

Position paper: Long Duration Storage Review

Review of Long Duration Storage under Part
6 of the Electricity Infrastructure Investment
Act 2020

October 2024



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We recognise Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to place and their rich contribution to society.

Artist and designer Nikita Ridgeway from Aboriginal design agency – Boss Lady Creative Designs, created the People and Community symbol.

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Published by NSW Department of Climate Change, Energy, the Environment and Water

October 2024

ISBN: 978-1-76058-841-0

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Overview of the long duration storage review

The [NSW Electricity Infrastructure Roadmap](#) (the Roadmap) establishes minimum objectives to deliver at least 2 GW and 16 GWh of long duration storage (LDS) by 2030. Under the *Electricity Infrastructure Investment Act 2020* (EII Act), LDS is defined as storage units with a registered capacity that can be dispatched for at least 8 hours and is scheduled by AEMO in the central dispatch process under the National Electricity Rules (EII Act, Section 43(1)(b)).

This paper sets out the NSW Government's final position following a review of the definition of LDS in response to the recommendation from the independent [Electricity Supply and Reliability Check Up](#) (the Check Up). This paper responds to submissions received as part of a [consultation paper](#) on potential amendments to the definition of LDS.

The NSW Government commissioned AEMO Services to model the storage requirements for NSW and the expected cost to consumers for a variety of storage durations. The [report provided by AEMO Services](#) was released alongside the consultation paper.

The consultation paper was released on 22 May 2024 and remained open until 18 June 2024. All non-confidential submissions are available on the Department's [website](#).

The NSW Government will retain the minimum 8 hours dispatch duration for long duration storage units

The NSW Government consulted on potential changes to the minimum duration of LDS infrastructure under the EII Act to meet near-term reliability needs and the minimum infrastructure objective for LDS by 2030, at the lowest cost to consumers.

The NSW Government also sought feedback on mechanisms to enable flexibility to adapt the duration of LDS projects to meet future system needs.

There was mixed stakeholder feedback on the appropriate minimum duration of LDS infrastructure. However, stakeholder feedback strongly recommended that the duration remain set in legislation to maintain policy certainty.

Final position

The minimum dispatch duration for LDS infrastructure will remain at 8 hours in legislation.

The NSW Government sought feedback on enabling flexibility in the duration of LDS infrastructure to meet forecast reliability gaps now and into the future, as well as lower the cost to consumers of achieving the NSW Roadmap objectives. Feedback was sought on the appropriate minimum duration of LDS infrastructure and potential creation of a regulation making power to set the LDS minimum duration in regulation to provide flexibility to adapt to future system needs.

There was strong feedback from stakeholders that the minimum duration for LDS should remain in legislation to maintain policy certainty, particularly due to the long lead times and significant capital expenditure required for most LDS projects. Stakeholders acknowledged the need for flexibility to respond to the changing system needs but strongly recommended that any change in duration be made following independent advice and industry consultation.

Modelling undertaken by AEMO Services, indicated that the lowest build cost to meet the 2030 minimum objective would be storage of 4 hours in duration, or a mix of different durations. The

recommendation from AEMO Services suggested that the NSW Government should continue to signal the importance of projects with durations of 8 hours or more to mitigate against future tail-risks. It should be noted that the modelling undertaken by AEMO Services did not consider the impact of the Commonwealth Government expanded Capacity Investment Scheme, which is expected to support the development of shorter duration storage projects by 2030.

Stakeholder feedback on the appropriate minimum duration was mixed. Key themes consistent across stakeholders centred on the expected cost to consumers, the need to maintain investment certainty and preparation for the future system needs particularly beyond 2030.

Consistent with the modelling provided by AEMO Services, stakeholders in support of reducing the minimum duration to 4 hours argued that reducing the duration is needed to meet both the near-term reliability needs and the 2030 LDS minimum objective at the lowest cost to consumers.

