

To: New South Wales Department of Climate Change, Energy, the Environment and Water

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

Date: 17th June 2024

Subject: Iberdrola Australia - LDS Review Consultation Feedback

Iberdrola Australia delivers reliable energy to customers through a portfolio of wind and solar capacity across the NEM. Iberdrola Australia also owns and operates a portfolio of firming capacity, including open cycle gas turbines, dual fuel peaking capacity, and battery storage. Our development pipeline has projects at differing stages of development covering wind, solar and energy storage. This broad portfolio of assets has allowed us to retail electricity to over 400 metered sites to some of Australia's most iconic large energy users.

Iberdrola Australia is part of the global Iberdrola group. With more than 120 years of history, Iberdrola is a global energy leader, the world's number-one producer of wind power, an operator of large-scale transmission and distribution assets in three continents making it one of the world's biggest electricity utilities by market capitalisation.

Iberdrola has extensive global investment experience in both battery and hydro firming assets, which we leverage for the Australian market. Currently, Iberdrola has 14 GW of hydro power installed worldwide of which 4.4GW is pumped hydro energy storage (PHES). A further 508MW is under construction and 5GW of PHES is under development (pre-FID). Iberdrola Australia can leverage this expertise in the development, construction, and operation of PHES to support firming the future grid, combined with our domestic and international experience in battery storage.

Overview of our submission

Iberdrola welcomes the opportunity to make a submission to NSW DCCEEW.

The AEMO Services is very useful in the near-term, but is not the full story

AEMO Services has conducted informative analysis based on AEMO's ESOO projections out to 2030, suggesting that storage projects with less than 8 hours of storage may be more useful in the near-term. We note this is consistent with current spot price market signals which favour shorter duration storage (2-8 hours).

By identifying the gaps indicated by ESOO modelling, near-term investment rounds could potentially be made more targeted towards addressing short-term reliability challenges or provide greater certainty around conditions that would trigger intervention on future coal closures.

However, we also note that this analysis is only an approximation of future system needs. Even within the ESOO timeframe to 2030:

- The distribution of unserved energy depends on the underlying capacity mix as well as the variability of wind resources. For example, a change in the assumed firming capacity mix may result in a change in the optimal renewable energy portfolio, leading to a different distribution of events.

- AEMO's ESOO only models a short historical period with a limited number of historical reference years, which may not reflect the full variability of renewable resource long-term¹.
- USE events may also stretch over multiple days if they are driven by energy shortfalls that cannot be fully replenished in-between. It is not clear from the AEMO Services paper what re-charging assumptions are made (noting that small but multi-day energy (MWh) shortfalls will be an important reliability consideration long-term, and potentially more critical than peak day MW shortages).

The modelling also does not reflect transmission outages from extreme weather events and other line outages. We note that the line between reliability events (unserved energy) and security events (such as driven by non-credible contingencies) may be increasingly one of semantics.

It is virtually certain then that the modelling presents a *lower bound* on the grid requirement for long-duration storage.

Long-duration storage is likely to be an important part of the future energy mix

Analysis of high renewables systems show that some long-duration storage is likely to be least-cost. This includes AEMO's Draft 2024 ISP Step Change scenario², academic studies of the grid³, and market analysts⁴. Current cost projections by the CSIRO show that PHES projects are likely the lowest-cost technology for delivering long-duration storage beyond ~12 hours.

Furthermore, most grid studies over-estimate the flexibility of the future gas fleet⁵ - assuming fleet duties that reflect 'what needs to be done', not necessarily 'what can be done'. In particular, gas peakers are assumed to be able provide sharp injections of energy with no consideration of pipeline capabilities. Long-duration storage will help mitigate the need for gas at peak times (or allow a more gradual injection of energy). More generally, it can also allow higher renewable generation with higher revenues by reducing curtailment, which in turn avoids gas usage and associated emissions, which have an unpriced cost in excess of \$100/t.

Risk management is also important

A single scenario of the future also does not consider the full risk profile, such as the unanticipated early failure of coal units, which has been repeatedly observed over the last decade in the NEM and will likely accelerate given coal units are at end of life.

We note that the scenarios presented by AEMO Services are, in absolute terms, very close in projected cost (especially when considering significant uncertainties such extended outages of transmission or coal units, future fuel prices, etc.).

