Friday, 20 December 2024

Department for Energy and Mining
Level 4/11 Waymouth Street,
Adelaide SA, 5000

Dear Ms Knights,

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia, representing nearly 1,000 of the leading businesses operating in renewable energy, energy storage, and renewable hydrogen. The CEC is committed to accelerating the decarbonisation of Australia's energy system as rapidly as possible while maintaining a secure and reliable supply of electricity for customers.

We welcome the opportunity to comment on the design paper of the Firm Energy Reliability Mechanism (FERM) from the Department for Energy and Mining (**the Department**).

The CEC is supportive of the proposed scheme and welcomes the introduction of a mechanism that incentivises long duration energy storage (LDES). With high levels of renewable energy penetration and a target of 100 per cent renewable energy by 2027, there is a need to integrate a mix of technologies that support the reliability of the power system.

LDES is a cost-effective and reliable technology for maintaining the power system in South Australia. It supports the integration of renewable energy, reduces curtailment, eases congestion, and brings benefits to consumers in the form of lower bill costs.

As the design of the policy progresses, we would encourage the Department to clearly communicate the desired outcomes of the FERM. While this mechanism addresses the *missing money problem*, we would caution against unintended consequences that could create a *misallocated money problem* by overcompensating some resources and undercompensating others.

> *The FERM can deliver significant benefits to reliability as the South Australian grid decarbonises. The intent of the mechanism should be clear to industry and the contractual obligations should minimise impacts on operation, contract market, bankability, and investment signals. In the current form, we would encourage broad engagement with storage asset developers and AEMO to clearly identify the impacts of any proposed design choice. This is because clarity and simplicity are more likely to deliver value for consumers.*

In the remainder of the submission, we would like to comment on several elements of the design paper related to performance targets, value for consumers, and existing reforms.

Phone: +61 3 9929 4100
Fax: +61 3 9929 4101
info@cleanenergycouncil.org.au

Level 20, 180 Lonsdale
Street, Melbourne, VIC
3000, Australia

cleanenergycouncil.org.au

ABN: 84 127 102 443

Meeting future demand

In South Australia, typical demand ranges from 1,000 to 2,000 MW for most of the year with peak demand reaching 3,000 MW during heatwaves periods. The widespread uptake of distributed solar PV has significantly lowered daytime demand from large scale generation during the day, especially on weekends and public holidays.

ElectraNet's latest Transmission Planning Annual Report projects a rise in demand due to changes in industrial load. This includes:

- Building a hydrogen power station, electrolyser, and storage facility in Whyalla City;
- Developing hydrogen export hubs;
- Expanding large mining operations for copper, gold, and magnetite;
- Establishing data centres and large industrial loads (LIL) leveraging the growing surplus of distributed rooftop PV.

In this context, maintaining reliability to support significant economic and industrial development is a priority. Firm capacity is crucial for achieving expected growth objectives, renewable energy and emissions reduction targets, and reducing costs for consumers.

The FERM aims to support investment in LDES technologies, recognising their essential role in maintaining reliability, time shifting excess renewable energy, and reaching higher levels of VRE penetration. The CEC commends the Department for specifically supporting technologies that provide depth of storage of 8 hours or more.

Several LDES technologies are already being deployed at scale with proven technical and commercial capabilities. However, long lived assets are particularly impacted by the effect of discount rates on required rates of return. The role of the policy is to further incentivise these technologies, the policy will need to balance bringing technologies down the cost curve and the value to consumers.

In our view, the new mechanism will likely be more effective if investment signals remain clear. Two of the proposed requirements might result in unintended consequences or unclear outcomes – the lack of reserve and gas / diesel participation – and we would like to expand on these points further.

1. Lack of Reserves 2 and 3

The CEC recognises the rationale to implement a performance target to ensure firm capacity is available when needed to reduce intervention through directions or the activation of Reliability Emergency Reserve Trader (RERT) contracts. At times, consumers in South Australia can face higher prices due to tight supply conditions compared to other NEM regions.

Placing responsibility on generators to be available during lack of reserve (LOR) conditions can be seen as a simple measure to ensure capacity is available when needed. However, there are other ways to achieve this objective.

