, this approach may be appropriate and timely.

² TransGrid, 2018, Integrated System Plan submission, << <https://www.transgrid.com.au/news-views/publications/Documents/TransGrid%20Submission%20to%20Integrated%20System%20Plan.PDF> >>

³ AEMC 2018, Coordination of generation and transmission investment, Options paper, 21 September 2018, Sydney, pp19

The mechanism gives utility transmission providers flexibility to develop, in consultation with their stakeholders, the necessary enhancements to existing regional transmission planning processes to comply with Order No. 1000, based upon the needs and characteristics of their transmission planning region.

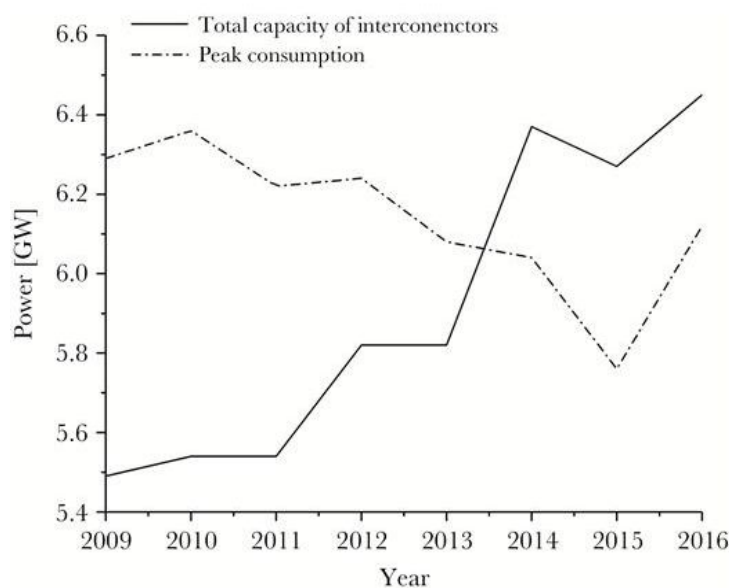
Order No. 1000 requires each public utility transmission provider to describe the circumstances and procedures under which public utility transmission providers in the regional transmission planning process will reevaluate the regional transmission plan to determine if delays in the development of a transmission facility selected in a regional transmission plan for purposes of cost allocation require evaluation of alternative solutions, including those proposed by the incumbent transmission provider, to ensure the incumbent transmission provider can meet its reliability liability needs or service obligations.

The importance of greater interconnection to large storage, although not directly comparable, is Europe where historical figures can be used to show the need for greater interconnection to deal with the energy transition to renewable energy.

The Danish energy system in Europe copes with the variability and uncertainty of its large share of wind power due to its close interconnection with Germany, Norway and Sweden. The interconnection of Europe plays a vital role in maintaining the energy balance and security of supply across the region. Fluctuations in renewable output, particularly in Denmark and, more recently, in Germany, are supported by generation flexibility from neighbouring markets. Flows from flexible hydro capacity and flexible thermal capacity are critical to maintaining system balance.

Denmark's key advantage is flexibility with its location between other Nordic countries such as Norway's Hydro generation where they are able to balance their intermittency with firm renewable energy. Figure 2 shows the total capacity of interconnectors has exceeded the Danish peak load, leading to adequate capacity for the Danish load while during times of low wind Norway's hydro generation has been significantly used. Denmark is able to sell the electricity to neighboring countries via interconnectors, when the wind speed is low, inexpensive hydro power can be imported from Norway to ensure a reliable operation of the Danish grid.

Figure 2: Denmark Interconnector capacity and Peak consumption⁴



⁴ Energinet. Market Data [Online]. 2017. <https://en.energinet.dk/Electricity/Energy-data> (13 July 2017, date last accessed).

When considering Australia and Europe, South Australia and Denmark sit amongst the highest per capita wind generators add to that the proposed closure of Liddell Power Station in NSW by 2022 and you have a system which will need significant storage initiatives that will facilitate the orderly transition to renewables and ensure ongoing energy security across the NEM regions. This can only be achieved by providing sufficient interconnection to connect strategic storage projects.