Stakeholder feedback in support of maintaining the current policy setting of a minimum of 8 hours argued that the EII Act and the Roadmap to date has effectively signalled a future system need to investors and without it there is no incentive to develop a pipeline of LDS projects. Feedback in support of maintaining the minimum duration also argued the modelling by AEMO Services showed that in 2030 a duration of 8 hours would be adequate in almost all expected unserved energy events.

Several stakeholders identified that the longer-term need for NSW should be considered as part of this review, and that a limitation of the modelling by AEMO Services was that it only considered the reliability needs for NSW in 2030, which assumes the operation of three coal-fired power stations. Two of the remaining three coal-fired power stations are expected to close in 2033, and corporate statements suggest that the remaining coal-fired power station may operate in a reserve basis only from the early-mid 2030's. Stakeholders generally predicted that the minimum duration of LDS will increase over time as reliability needs change with the exit of coal-fired generation and an increasing reliance on variable renewable energy.

Most stakeholders in favour of maintaining an 8-hour minimum duration suggested that near-term reliability gaps could be more cost-effectively filled through firming tenders or another similar mechanism when required.

It is also expected that longer duration projects will be more commercially incentivised in the future to align with the increasing cumulative price threshold which is currently at 7.5 hours at the market price cap. Additionally, retailers may require contracts of longer than 7.5 hours of storage durations to manage price risks.

Based on the stakeholder feedback, the dispatch duration will remain set in legislation at a minimum of 8 hours.

The NSW Government will seek to legislate a minimum objective of 28 gigawatt hours of long duration storage by 2034

The NSW Government consulted on additional mechanisms needed to further support LDS projects. It was proposed that a 2035 minimum objective for LDS could be established to provide certainty for LDS projects which have a longer lead time to develop.

Stakeholder feedback clearly outlined the need for transparent and clear policy to be set and suggested that an additional target should align with the exit of a significant amount of coal-fired power generation from the network, to align with the closure of two of the states remaining coal-fired power stations.

Final position

To provide longer term policy certainty, an additional minimum objective will be legislated requiring the construction of 28 GWh of LDS by 31 December 2033 (also referred to as the 2034 minimum objective). This involves an additional 12 GWh by 2034 beyond the existing 2030 objective.

The consultation sought feedback on mechanisms to support LDS projects and suggested legislating an additional minimum investment objective post-2030, namely 2035 as a potential mechanism.

Almost all stakeholders supported legislating an additional LDS minimum objective for post-2030. A further target would send a clear investment signal to incentivise sufficient infrastructure to be built to address scheduled coal-fired power station closures. Some stakeholders recommended setting a target for 2033 to align with the target closure date for two of NSW's remaining coal-fired power stations and to accelerate the development of replacement LDS infrastructure.

Stakeholders expressed concerns that the modelling conducted by AEMO Services as part of this review did not consider the system needs post 2030, particularly the closure of coal-fired generation and the increasing reliance on variable renewable energy. Stakeholder feedback highlighted the risk of failing to build the necessary infrastructure to maintain reliability and falling short of meeting the NSW Governments Net Zero targets or increasing the reliance on gas peaking generation or extension of coal-fired generation.

Several stakeholders also raised concerns regarding the certainty of coal-fired generation closures particularly considering increased difficulty in financing, public pressure to divest from coal and access to affordable and quality coal supply, suggesting that early closure may occur.

Based in part on the reliability assessment in the [August 2024 Electricity Statement of Opportunities \(ESOO\) report](#), the Department commissioned AEMO to run a bespoke scenario to better understand the need for LDS in a 'post-coal' market. This bespoke scenario assumes all NSW coal power generation had been withdrawn by 2033-34, transmission is developed on time and assumes there is sufficient variable renewable energy capacity to fully utilise NSW Renewable Energy Zone (REZ) hosting capacity available by 2033-34, along with additional short-duration storage in the Central West Orana REZ (equivalent to the storage capacity conditionally awarded access rights).

The Department investigated a series of portfolios of storage to close the reliability gap by inputting the hourly unserved energy results from the bespoke scenario into a capacity expansion model,

assuming an additional 6.6 GW of short-duration (2 and 4 hour) storage, and optimal storage location, behaviour and availability to recharge.