We encourage the Department to conduct further analysis and discussions with industry and AEMO to unpack the implications of this obligation on generators. We have several concerns about maintaining the current LOR requirement within the scheme. It is crucial to carefully consider these implications to avoid potential distortions in the market.

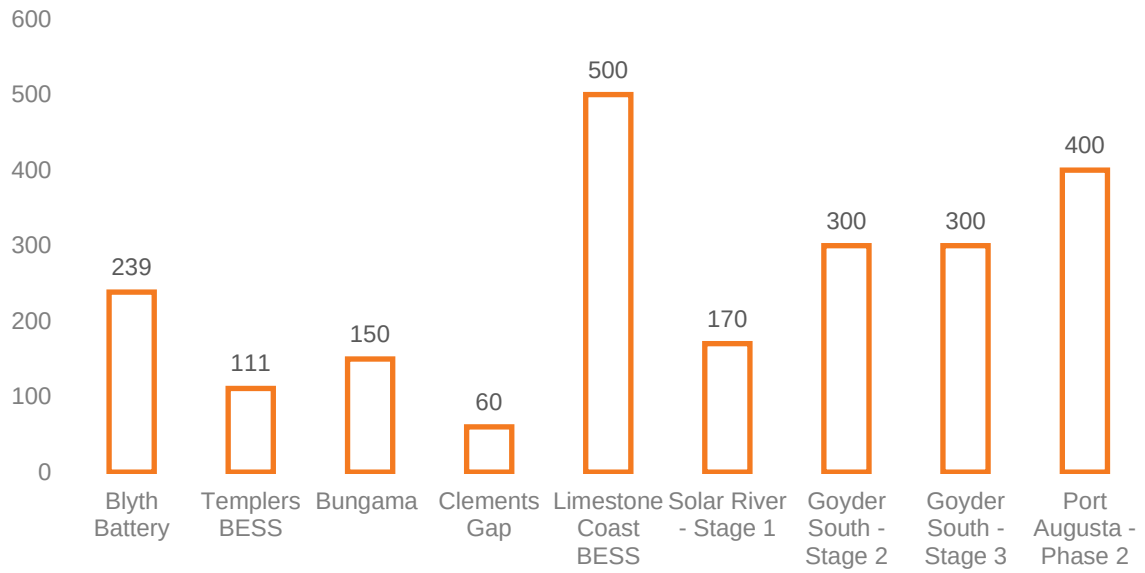
Impact on investment signals

We consider that an operational performance requirement might unintentionally affect investment decisions. During a forecasted LOR, expected pre-dispatch prices are likely to be very high, creating a natural inventive for storage operators to keep capacity available. This is needed to cover contracted positions and to capitalise on high prices.

The CEC's position is that market signals are sufficient to provide the natural discipline for storage assets to have available capacity for periods of tight supply. We would argue that the issue is one of *missing money* rather than inadequate market settings in the NEM.

Battery energy storage systems (BESS) are responding to changes in demand and tight supply conditions by installing larger systems, both in terms of rated power and duration. BESS proponents are currently building four stand-alone BESS systems with a total of 560 MW capacity and another four BESS projects have been approved for development and are set to be built between 2026 and 2030 with a total capacity of 1.6 GW.

Figure 1 | Under construction and approved BESS projects in South Australia (*Source: Rystad data – Project Analysis*)



Therefore, we urge the Department to test the necessity of LOR requirements with storage proponents and understanding the implications on investment. This will help clarify how the contract obligations interact with broader investment signals.

Our members have expressed concerns that the restrictions imposed by the LOR requirements could flow through to risk allocation, increasing the cost and risk of project finance due to the risk asymmetry.

Consequences on operating regime

Linking performance to the LOR regime presents challenges due to the conflict between the LOR framework and the activation of RERT contracts. RERT contracts reflect out-of-market reserves priced significantly higher than in-market dispatchable capacity. This can lead to inefficiencies in generation supply by dispatching higher priced capacity ahead of lower priced capacity as generators become available.