MAKING THE ISP AN ACTIONABLE STRATEGIC PLAN

Snowy Hydro considers that in making the ISP “actionable” the focus should be on “strategic, national” investments. For group 2 projects in the current ISP, there needs to be a different approvals process for highly strategic transmission investment which is both timely and avoids gaming opportunities from Stakeholders who are incentivised to delay the relevant investment.

Snowy Hydro is proposing to build and operate the Snowy 2.0 pumped hydro-electric storage facility (‘Snowy 2.0’). Snowy 2.0 will increase the pumped hydro-electric capacity within the existing Snowy Scheme by 2,000MW and 350,000MWh by linking the Tantangara and Talbingo reservoirs with tunnels feeding a new underground power station. The project will involve tunnelling and excavation works between the two reservoirs to depths of up to 1 kilometre. 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 new variable and variable intermittent renewable generation coming online across the NEM. Under AEMO’s Neutral ISP planning scenario, the analysis projects 28GW of solar and 10.5GW of wind coming on line within the plan period, complemented by 17GW/90GWh of storage and 500 MW of flexible gas plant.⁵

The transmission augmentation required to complement Snowy 2.0 has been identified by AEMO in its Integrated System Plan (‘ISP’) as being part of a set of transmission investments which can best unlock the value of existing and new resources in the system, at the lowest cost, while also delivering energy reliably to consumers. Specifically, the ISP includes the following project:

- A link between Tumut, Wagga and Bannaby as a “Group 2” Project (‘BannabyLink’); and
- Strengthening interconnection between NSW and Victoria as a “Group 3” Project (‘KerangLink’). Snowy Hydro is advocating for Keranglink to be recognised as a Group 2 project.

Snowy Hydro is strongly of the view that Group 2 Projects, which include BannabyLink and KergangLink, identified in AEMO's current ISP should not be subject to the RIT-T, or an amended version of the RIT-T which is integrated into the ISP process. Instead, the regulatory framework should be amended so that such these projects which are nationally significant and strategic are subject to an alternative approvals process, which simply requires the relevant TNSP to competitively source the most efficient means to deliver the project. This goes beyond the options identified in the Commission's Options Paper, however, in Snowy Hydro’s opinion, these Projects are urgently required to support the orderly transition of the NEM, in particular BannabyLink and KerangLink for the reasons outlined in this submission.

⁵ AEMO Integrated System Plan, p5

Overview of the Importance of BannabyLink and KerangLink

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. Failure to commit to appropriate infrastructure now will hinder the transition which places greater importance on the connection of strategic projects. Strategic transmission projects identified in the ISP cannot afford further delay and need to become actionable.

In fact, BannabyLink and KerangLink need to be accelerated ahead of the timeframes outlined in the ISP to secure reliability in NSW following the closure of Liddell in 2022 (for BannabyLink) and to help the Victorian market reliably incorporate increased renewable generation as a consequence of the VRET process (for KerangLink). The BannabyLink and KerangLink transmission upgrades to the shared network will also support other new projects, in particular the new renewable energy zones in NSW and Victoria.

The increase in variable and intermittent renewable electricity generation is forcing the exit of coal, by placing pressure on those assets physically and economically, and introducing system reliability and stability issues. This firming and de-risking of renewables will provide certainty to support further investment in new renewable generation and supply the energy needs of the NEM at the lowest cost after the minimum targets in the RET are reached.

Snowy 2.0, with Keranglink and Bannabylink is the key energy development for the future NEM as the key enabler of an orderly and secure transition to a low emissions economy. Therefore, the delivery of such transmission augmentation is not only for the benefit of a single generator (that is, Snowy Hydro), but critically will also deliver significant value for the NEM as a whole and ultimately consumers, because it will enable a reliable transition at lowest cost.

Given the above, there can be no doubt that in all plausible scenarios, Snowy 2.0, Keranglink and Bannabylink will be a vital and strategic assets which will help the NEM transition to a world dominated by renewable generation. The critically of large scale, long term, storage and extra capacity has been recognised by AEMO, has been a core element of the Commonwealth government's energy policy since early 2017 and has been recognised by the State of NSW including in the declaration by the NSW Planning Minister, the Hon Anthony Roberts MP, of the Snowy 2.0 Project and the associated transmission infrastructure to be Critical State Significant Infrastructure in March 2018. Snowy 2.0 has also received bipartisan support from both Mark Butler, Shadow Minister for Climate Change and Energy⁶, and Mike Kelly, the local member for the Eden-Monaro electorate in which Snowy 2.0 will be built.