This produced a conservative estimate of a minimum amount of LDS infrastructure required to meet the reliability standard.

Based on the results of this modelling, the Government will seek to introduce a minimum infrastructure investment objective of 28 GWh to be constructed by 31 December 2033. This minimum objective includes the existing legislated minimum investment objective of 2 GW and 16 GWh of LDS infrastructure constructed by 31 December 2029 (the 2030 minimum objective) as well as an additional 12 GWh to be constructed by 2034.

The NSW Government will require the Consumer Trustee to consider a wider range of benefits when assessing the financial value of long duration storage

The NSW Government consulted on potential improvements to how LDS Long-Term Energy Service Agreements (LTESAs) are assessed to further support the development of LDS projects.

Stakeholder feedback was generally supportive of the LTESA framework to date, but highlighted areas where the financial value merit criteria for LTESAs should be amended to value additional benefits which are provided by certain LDS infrastructure.

Final position

Through regulation when assessing a competitive tender for LTESA's the Consumer Trustee will be required to consider the financial value of:

- system resilience to low probability high impact unserved energy events, and
- system security services such as inertia and system strength, and
- avoidance or deferral of network investment through well-located storage.

The NSW Government sought feedback from stakeholders on other mechanisms to further support LDS projects specifically relating to how LDS LTESAs are assessed and awarded.

Almost all stakeholders outlined the benefit of the LDS LTESA framework in delivering the objectives of the NSW Roadmap. Several stakeholders identified the need to amend how project bids are assessed and the transparency of the assessment process for LDS LTESAs. Particularly relating to the assessment of the financial value merit criteria.

Several stakeholders identified that key system benefits to the grid which are provided by some LDS technology types are not being considered to have a financial benefit beyond the length of duration of dispatch. These system services are critical for the network and are predominately provided by coal-fired generators currently. Stakeholders outlined that the financial benefits associated with the provision of these system benefits should be included in the financial value merit criteria for LDS LTESAs.

It should be noted that some of the system services benefits for LDS projects are considered in the merit assessment for a projects impact on the electricity system (see Merit Criteria 1 of Roadmap Tender Round 5 Guidelines). However, this assessment criteria does not consider the financial benefits associated with these system services.

Some stakeholders suggested that as part of the financial merit criteria that the Consumer Trustee should consider the value of avoiding the risk of expected unserved energy events (USE) by considering the duration of time a project is capable of dispatching the stored energy for. Currently, the financial value merit criteria only considers how longer durations can reduce forecast market prices in different scenario modelling results. By assessing the value of avoiding the risk of unserved energy, the additional benefits of longer duration storage will be realised.

Stakeholders also suggested a range of other benefits and aspects that should be comparatively assessed as part of LTESA Tenders. Stakeholders proposed including factoring in the terminal value of an asset, considering the local economic stimulus the project provides and the value of avoided USE events. Upon review the NSW Government considers that these additional points are adequately addressed into the existing assessment process for LDS LTESAs or through other mechanisms.

Based on this feedback, the NSW Government will require (through regulation) that when assessing the financial value for LDS LTESAs, the Consumer Trustee must consider the financial benefits associated with:

- system resilience to low probability high impact unserved energy (USE) events, and
- system security services such as inertia and system strength, and
- avoidance or deferral of network investment through well-located storage, reducing technical curtailment of renewables and/or unlocking additional network hosting capacity.

The NSW Government supports proponents to aggregate long duration storage and firming infrastructure to participate in tenders

The NSW Government consulted on whether amendments were needed to the definition of LDS under the EII Act to clarify that LDS infrastructure can consist of aggregated units across multiple sites.

Overall, consultation feedback acknowledged the important role that aggregated assets including community batteries and VPPs will play within the electricity transition. There was general understanding that aggregated assets are consistent with the definition of LDS under the EII Act and are eligible for participation in LDS LTESAs. The Consumer Trustee has also previously made statements confirming this eligibility.