Given that AEMO can activate RERT contracts when LOR 1 and 2 are declared, this would result in inefficient outcomes for storage assets operators that are required to maintain a certain state of charge level to meet the FERM contractual obligations.

Operators cannot manage or have direct oversight of the forecast uncertainty measure (FUM) calculations informing reserve level declarations. They must make decisions in operational timeframes with an incomplete view of the market. If they are incorrect or not dispatched in the market (for example because conditions alleviate), they have foregone valuable merchant revenues that underpin revenue return profiles.

This is also an asymmetry risk that leads to unintended consequences for investment in storage assets, as described above. The scheme should seek to reduce, as much as possible, the potential risks and costs associated with these uncertainties.

In addition, there needs to be clarity around the expected mode of operation of the storage asset. The Department should be clear if the 8-hour duration requirement is tied to the asset's capability or represents the name plate requirements. In the event of a sudden forecasted LOR, a storage asset of 8-hour might not be fully changed and be penalised for this or a shorter duration battery would be better placed to address the LOR condition, while the long duration asset undergoes revenue loss without any compensation.

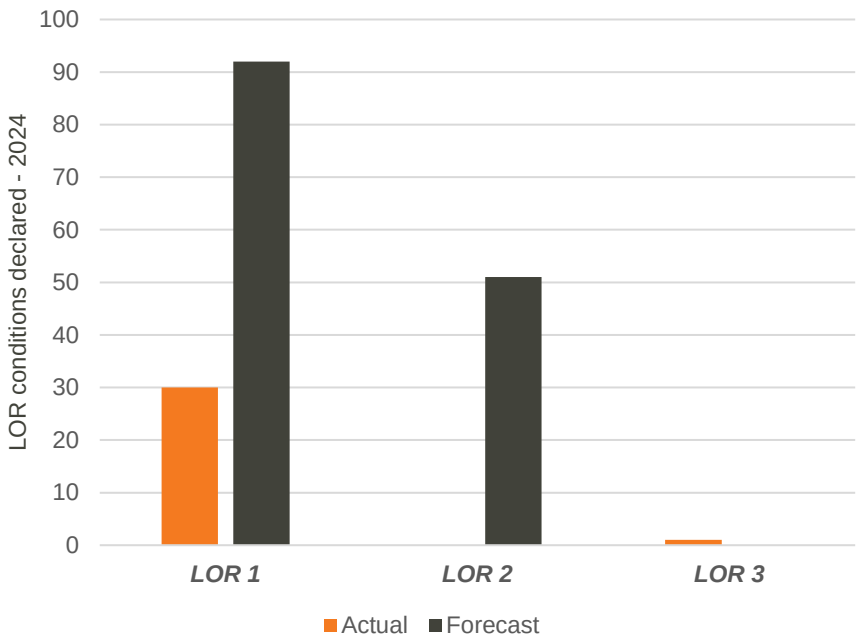
Need for outcome clarity

We consider the FERM aims to ensure depth of capacity is available when needed rather than addressing low probability, high impact events signalled through the LOR framework. LOR conditions are forecast by AEMO when there is probability of a shortfall in available capacity reserves due to specific system conditions.

If this is the case, we strongly suggest that the Department consult with the industry, including AEMO, to find an alternative performance obligation that more clearly aligns with the policy intend. Consulting AEMO Services and EnergyCo in New South Wales could provide insights into how to balance the investment signal of the scheme with the desired performance requirement.

According to the 2024 LOR Frameworks Reports, South Australia had four forecast LOR 2 conditions, none of which materialised. No LOR 3 conditions were forecast. LOR conditions were declared due to decreased generation availability and increased demand.

More broadly across the NEM, none of the forecast LOR 2 conditions have eventuated (Figure 2). Therefore, the Department should be clear in relation to what outcome it seeks to drive. There is an argument that the policy could focus on ensuring LDES enter the market, rather than preparing for infrequent events or unserved energy. LDES will naturally provide the reliability needed.