Keranglink and Bannabylink transmission investments are national strategic projects which will underpin the long-term reliability and security of the NEM. The CoAG report, Review of the Regulatory Investment Test for Transmission, RIT-T Review, 6 February 2017, page 6, states that:

While outside the terms of reference for this review, the Energy Project Team (EPT) notes it would be open to jurisdictions and/or the Energy Council to bring forward interconnector investment outside the regulated framework, taking account considerations broader than those under the RIT-T. The RIT-T is only required for large transmission projects seeking regulated returns, to ensure the long-term costs to customers are warranted. Funded projects are exempt. Careful consideration would need to be given to key design questions

⁶ Mark Butler Media Release, 21 December 2017

were such an approach to be considered, including what would be the decision making criteria; who is the decision maker; and importantly, who would pay for these investments.

At the completion of the climate change review, the Finkel review, and the inaugural ISP, it is critical for the on-going security and reliability of the NEM that the regulatory framework should be amended so that projects which are nationally significant and strategic ie. Bannabylink and Keranglink are subject to an alternative approvals process, which simply requires the relevant TNSP to competitively source the most efficient means to deliver the projects.

Context to the Commission's consultation

On 10 August 2018, The COAG Energy Council has asked the Energy Security Board ('ESB') to report in December 2018 on:

- how 'Group 1 Projects' identified in AEMO's ISP can be implemented and delivered as soon as practicable and with efficient outcomes for consumers;
- how 'Group 2 Projects' identified in the ISP will be reviewed and progressed; and
- what modifications may be needed to existing processes for these projects to be delivered.

The COAG Energy Council has also asked the ESB to identify a work program to convert AEMO's ISP into an actionable strategic plan. The Commission's Options Paper seeks the views of stakeholders on how to convert the ISP into an actionable strategic plan, and sets out five potential options for making the ISP actionable. Those options are intended to create stronger links between the ISP and actual investments in transmission, and to improve overall confidence in the regulatory investment process. The Options Paper also addresses the RIT-T, and asks how the existing RIT-T process could be improved as part of the broader economic regulatory framework.

The Commission's Options Paper notes that submissions received will be an input into the ESB's work program and reporting on these issues at the December COAG Energy Council meeting.

We address these below in turn.

Modification to existing processes to deliver Group 2 Projects

In the current ISP, AEMO identifies several 'Group 2 Projects', which are developments in the medium term to enhance trade between regions, provide access to storage and support extensive development of renewable energy zones. AEMO notes that work needs to commence immediately on refining the requirements for the developments identified in Group 2, finalising the design, and establishing implementation processes and plans to support the lowest cost outcome for consumers.

One of these Group 2 Projects is BannabyLink (called 'Snowylink North' in the ISP), being a new transmission link from Tumut to Bannaby to facilitate Snowy 2.0. AEMO concludes in the ISP that BannabyLink and associated works between Bannaby and Sydney West would provide system benefits, including allowing the Snowy 2.0 project access to the national market and assisting in providing reliable supply to New South Wales, but also providing wider system benefits.

Under the current regulatory framework, BannabyLink, and other Group 2 Projects will be subject to the existing RIT-T process. Snowy Hydro considers that the RIT-T process is unsuitable for assessing strategic transmission projects, because:

- AEMO has already identified that project in the ISP and concluded it will provide system benefits;
- the RIT-T process is unduly lengthy, and can exceed 18 months after publication of a project specification consultation report;
- the need to conduct the RIT-T creates a “chicken and egg” dilemma, in which major generation projects require certainty regarding transmission investment in order to proceed, but transmission investment is delayed by the RIT-T, and may be dependent on the major generation project first being committed;
- the consideration of strategic benefits valued by consumers under the RIT-T is limited and broader risks such as political, regulatory, and social risks are not adequately captured for low probability but high impact events;
- the RIT-T favours incremental development in generation and transmission, which can be more expensive for consumers in the long run; and
- the RIT-T can be delayed by individual interests through the disputes process.

