

21 June 2024

The Hon. Penny Sharpe MLC
Minister for Climate Change, Minister for Energy
Department of Climate Change, Energy, the Environment and Water
New South Wales Government

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

Dear Minister Sharpe,

Review of Long Duration Storage: Consultation Paper

Nexa Advisory is a full-service advisory firm, working with public and private clients including renewable energy developers, investors and climate impact philanthropists to help accelerate efforts towards a clean energy transition.

It is pleasing to see the continuing leadership of the New South Wales Government in supporting the clean energy targets through the New South Wales Electricity Infrastructure Investment Act. The Act has facilitated a strong pipeline of storage projects of all scales and has secured critically needed Long Duration Storage, most recently seeking 1 GW of long-duration capacity for Long Duration Storage (LDS) Long-term Energy Service Agreement (LTESA) and in the current Tender 5¹.

The New South Wales Government must provide confidence in the state's ability to meet the ambition of its legislated targets – through the timely delivery of renewable generation, long duration storage, firming and transmission capacity. This is required to enable the closure of coal generators on time and maximise the long-term interest of New South Wales electricity consumers.

Context

In the Draft 2024 Integrated System Plan (ISP), the Australian Energy Market Operator (AEMO) has identified that there will need to be a rapid increase in the amount of electricity storage of all scales across the National Electricity Market (NEM)². Today's 3 GW will need to grow to 19 GW in 2030, and 57 GW in 2050³. In energy terms, this equates to today's 20 GWh growing to 450 GWh in 2030, and 650 GWh in 2050.

The ISP's *Step Change* scenario only limits temperature rise to under 2 °C⁴. However, to achieve the Paris Agreement goal of keeping global temperature increase below 1.5 °C⁵, medium and deep storage will be even more important as it reduces the need for gas⁶.

Why definitions matter

There are a broad range of electrical energy storage technologies with differing discharge durations and maturities. It is critical that that the New South Wales and the broader energy

¹ <https://aemoservices.com.au/tenders/tender-round-5-long-duration-storage-and-south-west-access-rights>

² https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en

³ https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en

⁴ <https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-inputs-assumptions-and-scenarios-report.pdf?la=en>

⁵ <https://www.dcceew.gov.au/about/news/aus-delivers-key-paris-agreement>

⁶ https://nexaadvisory.com.au/web/wp-content/uploads/2024/03/Nexa-Advisory_-Energy-Storage-Financeability-in-Australia-March-2024.pdf

industry share common definitions of storage for energy planning and policy purposes, as outlined below:

| Description | Duration | AEMO description in ISP |
|-------------------------|-------------------------|-------------------------|
| Short duration storage | <4-hour discharge | Shallow |
| Medium duration storage | 4–12 hours of discharge | Medium |
| Long duration storage | >12-hour discharge | Deep |

In the ISP, long duration storage (with a duration of greater than 12-hours) represents over 70 per cent of the stored energy required in 2050. PHES is an established long duration energy storage that will be critical to support a fully decarbonised power system. For example, the Snowy 2.0 project in New South Wales will comprise 55 per cent of the deep storage required in 2050 – and critically is over 75 per cent of the deep storage needed by the NEM in 2030⁷. Additionally, medium duration storage of between 4-12 hours - encompassing the current eight-hour definition of LDS in New South Wales) will comprise 20 per cent in 2030, falling to 5 per cent of required storage in 2050 given the growth in coordination consumer energy resources.

Medium and long duration storage is critical to achieve reliability and emissions reduction

As outlined in the Consultation Paper, while four-hour duration storage would address 63 per cent of Unserved Energy (USE), there remains a further 37 per cent of USE associated with high impact, low probability (HILP) ‘tail’ events that must be addressed. This highlights the role of storage of medium and long duration storage to ensure reliability of the grid in New South Wales.

The ISP also places a significant reliance on new gas peaking plants, envisaging more installed gas plant capacity (16.7 GW) than is connected today (10 GW⁸) or was projected in the 2022 ISP (9.4 GW⁹). This is despite AEMO also identifying that less gas generation is being used today¹⁰ and that the role of gas is shifting from ‘baseload’ to peaking plant¹¹ - with the latter role being a major opportunity for LDS.

There remain key challenges for storage that are yet to be fully addressed

As identified in our recent report commissioned by the Clean Energy Investor Group, there are several challenges which storage developers face across the NEM. These include:

- Missing services and markets that are urgently needed to facilitate investment (further explained below)
- Uncertainty around the retirement of thermal power stations
- Limited competition in the contract (Power Purchase Agreement) market

While batteries are cost competitive with gas peakers today¹², the ancillary and reserve services that would provide the revenue streams to support new storage are missing and/or can be high risk for investors in the NEM¹³. AEMO identifies that without developing new system services which support the changing generation mix, there will be risks to reliability in a high penetration renewables-led power system¹⁴.

⁷ Analysis of AEMO Draft 2024 ISP step-change scenario data: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/supporting-materials/draft-2024-isp-chart-data.xlsx?la=en

⁸ <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information>

⁹ <https://aemo.com.au/-/media/files/major-publications/isp/2022/2022-documents/2022-integrated-system-plan-isp.pdf?la=en>

¹⁰ <https://aemo.com.au/-/media/files/major-publications/qed/2023/qed-q3-2023-report.pdf?la=en&hash=165E68BF9A6DAF100B56CFAAC437CE20>

¹¹ https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en

¹² <https://www.csiro.au/en/research/technology-space/energy/energy-data-modelling/gencost>

¹³ https://nexaadvisory.com.au/web/wp-content/uploads/2024/03/Nexa-Advisory_-Energy-Storage-Financeability-in-Australia-March-2024.pdf

¹⁴ https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en

This highlights the critical role for LDS LTESA to manage this risk and support projects which will contribute to emissions reduction and reliability while protecting the long-term interests of New South Wales electricity consumers.