The graph shows the LOR conditions declared in Q1 2024, Q2 2024, Q3 2024 across the NEM

46 out of 51 LOR 2 conditions declared throughout 2024, 46 declarations were set by FUM

Effect of LOR on different technology types

We recognise that LOR conditions impact longer duration storage assets differently than shorter duration storage assets, for example BESS that provides 2 hours duration. Several LDES technologies such as compressed air or pumped hydro can deliver very large energy capacity (in the order of hundreds of MWh) and can more easily partition their stored capacity to meet FERM contract obligations while also participating in the market.

The LOR requirement is more challenging to manage for shorter duration storage assets and we acknowledge that the FERM is targeting long duration capacity. However, as most LOR declarations are cancelled, there is a misalignment and inefficient resource allocation that impact asset revenues and long-term investment. We consider it is crucial for the price of energy to remain transparent.

Reliable energy for a growing industry and economic development is crucial. As such, the Department should understand the effects of operational outcomes of LOR conditions on different technology types. The risks associated with an LOR requirement for investors and operators of BESS, gas or diesel generation or new LDES such as compressed air, thermal storage or flow batteries are not similar. The Department should be clear on the trade-offs, complementarity, and differences between technologies.

We would encourage the Department to explore other types of performance obligations that still align with the framework objectives, while offering operators flexibility to participate in the market.

We consider that LDES storage operators will likely be available during LOR conditions to take advantage of high prices. In this scenario, a performance target could be based on the LOR conditions that materialise, with compliance assessed at the payment phase. This way, operators make decisions based on market conditions without being restricted by contract obligations. Penalties would apply if they were found not to have sufficient reserves for LOR conditions that eventuate.

In other words, payment would be tied to maintaining a certain state of charge during forecasted LOR conditions but only be evaluated on compliance if the LOR condition occurs. State of charge is a function that can be verified and can form the basis for quarterly contract payments.

We also ask the department to clarify how the 8-hour requirement is linked to the asset operation. For example, it might be more beneficial for the asset to operate as unrestrained as possible and be able to discharge for the duration required by the market except during periods when the contract is called upon and operate as an 8-hour asset.

In lieu of LOR requirements, the Department could implement a set of principles for contracted parties. This would allow participants flexibility to leverage their knowledge of market conditions without implementing rigid obligations.

We might also argue, as we did in our report on LDES, *The future of long duration energy storage*, that a new energy reserve service could better value the MWh in stored capacity. This service would incentivise projects that deliver energy in specific locations, for a specific duration, and at times when needed in line with system needs. For example, the storage asset owner would be paid for energy provided during forecasted unserved energy events.

2. Operation of gas / diesel generation

The scheme supports gas and/or diesel generation in the mid-term. However, South Australia's long-term goal is to transition to a low emission power system. The proposed obligation for existing generation to participate in the FERM may create barriers for gas and/or diesel generation seeking to exit the market.

Under the scheme, exit would not be permitted within the tender period which could be 4 to 8 years in advance. This does not align with the current NEM rules, which require 42 months of exit notice.

We would ask the Department to clarify the requirements for generators that have either indicated the intention to exit the market or are not receiving payments under the scheme. The scheme should not obstruct exit or penalise generators when they are not under contractual obligations.

Valuing long duration energy storage

We support the FERM as a mechanism that values and recognises the contribution of LDES to reliability. We would like to suggest improvement or changes on a few design choices that could further enhance this mechanism and ensure the policy meets its objectives.

1. Contract length

Several CEC LDES members consider that the proposed contract length for new LDES could be adjusted. Most of LDES technologies, such as compressed air and solar thermal, are long lived assets, in the order of 40 to 50 years. A 15-year contract, alongside the forward tender of 6 to 8 years does not provide sufficient certainty for investors. Projects would need to achieve a return on investment within the first 15 years, which greatly inflates bid price for these projects. We consider this is not desirable.

The mechanism describes a separate category of generators with long-lead time likely to have different contract terms. We recommend that the Department considers this category closely to ensure it reflects the commercial opportunities of new LDES technologies.

Equally important, subsequent 1-year rolling contracts after the initial contract period is too short. Many projects continue to invest in upgrades to maintain operation, as well as to extend the life of the project. Proponent may not be adequately incentivised to make these costly improvements based on short-term rolling contracts.