In those circumstances, Snowy Hydro is strongly of the view that Group 2 Projects identified in the current ISP should be subject to an alternative regulatory approval process, which would only require the relevant TNSP to competitively source the most efficient means to deliver the Group 2 Project. Snowy Hydro supports a change in regulation to achieve this outcome.

Snowy Hydro also is strongly of the view that KerangLink (called ‘SnowyLink South’ in the ISP) ought to be a Group 2 Project, and is liaising with AEMO on the Project.

FUTURE ISPS

AEMO have done a comprehensive job with the inaugural ISP. Snowy Hydro considers it appropriate that the ISP should focus on identifying transmission projects which are Snowy Hydro believes the transmission developments identified through ISP should only be focused on strategic and nationally significant investments. In our opinion the transmission developments identified in the inaugural ISP has met these criteria.

The key question is how to make the ISP plan actionable without overinvesting in transmission. For future ISPs, Snowy Hydro’s advocates for a two tier approach. Tier 1 projects are identified as being strategic, low regrets, and relevant to a range a future scenarios. These are transmission developments identified in the *current* ISP. These transmission projects must have an expedited approvals process because the analysis that underpins the transmission development option has already been done through the ISP process. This is akin to Option 3 where AEMO has already identify the transmission need, has identified credible options that address the need, assess costs and benefits of credible options, and determine the option that maximises the net benefit. Group 2 projects including BannabyLink fall into this Tier 1 process, and should include KerangLink. We note all the Group 1 projects identified by AEMO in the inaugural ISP are already being progressed by individual TNSPs under current arrangements.

The question of who pays is with the consumer because the consequence of getting wrong is too severe with broader risk impacts including economic, political, regulatory, and social risks. If the assets turn out to be stranded then this is a risk worth taking due to the unacceptability of getting it wrong ie. underinvestment in transmission.

All other transmission needs identified by the *current* ISP fall under a Tier 2 process which is consistent with Option 1 and reflects an enhanced status quo.

Snowy Hydro considered the five potential ways in which AEMO’s role as national transmission planner could be linked more strongly to the individual investments undertaken by the TNSPs. The option closest to Snowy Hydro’s preference is the Commission’s Option 3.

Under Option 3 AEMO, in addition to identifying network needs and credible options, would also conduct cost/benefit analyses to determine the investment option that best meets the needs identified in the ISP. Snowy Hydro believes this option will make the ISP more actionable and also give the TNSP’s enough flexibility to proceed with a different credible option to meet the same identified need if they choose to do so. The RIT-T process will become shorter and more timely as aspects of the current RIT-T could be incorporated into the ISP process while also allowing the process for ‘strategic’, national investments to be shortened. In the long term interest of the NEM we believe changes to the NEL are appropriate to implement of this option.

Table 1: Options to strengthen the link between the ISP transmission investment decisions⁷

STAGE IN INVESTMENT PROCESS	RESPONSIBILITY UNDER EACH OPTION				
	1. TNSPs must consider ISP-identified needs in their TAPRs	2. TNSPs must conduct RIT-T on ISP-identified needs and options	3: AEMO determines "best" option	4: AEMO directs TNSP to proceed with the "best" option	5: AEMO directs TNSP to implement the investment
1 Identify need	AEMO	AEMO	AEMO	AEMO	AEMO
2 Identify credible options that address the need	TNSP	AEMO	AEMO	AEMO	AEMO
3 Assess costs and benefits of credible options	TNSP	TNSP	AEMO	AEMO	AEMO
4 Determine "best" option	TNSP	TNSP	AEMO	AEMO	AEMO
5 Make decision to implement "best" option	TNSP	TNSP	TNSP	AEMO directs TNSP to do so	AEMO
6 Undertake detailed costing and planning for the investment	TNSP	TNSP	TNSP	TNSP	AEMO
7 Implement the investment	TNSP	TNSP	TNSP	TNSP	AEMO directs TNSP to do so
TNSP control over investment	Higher degree of control				Lower degree of control

Option 1

As outlined earlier, Snowy Hydro believes the specific transmission developments identified through ISP should only be focused on strategic and nationally significant investments. All other transmission needs (as opposed to specific transmission developments) identified by the ISP fall under a Tier 2 process which is consistent with Option 1 and reflects an enhanced status quo.

Under Option 1, as noted by the Commission the current framework for making investment decisions would remain largely unchanged.

