

18 June 2024

NSW Government Department of Climate Change, Energy, the Environment and Water (DCCEEW)

Submitted via email: lds.review@dpie.nsw.gov.au

Dear NSW DCCEEW,

Review of Long Duration Storage Consultation Paper

Hydro Tasmania welcomes the opportunity to respond to the Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) on the Consultation Paper for the *Review of Long Duration Storage*. We also appreciate the Australian Energy Market Operator's (AEMO's) analysis on this topic, presented in the accompanying report.

Long-duration energy storage (LDES) is a widely used term, with many opinions on what should be classed as long-duration. The NSW Government's definition is important as it will inform the Australian perception on what LDES is and the specific role(s) it has in an energy system dominated by variable renewable energy (VRE). These roles include providing grid resilience, offering firming products, and supporting general contract market liquidity. While Hydro Tasmania does not have any active, nor planned, LDES projects within NSW, we are pursuing LDES developments within Tasmania (including the 750 MW Cethana pumped hydro facility) and are active contributors to the ongoing discussion of appropriately valuing LDES in Australia. This includes exploring ways to better enhance and utilise the existing energy storage capabilities of Tasmanian hydropower to support the broad decarbonisation of the National Electricity Market (NEM).

Hydro Tasmania recognises that the NSW Government has a 2030 LDES target of 2 GW / 16 GWh and that the scope of AEMO's analysis was to specifically address meeting reliability standards in 2030, in NSW. However, this limitation in scope creates both a significant analytical and policy barrier given the strategic imperative to consider reliability needs beyond the 2030 bounds of this target, especially as we move towards the federal target of Net Zero by 2050.

Storage portfolio analysis

AEMO's modelling presents analysis of example storage portfolios with estimated build costs. Whilst government policies should aim to keep the costs of the energy transition low, Hydro Tasmania believes that looking solely at reliability needs for 2030 will result in larger costs to consumers over the long term. To illustrate this, Table 1 from AEMO's report states that portfolios with the cheapest build cost to meet the Interim Reliability Measure (IRM) in NSW in 2030 are those with mostly 4-hour storages, supplemented with varying amounts of 8-hour storages. Whilst we do not disagree with AEMO's findings, it is important to note that a modest increase in investment costs (\$0.52bn) could build the more diverse Portfolio 7. This will offer a marked increase in total energy storage (GWh) as well as better resilience and flexibility to the system far beyond the existing 2030 target. Additionally, 24-hr and 48-hr LDES assets have long operational lifespans, which will further help lower long-term costs for consumers. Long-term planning is necessary for assets like these and so it is essential that planning and cost analysis extends beyond the short-term target of 2030.

Table 1. Forecast storage infrastructure requirement to meet the Interim Reliability Measure (IRM) in 2030, capacity and build cost estimates¹

Portfolio	Configuration					Capacity		Build cost	
	(percentage, capacity (MW) basis)					to meet IRM			
	Battery system			Pumped hydro		Capacity	Energy	Absolute to meet IRM	Normalised
	2 hour	4 hour	8 hour	24 hour	48 hour	GW	GWh	\$ b	\$ m/GWh
Portfolio 1	100%	-	-	-	-	5.77	11.54	7.05	611
Portfolio 2	50%	50%	-	-	-	3.39	10.18	5.35	525
Portfolio 3	-	100%	-	-	-	2.43	9.71	4.68	482
Portfolio 4	-	95%	5%	-	-	2.33	9.77	4.66	476
Portfolio 5	-	80%	20%	-	-	2.11	10.14	4.68	461
Portfolio 6	-	70%	30%	-	-	2.02	10.50	4.76	453
Portfolio 7	-	60%	20%	20%	-	1.93	16.97	5.18	305
Portfolio 8	-	-	100%	-	-	1.77	14.16	5.93	418
Portfolio 9	-	-	-	100%	-	1.75	41.96	7.52	179
Portfolio 10	-	-	-	-	100%	1.75	83.91	11.73	140

LDES Project lead-time

As mentioned in both AEMO's report and the Consultation Paper, LDES projects have long lead times – these lead times increase as storage depth increases. Additionally, AEMO's analysis found that storage depth of greater than 8hrs will not be needed in NSW until the late 2030s, consistent with the needs of the NEM more widely. However, the long lead times for these projects means that to be operational in time, such projects need to be underway in the imminent future. AEMO's report notes that "projects with durations of 8 hours or more continue to struggle to reach financial close without some form of underwriting or other support from government policy". This demonstrates a clear imperative to provide additional policy support for these projects.

¹ Table taken from AEMO Services Long Duration Storage Advice. P9. <https://www.energy.nsw.gov.au/sites/default/files/2024-05/NSW-202405-AEMO-Services-Long-Duration-Storage-Advice.pdf>

Perfect Foresight

In addition, the assumption of perfect foresight within models in this space presents an extra layer of complexity. Perfect foresight can result in tail-risk events being underestimated – a point made by AEMO in their report. As our energy system becomes increasingly dependent on weather-driven generation, the impact and likelihood of weather-created tail-risk events increase. At the same time, Australia's coal fleet is ageing – leading to increased plant operational issues and sooner closure dates. These two factors are unable to be accounted for in models with perfect foresight, with the result being an underestimated value of longer duration LDES assets and the services they provide.

Having deep storage in the energy system earlier provides not only additional flexibility, but necessary resilience against any unexpected market changes. These assets provide replacements for services currently offered by coal generation, such as inertia, voltage stability, and contract market liquidity. It is vital that future policy regarding LDES reflects this and acknowledges the many benefits LDES provides to the market.

Summary

As coal generation continues to retire, market signals should act to bring forward investment in alternative forms of dispatchable generation like LDES, however current market settings and the lack of forward price signals do not provide strong incentives. Accordingly, if the LDES definition is reduced to 4hrs then it is critical that NSW DCCEEW has additional avenues to support the development of longer-duration LDES projects now, so that they are operational for the mid-2030s and beyond. We look forward to working with NSW DCCEEW as these options are considered and presented.

Hydro Tasmania is an active participant in many discussions relating to LDES both within Australia and internationally, including recent collaboration with the International Energy Agency Technology Collaboration Programme on Hydropower on their report *An Assessment of Resource Drought Events as Indicators for Long-Duration Energy Storage Needs*². We would be glad to explore further work with NSW DCCEEW and AEMO in this space, both in understanding the trade-offs between different definitions and what additional measures may be needed to provide confidence in a resilient system going forward.

Hydro Tasmania looks forward to ongoing engagement as this work progresses. If you wish to discuss any aspect of this submission, please contact me at [REDACTED].

Yours sincerely,



Colin Wain

Manager Policy Development

² <https://www.osti.gov/biblio/2349123>