Contract length could align more closely with the project lifespan. Contracting structures could reflect the characteristics of the potential LDES tender participant. As such, we recommend that the Department allows for flexibility to explore firm capacity offers.

2. Cap and collar model

The CEC supports cap and collar model and the establishment of the Scheme Administrator entity. While the detail of the cap and collar model are yet to be determined, we consider that the types of technologies targeted by the scheme, require the revenue floor to be as low as possible.

For LDES projects to be bankable, floor prices should align closely with the levelized cost of storage (LCOS). However, this will have to consider the impact of contract terms and performance obligations on a project's expected revenues.

We understand that other contracting mechanisms, such as derivatives and PPAs, also factor prominently in investment decisions from debt providers. Any design choices that have the potential to reduce incentives for parties to participate in contracting markets should therefore be avoided.

CEC's position is that the contracts with the Scheme Administrator should not impact the contracts market, retaining incentives for project proponents to participate in multiple markets to ensure diversify of revenue. We encourage the Department to consider the interaction between potential floor prices and contract market liquidity. To the extent that these floors represent an alternative to foundational contracts being struck – such as foundational PPA offtakes - this may affect PPA market liquidity.

We encourage the Department to consult with industry on the structure of the cap and collar that ensures revenue sharing does not limit potential upside or does not reduce the incentives for proponents to respond to wholesale price signals, by reducing the extent to which an asset can access high price periods.

3. Merit criteria

The CEC recommends that ex-ante merit criteria be defined, preferably with a quantitative element, particularly around merit criteria related to system security and reliability benefits.

Merit criteria will determine which projects are selected following the tender. Given the role of LDES for reliability, the relative early-stage deployment, and South Australia's high renewable energy penetration, it is critical to provide as much guidance as possible advance of tenders to allow proponents to prepare their proposals accordingly.

Merit criteria could be designed to assess unique functions of LDES, such as:

- *The relation between gas-powered generation and LDES*: Trends in gas supply and underlying transmission pipeline capacity do not necessarily align with a future where gas plays a major role in energy generation. LDES are a preferable alternative to gas-powered generation, providing both energy duration and carrying capability, without any carbon emissions.
- *Synchronous generation*: AEMO requires a certain number of synchronous units online to maintain power system stability and operability. LDES technologies, such as compressed air and solar thermal, bring innate synchronous capability which replace the current role of synchronous gas units. Other forms of LDES, such as flow batteries or 8-hour BESS, can provide grid forming capability.
- *Reducing network costs*: New transmission network will be needed in the coming decades. Wherever possible, alternatives to network build should be promoted, from both an economic and social license perspective. LDES demonstrate multiple capabilities, including essential system service provision, duration and energy carrying capability, which make them excellent candidates for supporting or replacing network infrastructure.
- *Providing system reliability at risk periods*: To enhance system reliability, it is useful to consider the timing of delivering energy from LDES assets. Assessment technical capabilities to address seasonal shortfalls, wind droughts and dunkelflaute events could further inform the selection of successful tenders. We know that LDES have the capacity to carry large volumes of energy through time, have good cycling capability, low degradation over time, and can have a long lifespan, up to 50 years.

Value for consumers

The framework is seeking to provide secure, reliable, and resilient electricity at least-cost for consumers. We would encourage the Department to understand several factors in depth before considering how to progress with the scheme.

1. Cost of very high levels of reliability

We urge the Department to carefully weigh the "shock" scenarios considered in the analysis. According to the Reliability Panel, consumers are not willing to pay more for higher levels of reliability and the current USE levels have proven adequate. Modelling tail end events should consider the impact on consumer bills. This is relevant because the indicated cost recovery model is based on TNSPs passthrough. This will mainly affect customers without rooftop solar PV and / or household battery and generally the more vulnerable consumers.

We acknowledge that in South Australia, the cost of market directions and opaque RERT contracts are leading to higher prices for consumers. Allocating the cost of the mechanism should be based on thorough analysis of wholesale market prices. In principle, consumers should not bear the costs of efforts to deliver lower levels of reliability below what is currently defined. The Department may consider other forms of financing the scheme, such as on balance sheet financing.