Option 1 highlights that *“consideration would need to be given as to whether there are aspects of the existing RIT-T process could be incorporated into the development of the ISP in order to reduce duplication and streamline the RIT-T process.”*⁸

Option 2

Option 2 although speeding up part of the RIT-T process does not go far enough and leaves a lot of ambiguity which could result in further delays in transmission investment. In addition the option

⁷ AEMC 2018, Coordination of generation and transmission investment, Options paper, 21 September 2018, Sydney

⁸ AEMC 2018, Coordination of generation and transmission investment, Options paper, 21 September 2018, Sydney, pp31

largely retains the degree of discretion TNSPs have to identify and undertake investments in their networks, and their control over those investments making the ISP less actionable.

Option 4 and Option 5

AEMO directing TNSP's to proceed with the "best option" or AEMO conducting all stages of the investment process, with the exception of actually implementing the investment are not preferred options for Snowy Hydro.

Firstly, we agree with the Commission that these options would require significant regulatory changes to implement and transfer many of the aspects of the RIT-T process to AEMO, changes to the TNSP licence conditions, and the introduction of some sort of ability for the AER to assess efficiency of AEMO's decision. These developments and implementation of these would take significant time.

Removing a significant amount of responsibility from the TNSP to AEMO to conduct due diligence on investments through AEMO involves significant uncertainty.

In summary, in the long run (ie. future versions of the ISP), Snowy Hydro considers that Option 3 set out in the AEMC's Options Paper would be most suitable to make the ISP actionable, and to improve the regulatory investment process for transmission, while providing appropriate accountability and regulatory oversight. However, these options may require significant regulatory change and take some time to implement, and are therefore not suitable to the Group 2 Projects identified in the current ISP.

STORAGE AND TRANSMISSION CHARGING ARRANGEMENTS (TUOS)

The current cost recovery regime for prescribed and common transmission services collectively Transmission Use of Services (TUOS) was put in place on the basis that application of sunk costs to consumers is unlikely to impact consumption and utilisation of the network whereas the same charge applied to upstream market participants would distort efficient energy consumption and dispatch. Upstream market participants include all entities engaged in the wholesale electricity market including generators, and pump hydro energy storage.

Previous consultations on charging TUOS charges to Markets Generators have clearly shown how detrimental they can be to the market. These arguments against charging generators for TUOS were described in the 1999 ACCC transmission and distribution network pricing review and the 2006 AEMC (Commission) transmission pricing for prescribed transmission services rule. These same arguments not to impose TUOS are applicable to PHES as an upstream market participant.

Snowy Hydro submits that TUOS charges are sunk costs of the transmission networks which cannot be reversed or avoided and the recovery of these costs should not affect or impact future decisions with respect to upstream asset use (ie. both generation and pump storage hydro). The recovery of sunk costs from customers leads to an economically efficient outcome because the regulated wires businesses can structure their tariffs using a combination of fixed and variable charges so as to minimise the distortions to network usage. Snowy Hydro already contribute to the variable costs of transmission through marginal losses, the risk of being constrained-off without compensation and the risk of creating a new pricing region.

Imposing TUOS charges to pump storage hydro generators will likely distort regional spot prices and give economically incorrect signals to market participants. Snowy Hydro argues that the likely result of requiring pump storage generators to pay for the sunk network would be that the costs there would be distortion on the uptake of pump storage hydro investment, if an investment is made then there would be potential distortions on the level of pumping, and finally any TUOS costs imposed on PHES would be passed through to customers via higher spot prices. Hence the recovery of sunk network costs from pump storage hydro generators can potentially lead to distortions in investment/retirement decisions and generation dispatch.

In 2006 the Commission did not believe there was a case for requiring generators to pay ongoing charges in respect of Prescribed TUoS Services⁹. The Commission noted that the time that it would represent a profound shift from the existing arrangements and to was not clear whether it would be worthwhile. Generator TUoS charges would most likely be ultimately passed on to loads, potentially distorting bidding and dispatch in the process¹⁰.