Additionally, AEMO also has an important role in supporting LDS through the contracts it offers to ancillary service providers. Currently, these contracts have 2-3 years terms, which does not provide adequate revenue certainty to make LDS bankable for new projects¹⁵. While LTESAs have provided a longer-term contract length to provide certainty, there could be a role for the New South Wales Government to support broader reforms to further develop the market for these broader network services, as well as the energy contract market challenges discussed above.

Policy certainty and bankability is critical for efficiently delivering storage – no matter the duration

In the Nexa Advisory report mentioned above, we identified that batteries of one to two-hour duration are bankable today. Similarly, four-hour duration batteries are approaching bankability based on the revenue that can be secured through the energy market and through providing ancillary services.

There remain missing revenue opportunities for longer duration storage to provide new ancillary services needed to support a high penetration of renewables in the grid. For example, LDS has a long development lead-time (e.g., well-established PHES technology) - which is why support will be needed to ensure that LDS capacity can be delivered within the required timeframe.

It is worth noting that the recent South Australia and Victoria Capacity Investment Scheme (CIS) tender sought a minimum of two-hour duration requirement. In addition to these projects already being bankable based on market revenues, we consider the support provided by the CIS is adequate to support shorter duration storage – and that amending the New South Wales eight-hour minimum duration is therefore unnecessary.

Further, altering the definition of LDS, along with granting the Minister the ability to revise the definition of LDS as required, would create uncertainty for investors and undermine confidence in the LTESA framework.

We note the LTESA scheme is the only market-based mechanism specifically targeting LDS across the NEM. As such, it is critical that the New South Wales Government continues to build confidence in this scheme. In addition to creating uncertainty, changing the minimum definition of LDS or failing to deliver the required capacity would give rise to reactive, sub-optimal solutions – including the extension of coal and gas generation - that would threaten reliability, decarbonisation and the long-term interests of electricity consumers.

Supporting shorter duration storage is complementary to LDS LTESAs

Notwithstanding the critical need for LDS discussed above, we consider shorter duration storage is complementary in delivering value for consumers and accelerating the energy transition in New South Wales.

If the New South Wales Government were to change the intention of the LDS LTESA to include shorter duration storage, adopting a derating approach as suggested in the Consultation Paper could become overly complicated. We note this approach is similar to what was initially

¹⁵ https://nexaadvisory.com.au/web/wp-content/uploads/2024/03/Nexa-Advisory_-Energy-Storage-Financeability-in-Australia-March-2024.pdf

proposed in the CIS consultation¹⁶ alongside a four-hour minimum duration – which was subsequently dropped to two-hour minimum with no derating mechanism (though longer durations are considered to be more favourable in merit)¹⁷.

Separately, aggregated batteries, demand side participation¹⁸ and Virtual Power Plants (VPP) - particularly Commercial and Industrial (C&I) scale resources¹⁹ - have an important role to play in delivering value to New South Wales electricity consumers. Support is available for VPP and demand side participation through existing mechanisms such as the Peak Demand Reduction Scheme²⁰ and the recently announced incentives for batteries²¹. However, these aggregated resources may not be best placed to deliver the deep storage that is delivered by projects supported by LDS LTESAs.

Additionally, while recognising that shorter duration batteries can be aggregated to deliver power over a longer duration, the individual locations of each shorter duration battery may be critical to ensuring that energy is available where and when it is needed. This is because some of the portfolio of aggregated batteries connected to the distribution network (or transmission network) may be behind a constraint, reducing the availability of energy when it is needed.

If the New South Wales Government were to consider supporting this storage segment, this should be considered as complementary to the existing LTESA products - rather than through changes to the current intention of the scheme.

Concluding remarks

Nexa Advisory strongly encourages the New South Wales Government to address the key issues around delivering the required storage across the state by supporting broader reforms around energy contracts market and new market services, as well as by providing certainty around thermal exit. This is likely to ensure that energy storage investment in New South Wales continues at pace to meet the legislated targets, without creating uncertainty for investors by changing the existing LDS LTESA mechanism.

Thank you for the opportunity to provide input the consultation on the Review of Long Duration Storage. We look forward to continuing to work with the New South Wales Government to accelerate the state's energy transition. If you would like to discuss any of the issues raised in this submission, please contact me.

Yours Sincerely

Stephanie Bashir

CEO and Principal
Nexa Advisory

¹⁶ https://storage.googleapis.com/files-au-climate/climate-au/p/prj2845a19ab92efac40adf8/public_assets/Capacity%20Investment%20Scheme%20-%20Public%20Consultation%20Paper%20-%20August%202023.pdf

¹⁷ <https://aemoservices.com.au/-/media/services/files/cis/cis-sa-vic/cis-sa-vic-tender-guidelines-december-2023.pdf?la=en>

¹⁸ <https://nexaadvisory.com.au/web/wp-content/uploads/2024/02/Nexa-Advisory-Report-Accelerating-CI-demand-response-in-NSW.pdf>

¹⁹ <https://nexaadvisory.com.au/web/wp-content/uploads/2024/06/Accelerating-CI-rooftop-and-batteries-is-a-win-win-Discussion-paper.pdf>

²⁰ <https://www.energy.nsw.gov.au/nsw-plans-and-progress/regulation-and-policy/energy-security-safeguard/peak-demand-reduction-scheme>

²¹ <https://www.energy.nsw.gov.au/households/rebates-grants-and-schemes/household-energy-saving-upgrades/residential-battery-incentives>