We would return to our point discussed throughout, that of clearly defining what outcomes the policy is seeking to drive and set the mechanism accordingly.

2. Setting the Firm Energy Target

We encourage the Department to assess the interaction between the Firm Energy Target (FET) and the market signals for shorter duration batteries when determining the volumes it seeks to procure.

BESS assets play a key role in maintaining power system security and reliability. They provide intra-day energy support, while also providing voltage and frequency control, and more recently system strength and inertia. BESS assets such as the Hornsdale Power Reserve have also been used to provide System Protection Integrity Schemes (SIPS), which increase the transfer capacity and overall resilience of the power system.

With the continuing decrease in the cost of lithium battery cells, there is a growing trend toward the installation of BESS of 4-hour duration and a higher power rating. This reflects the changing retail and commercial load, as well as management of physical and economic curtailment. Governments are also supporting larger systems, as seen in the tender outcomes for the Long-Term Energy Service Agreements in New South Wales and the Capacity Investment Scheme.

We consider that shorter duration BESS plays a role in the energy mix in South Australia, and the purpose of the FET is to balance the investment signals that currently supports shorter duration energy storage to enter the market, while carving out the required capacity for LDES.

Finally, transparency in the assessment and setting of the FET is crucial for investors. Ultimately, consumers benefit from deployment of BESS as this is a mature technology, with costs and risks well understood by developers, the market, and government.

3. Incentives for new forms of LDES

The mechanism proposes to offer tenders to storage assets over 30 MW capacity. We would encourage the Department to consider lowering this threshold for eligibility. Certain LDES technologies have lower power but long duration. Some of the technologies are also more commercially attractive at lower capacity.

Delivering projects at higher capacity for novel LDES technologies can be challenging. Each technology starts by developing small systems that allows developers to gain crucial technical and commercial insights. It may be more economically feasible to deliver smaller projects. However, the duration can be in the order of 10 to 100 hours. For example, metal-air batteries such as iron-air batteries, have proven to deliver 100 hours energy at lower power rating[1]. The process of oxidating the metal by utilising oxygen from the air is attractive since these batteries would have low material costs, high energy density, simple cell designs, and inherent battery safety.

The same can be said about flow batteries. Although a more advanced LDES technology, commercially, smaller system of up to 30 MW are more palatable to investors.

We also note that Virtual Power Plants (VPP) or services that can be provided by small aggregators has not been included in the initial design of the scheme. Several reforms are on foot with AEMC aiming to make VPPs and other distributed resources more responsive to market signals and to support the grid. We encourage the Department to reassess the eligibility of these services as soon as practicable. Their contribution to reliability, managing minimum system load, and system security should be considered in the future.

[1] Form Energy, Georgia Power Continue Forward With 15 Megawatt Iron-Air Battery System Agreement | Form Energy

These technologies, together with more established forms of LDES, such as compressed air and solar thermal will support power system reliability as South Australia paves the way for a power system with high levels of renewable energy.

Interaction with other reforms

Lastly, significant reforms are underway in the NEM as the energy transition progresses. Recently, the Terms of Reference for the Review of Market Settings in the NEM have been released, with the Review Panel set to assess the reliability framework and market settings that promote investment in firmed renewable generation and storage following the Capacity Investment Scheme.

The Department may seek to understand the interaction between NEM-wide reforms and this state-based scheme. In our view, a mechanism that is simple to implement, with clear guidelines for investors in LDES, and ability to be modified is preferred. This is withstanding that existing contacts should continue to be awarded but new tenders to cease if the FERM objectives are reached.

The FERM is set to incentivise long duration storage. However, the Department may want to consult with DCCEEW on how the Capacity Investment Scheme tenders might change firm capacity in South Australia as well as gaining insight into a better application of LOR requirement.

As always, the CEC welcomes further engagement from the Department for Energy and Mining on the design of the policy. Further queries can be directed to Ana Spataru on aspataru@cleanenergycouncil.org.au.

Kind regards

Christiaan Zuur
Director, Market, Investment and Grid