In 1999, the NGF noted that current arrangements represent the economically efficient approach that, by definition, minimises the distortions from the recovery of the residual sunk costs of the network¹¹. The report found that the imposition of charges for sunk cost recovery on generators is not theoretically sound and that there is no credible case that such an arrangement will create a demonstrable net benefit for the market as a whole¹². The paper noted that distortions could include and are not limited to:

⁹ AEMC 2006, Proposed National Electricity Amendment (Pricing of Prescribed Transmission Services) Rule 2006, Rule Proposal Report, 24 August 2006, Sydney.

¹⁰ *ibid*

¹¹ National Generator Forum (NGF), 2018, "Transmission and Distribution Network Pricing Review Issues: Submission to ACCC"

¹² *ibid*

- early retirement or mothballing of peak generators;
- deferral of market entry by potential new entrants; and
- uneconomic location of generation at load centres in order to avoid TUOS charges¹³.

The recovery of these TUOS costs from end use customers was found to least distort decisions with respect to network use.

There is a strong case that can be made that the PHES is only temporarily storing the energy before it is transmitted to the final consumer, and therefore the TUOS charges should be applied only to the final consumer of the power and not ‘double charging’ for the same units of electricity. We advocate for redefining the purpose and allocation of TUOS charges from “those who are supplied electricity by means of the grid” to “those who end-consume the electricity provided by the grid.”

EnergyAustralia noted at the time impact on a 250MW pumped Hydro project could equate to approximately \$15 million per annum¹⁴. The ARENA paper noted that a strong case can be made that the pumped hydro is only temporarily storing the energy before it is transmitted to the final consumer, and therefore the TUOS charges should be applied only to the final consumer of the power, otherwise there would be ‘double charging’ for the same units of electricity.

A PHES will be required pay transmission connection costs. If the PHES is also required to pay TUOS charges as well it may deter new entry entirely because it is unable to compete on a level playing field with other forms of generation.

In Scotland, Scottish Power who owns legacy pumped hydro assets in the UK has found that the construction of new pumped hydro or conversion of hydroelectric generation to pumped hydro can be hampered by the potential for “double charging” of Use of System charges. Significant impact with double charging pumped hydro, as noted by Scottish Power, include:

- Distortion to competition which does not result in fairer allocation of the costs of the transmission system and detriment to competition, which in turn leads to higher costs in the wholesale electricity market.
- Significant costs compared to other technologies.
- Generator parties are not on a level playing field with storage in terms of the costs faced. Requiring storage parties to contribute to both connections costs and TUOS gives an unfair advantage to generators who are exempt for paying TUOS.

Finally, if a PHES must be registered as a market customer, it can be constrained off if there is congestion – it is inefficient and unfair to make PHES pay TUOS charges when this can occur because there is no explicit right to use the network.

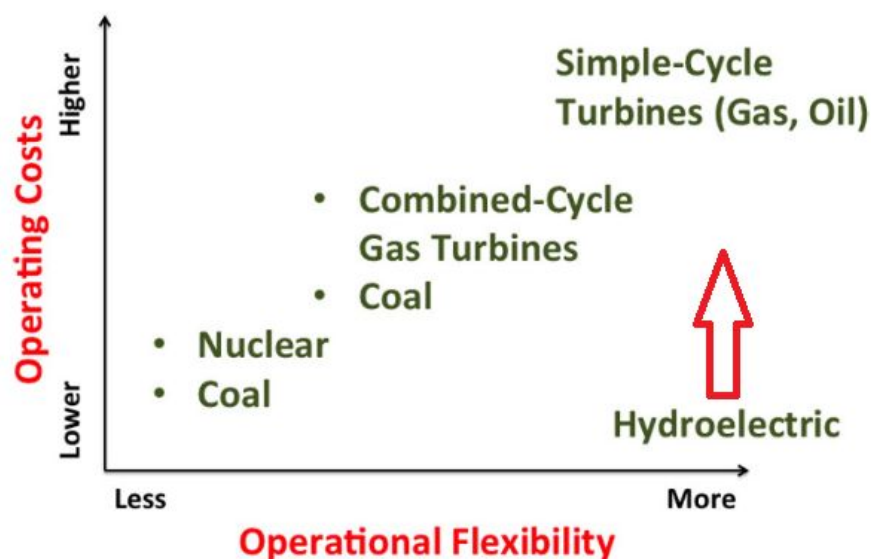
¹³ ibid

¹⁴ ARENA, 2017, “Cultana Pumped Hydro Project - Knowledge Sharing Report”, <<
https://arena.gov.au/assets/2017/09/Cultana-Pumped-Hydro-Project-_-Public-FINAL-150917.pdf >>

As noted in our submission to the discussion paper¹⁵, Snowy Hydro believes that pumped hydro development, the pumping of the water is primarily for the provision of services such as energy, inertia, system strength, and voltage support - these are all services provided from synchronous generation - and services that are not provided from end consumption load. PHES is only storing energy to be used later by a consumer of power. Otherwise there would be “double charging” for the same units of electricity.