There was strong support for aggregated assets to be registered in the central dispatch to enable transparent oversight from AEMO, however under current requirements this may be an onerous requirement for smaller scale storage units. However, the proposed AEMC rule change and introduction of a “scheduled lite” registration may overcome this barrier once in force.

Final position

The NSW Government acknowledges the important role and opportunities of aggregated assets, particularly on the distribution network.

Currently, the EII Act enables multiple connection points to be aggregated to satisfy the dispatch criteria for LDS infrastructure, and the aggregated unit may be registered with AEMO and participate in the central dispatch.

Aggregated assets should be registered in the central dispatch to enable transparent oversight by AEMO. The draft rule change by the AEMC to allow aggregated consumer energy resources to be

scheduled and dispatched in the NEM, is likely to achieve this intended policy outcome. The final determination for the rule change is expected in December 2024.

Following the AEMC rule change, the NSW Government will consider if any further amendments are required.

Currently, under the EII Act, LDS infrastructure must consist of storage units that can dispatch their registered capacity for at least 8 hours and participate in the central dispatch process. Registered capacity refers to the nameplate capacity as listed in the NEM Registration and Exemption List by AEMO (Chapter 4A of the NER). Currently, infrastructure with a capacity of less than 5 MW are not required to register with AEMO and do not typically appear in the NEM Registration and Exemption List. The central dispatch is a central-coordination process operated by AEMO to conduct the National Electricity Market (NEM). Projects must be registered with AEMO as scheduled or semi-scheduled units to participate in the central dispatch.

The NSW Government consulted on the need to clarify that aggregated assets are consistent with the definition under the EII Act for LDS infrastructure. The intent of this clarification is to accelerate the development of additional storage infrastructure, for example community batteries. The NSW Government also consulted on the requirement for aggregated LDS infrastructure to register on AEMO's NEM Registration and Exemption List and participate in the central dispatch process.

Generally, feedback expressed that aggregated storage infrastructure such as community batteries and virtual power plants will play a role in supporting the energy transition, particularly on the distribution network.

Some stakeholders suggested that aggregate resources are not best placed to deliver the intended purpose of LDS infrastructure and may result in a higher cost to consumers over a longer term period. Although smaller capacity units could be aggregated to meet the minimum capacity for registration, the individual locations of the units as well as availability of the units is critical and needs to be considered.

Several stakeholders proposed that if the duration for LDS remained at a minimum of 8 hours, enabling aggregated assets to bid for LDS LTESAs would not significantly improve the commercial case for community batteries. Some stakeholders suggested that most of the value of community batteries is from shorter firming and could be better placed to bid into future firming LTESAs rather than LDS LTESAs.

Most stakeholders recommended that aggregated assets should be required to register on the NEM Registration and Exemption List and participate in the central dispatch to enable visibility and coordination by AEMO. Stakeholders also indicated that this would be a barrier to adoption due to the registration process being onerous and slow. Stakeholder suggested that other approaches should be considered.

Aggregation of multiple storage projects that individually can dispatch for less than 8 hours are eligible for LDS LTESAs if the aggregated asset meets the legislated requirements for LDS, as confirmed by AEMO Services.

Independent to this review, the Australian Energy Market Commission (AEMC) is progressing a rule change request from AEMO for a 'scheduled lite' mechanism into the NEM, this rule change is referred to as "Integrating price-responsive resources into the NEM". This mechanism would allow aggregated consumer energy resources to be scheduled and dispatchable in the NEM, specifically a dispatch mode that allows voluntary registration of unscheduled price-response resources into the

NEM market scheduling process wither in aggregations or individually. On 25 July 2024, AEMC made a draft determination of the rule change. The final determination is expected in December 2024, with the dispatch mode to commence in November 2026.

The NSW Government considers that the rule change proposed by the AEMC has the same policy intent and will establish a streamlined registration process to participate in future LDS LTESA tenders. Following the AEMC rule change, the NSW Government will consider if any further amendments will be required.