¹ https://www.griffith.edu.au/_data/assets/pdf_file/0024/1615614/No.2022-06-VRE-droughts-modelling-Griffith.pdf

² For example, AEMO's Draft 2024 ISP includes development of 500 MW of 24-hour storage in NSW

³ <https://journals.sagepub.com/doi/10.5547/01956574.44.6.jgil?cid=int-sj-full-text-citing-articles.3>

⁴ For example, Endgame Economics Q2 2024 forecast includes ~250 MW of 24-hours PHES and 220 MW of 48-hours PHES in NSW, in addition to Snowy 2.0, Borumba, and a further 700 MW of PHES in Victoria.

⁵ https://www.griffith.edu.au/_data/assets/pdf_file/0032/1946714/No.83-Solving-for-Y-FINAL.pdf

Four of the five top scenarios include at least some long-duration storage – likely implying that some long-duration storage is an important risk hedge. Furthermore, particularly if PHES forms part of the storage mix, these assets have lifetimes of 75 years or more. So for example while AEMO Services projects the cost of Portfolio 7 to be 11% more than Portfolio 5, if 20% of that investment is for PHES, it will provide a long-term asset for NSW – supporting a long-term ~zero emissions grid. Market modelling is also needed to understand the relative market *benefits* of each portfolio. As noted above, this analysis is likely a lower bound on the need and value of long-duration storage.

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

Portfolio	Configuration					Capacity		Build cost	
	(percentage, capacity (MW) basis)					to meet IRM		Absolute to meet IRM \$ b	Normalised \$ m/GWh
	Battery system			Pumped hydro		Capacity	Energy		
	2 hour	4 hour	8 hour	24 hour	48 hour	GW	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

We therefore note that:

- On a risk adjusted basis, AEMO Service's analysis implies that some long-duration storage (12-24 hours) is likely an important investment.
- “Desktop” analysis such as conducted by AEMO Services, while a valuable tool, should not substitute for detailed long-term market modelling with multiple scenarios. This is the “least regrets” approach, which also informs AEMO ISP transmission development pathways.

Investment in LDS is challenging

Despite the first-principles need for LDS, making investment decisions are currently challenging. The need for LDS is closely linked to coal closures; the mis-match between currently announced dates and NSW's legislated climate targets suggests that the need for LDS will be accelerated, but the timing remains highly uncertain.

PHES in particular is a long-lead time and long-lifetime asset, which may require investment decisions beyond the time horizon of many equity providers.

On this basis, we consider that underwriting through an LTESA-like scheme would be a way of providing revenue certainty sufficient to drive investment, and support a continued role for the LDS LTESA framework.

Non-market benefits

Long-duration storage can also be a source of regional economic growth and support the development of national supply chains.

PHES in particular provides local jobs and investment, with the majority of the workforce being local workers and contractors, and more opportunity to enhance local supply chains – more than 60% of capex is typically domestic investment. For example, Iberdrola's Tamega project was one of the largest hydroelectric projects in the history of Portugal, providing 6% of installed capacity. It created 13,500 jobs (both direct and indirect), with more than 30,000 different workers on construction sites at any one time.

Changes to the scheme

Balanced changes to the LDS targets could improve both short- and long-term reliability and cost if they provided certainty for investors. We suggest that a reasonable approach would be:

- Greater focus on medium-duration storage in the near-term (including supported by the CIS) could deliver capacity sooner and be more targeted to near-term needs.
- Clear targets, with tenders held in the next 12-24 months for delivery of LDS projects after 2030, should be developed based on a risk-adjusted assessment of firming needs as coal closes. This would allow sufficient lead time for project development and the delivery of resources that will be required long-term.
- Future LDS tenders should focus on longer duration storage (12-24 hours) and merit criteria weighting should incentivise projects with longer durations, reflecting that expected long-term need.
- The timing of future LDS rounds and fixed minimum (and potentially maximum) quantities to be procured should be determined and published (in addition to target values). This will accelerate development sites.

Given the significant development time and cost required to develop PHES, in particular, any changes should be implemented quickly.

We look forward to continuing to work with NSW government to deliver the renewable and firming projects required to deliver a net zero emissions grid. If you would like to discuss this submission, please contact me on [REDACTED] or [REDACTED].

Yours sincerely

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