18 June 2024

NSW Department Climate Change, Energy, the Environment and Water

By email: lds.review@dpie.nsw.gov.au

Dear Sir/Madam,

Re: Review of Long Duration Storage (Part 6 of the Electricity Infrastructure Investment Act)

ACEN Australia is pleased to provide a response to the NSW Department of Climate Change, Energy the Environment and Water (the DCCEEW or NSW Government)'s Consultation Paper.

ACEN Australia is a fully owned subsidiary of ACEN Corporation (ACEN). ACEN, headquartered in Manila, is one of the largest renewable energy companies in South-East Asia. The company has 4,400 MW of attributable capacity in the Philippines, Vietnam, Indonesia, India, and Australia, with a renewable share of 98%. We currently have several gigawatts of generation and storage capacity at various stages of development across the National Electricity Market (NEM), including in New South Wales, Victoria, South Australia, and Tasmania.

As part of our growing portfolio we are developing the Phoenix Pumped Hydro Project, an 800MW, 12-hour pumped hydro facility, located 35km west of Mudgee, within the NSW Government's Central-West Orana Renewable Energy Zone (REZ). For more on ACEN, visit www.acenrenewables.com[1]

As a developer of a large pumped hydro project in NSW, ACEN would caution against changing the definition of long duration storage in Part 6 (3) (b) of the Electricity Infrastructure Investment (EII) Act. This clause, as currently drafted, provides a strong signal for investment in forms of long duration storage (LDS) such as pumped hydro and underpins the LDS LTESA. Pumped hydro has a very long asset life of 50 to 80 years and the availability of a 40-year LTESA provides a critical long term revenue foundation for these assets. A change in definition that would allow shorter duration storage (ostensibly to 4 hours), to participate in LDS LTESA Tenders risks undermining incentives to invest in LDS, for two key reasons:

- Current reliability modelling, based on the 2023 Electricity Statement of Opportunities (ESOO), suggests very low likelihood of more than 2-to-4-hour duration of USE events out to 2030. Therefore, to the extend an LTESA Tender process is focused on addressing a near term reliability objective then pumped hydro and other forms of LDS are likely to be significantly more expensive compared to shorter duration storage; and

[1] In 2017 ACEN acquired an 50% equity stake in UPC Renewables Australia Pty Ltd, headquartered in Tasmania and part of the global UPC Renewables Group that was established in the early 1990s. The UPC Renewables Group has developed, owned, and operated over 10,000 MW of large-scale wind and solar farms in 10 countries across Europe, North America, North Africa, China, Southeast Asia, and Australia, with an investment value of over $5 billion USD. In 2021 ACEN started the process to fully acquired UPC Renewables Australia Pty Ltd to form ACEN Australia, which was completed in 2023.

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- LDS projects have typically much longer lead times and more complex development hurdles to overcome compared to shorter duration storage. For a given reliability objective, an LTESA tender process will tend to favour short duration storage because it can be built more quickly and provide the Government with greater confidence the objective can be met in the required timeframe.

Consequently, based on measures of cost and deliverability, pumped hydro will simply not be able to compete with shorter duration storage in future LDS LTESA rounds – at least on the basis of the 10-year reliability time frame modelled in the ESOO.

Without the possibility of an LTESA however, or an alternative form of long-term government support, pumped hydro projects would be dependent on the wholesale and contracts markets for its future revenue streams, for example selling forward cap contracts on the ASX. With cap contracts currently trading at >$30MWh, the revenue stream underpinned by cap contracts over a pumped hydro's asset life could, in principle, be sufficient for it to recover its cost and provide a reasonable return to equity investors. The issue is however that such short-term contracts will not support lender financing for the project (ie they are not bankable) as they do not provide a predictable long term revenue stream for the project. Minimum long term revenue streams are important to lenders for the following reasons:

- *Long project development lead-times* - Long-duration storage projects, such as pumped hydro, are characterised by long project development lead times (e.g. 5 to 10 years). Lenders have no certainty over this timeframe about what revenues the project will earn once it becomes operational;
- *High up front capital requirements* – Storage and in particular long-duration storage, such as pumped hydro, is highly capital intensive. When combined with future cash flows which are highly uncertain this substantially amplifies the risk profile of the project, as financiers cannot be certain the high up-front costs can be recovered over the life of the project.

Pumped hydro projects will therefore find it very difficult to access debt financing without a long-term revenue contract.

While longer term products could be explored, certainly in respect of Phoenix, no counterparty has to date expressed an interest in a long-term offtake for the project. More generally, no longer dated products are currently available in the market for LDS technologies. Typically offtakers with the right credit rating target the next 1-3 years for their contracting requirements, to match the term of their customer retail contracts. They simply do not value longer term contracts for peaking capacity. Offtakers also do not value the reliability benefits of LDS, such as increased system resilience to low probability high impact events. Such a resilience benefit is impossible to capture in private contracts or lender financing. This is a market failure, because the full value of an LDS cannot be captured under existing market mechanisms.