Hydro electricity provides low operational cost and high operational flexibility something which would be severely impacted by being charged TUOS on a service that provides security to the NEM. Figure 3 below shows the position of hydro and the impact TUOS charges would have in increasing the fixed costs of hydroelectricity (TUOS is a sunk cost which would be added to the fixed costs) punishing the use of PSH when it is needed for the transition of the NEM to lower emissions.

Figure 3: Relative comparison of operating cost and operational flexibility for different power plant technologies¹⁶



Pumped hydro energy storage has the potential to significantly support the NEM, bringing a number of flexibility services. PHES is not an “end-user” of electricity, it will and continue to play a critical role in meeting the challenges arising from the increased take-up of intermittent renewables.

Snowy 2.0 without unnecessary TUOS charges is expected to use cheap, large sources of existing energy storage with the levelised cost of storage expected to be \$25-35 megawatt hours. This is in addition to Snowy 2.0 being included in numerous modelling results forecasting downward pressure on retail and wholesale electricity prices.

Given that storage and generators are not end users of electricity, and are connected to the network primarily for the purposes of providing flexibility and energy services, there is no rationale for them to contribute to both the generator connection costs and shared network TUOS charges.

¹⁵ Snowy Hydro submission, “Coordination of generation and transmission investment Discussion Paper”, << <https://www.aemc.gov.au/sites/default/files/2018-05/Snowy%20Hydro.pdf> >>

¹⁶ Snowy analysis and source: <https://www.e-education.psu.edu/ebf483/node/583>

In summary, Snowy Hydro believes the following are valid and economically efficient reasons why pump hydro energy storage should not be required to pay for TUOS charges¹⁷ :

1. It would disincentivise investments in large scale energy storage and potentially render projects commercially unviable. This would be a perverse outcome at a time when there is a need to promote the uptake of energy storage in the NEM.
2. Pump hydro energy storage systems provide valuable system services. Payment of TUOS charges would disincentivise storage providers to provide these services.
3. Pump hydro energy storage systems are not 'customers' in the way that end use residential or business consumers are.
4. Pump hydro energy storage systems do not drive transmission investment.
5. If the pumped hydro energy storage system is registered as a scheduled load, it can be constrained off if there is congestion. This would be unfair to make PHES pay TUOS charges when this can occur and there is no explicit right to charge.

For all the reasons outlined above, Pump Hydro Energy Storage must be exempt from paying TUOS. The Commission states that separate registration for storage may be appropriate. Snowy Hydro therefore supports consideration of establishing a separate registration category for pump hydro energy storage, and specific exemption for paying TUOS for such participants.

Treatment of Storage - Interim arrangements for utility scale battery technology

The Commission have used AEMO's interim arrangements for utility scale battery technology as a starting point for discussion on imposing TUOS charges to energy storage facilities which are required to register as both a generator and market customer.

Snowy Hydro has analysed the basis of AEMO's interim arrangements are observed:

1. The interim arrangements were applied to utility scale battery technology and not explicitly all forms of energy storage providers. This is pertinent to whether pump hydro energy storage (PHES) is submitted to TUOS charges as this technology provides additional system security and reliability services that cannot be effectively provided by utility scale batteries.
2. That is the interim arrangements for utility scale battery may inadvertently create a barrier to entry for PHES.
3. The interim arrangements were made to address power system security by requiring the utility scale battery to be a scheduled generator and market customer. Hence the operational intentions of these facilities would be taken into account in the NEM central dispatch.
4. The matter issue of efficient recovery of shared network transmission costs (TUOSs) was not a major consideration in the interim arrangements.

¹⁷ AEMC 2018, Coordination of generation and transmission investment, Options paper, 21 September 2018, Sydney, pp108-112