These issues contribute to the current lack of availability of long-term contracts in the market for LDS projects. Without such long-term contracts however, lenders will not finance LDS, due to their high up-front costs, long lead times and extended pay back periods. The critical value of the LDS LTESA is therefore that it offers a minimum long term revenue stream that allows LDS projects to be debt financed. In current market environment, without such a long-term government support scheme, LDS projects will struggle to secure the required finance to reach FID.

This may be considered acceptable from a public policy perspective if LDS is not really needed. To the extent a government underwriting scheme such as LTESA supports excess capacity that is not needed this obviously entails unnecessary costs to consumers. In essence, this is the advice of AEMO

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Services to the DCCEEW. This advice is however based on the 2023 ESOO, which takes a 10-year forecast time horizon of reliability needs for the NEM. This modelling reflects that the NEM is currently characterised by short, sharp demand spikes in summer (caused by air conditioning loads) and a more consistent prolonged increase in energy consumption over winter. System stress events are currently more prevalent during hot summer evening peaks and lasting between 1 and 3 hours, which means batteries with shorter storage durations are currently better positioned to meet reliability requirements. LDS could then only address these reliability needs at higher cost.[2]

However, while this might apply in the short term, over the medium to longer term, reducing incentives for longer duration storage to participate in the NEM could undermine future supply reliability. Modelling work performed for the 2022 Reliability Standard and Settings Review by IES, showed that the distribution of USE associated with reliability performance at 0.002% USE over the period FY2022 - FY2028 will likely be dominated by short-duration (<2 hr) events. However, the modelling also found, that low probability longer duration events (5 to 20 hours), would become an increasing risk to expected USE outcomes towards the end of the decade and beyond.[3]

More broadly, as coal exits the market and the power system becomes dominated by variable renewable generation and storage, reliability events are expected to shift to the winter and the duration of reliability events will increase.[4] This is because energy consumption is higher during winter and the risk of periods that combine low solar radiation with low wind is also higher during the winter months.[5] As the predominant energy technology becomes dependent on the weather, so too will USE become dominated by weather driven events (such as a combination of low wind and low solar irradiance).

This view was echoed most recently by the Reliability Panel in its 2024 draft report reviewing the current form of the reliability standard and administered price cap, which found that expected USE events: [6]

- are likely to become deeper and/or longer but less frequent
- expected USE is likely to shift from mainly being in summer to winter
- USE events are likely to be driven increasingly by weather
- events are likely to occur across the day rather than just appearing in the evening peak.

The reliability panel modelling suggests that if they occur, individual unserved energy events may have the potential to be longer and deeper as the NEM transitions, requiring longer duration storage to mitigate its effects.[7] In any case, it is clear that going forward a mix of reliability risks, in terms of both duration and frequency will characterise the power system. Beyond 2030 there will be an increasing need for longer duration batteries, pumped hydro and alternative long duration storage solutions, to manage daily and seasonal variations in the output of solar and wind generation. It is important that all such forms of storage are appropriately incentivised in the NEM. Also important is that a sufficient buffer of deeper storage solutions is developed to add resilience against unpredictable future reliability

[2] AEMO, "2023 Electricity Statement of Opportunities", August 2023, p 134
[3] IES, Reliability Standards and Settings Review 2022, Modelling Report, Final Report August 2023p 11
[4] AEMC Reliability Panel, "Issues Paper: Review of the form of the Reliability Panel", March 2023, p 20
[5] Ibid, p 4
[6] Reliability Panel, Draft Report, "Review of the form of the reliability standard and administered price cap", April 2024 p 4
[7] AEMC Reliability Panel, "Directions Paper - Review of the form of the reliability standard and administered price cap", November 2023, p 21

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risks driven by changing weather patterns. For these reasons, we strongly encourage the DCCEEW to retain the existing definition for LDS in the EII Act.

Finally, we note that one concern expressed by AEMO Services with Part 6 of the EII Act is that the 2 GW of LDS by 2030 target, under the current definition of LDS, will not be achieved given financing and development hurdles of LDS. In our view, rather than changing the definition to address this issue, a better approach is simply to extend the target to 2035. This would be justified on the basis that the reliability need for LDS projects, given the modelling considered above, will likely not arise until the 2030s. A longer term target would better target reliability requirements after 2030, while given greater certainty to large and complex LDS projects with long lead times. Also, the 2035 date ensures the LDS can be available when a significant amount of coal is due to be retired from the NSW market and the NEM.

If you would like to discuss any of the comments in our response further, then please contact Con Van Kemenade at [redacted] or phone: [redacted].

Yours Sincerely,

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