Submission to the Draft Determination on Improving the NEM Access Standards – Package 2

Introduction

Celero Infrastructure Ltd (Celero) and Global Power Energy (GPE) welcome the opportunity to comment jointly on the Australian Energy Market Commission's (the Commission) Draft Determination of 12 March 2026 on *Improving the NEM access standards – Package 2*.

Australia's energy system is changing rapidly and Celero and GPE support the Commission's efforts to modernise the access standards framework, in response to rule change requests from the Australian Energy Market Operator (AEMO) and Rod Hughes Consulting, towards a new phase in Australia's power system. In this new phase, data centres will be an increasingly large source of demand.

Celero has recently entered Australia's energy market through the development of four integrated energy and digital infrastructure precincts across the National Electricity Market (NEM), that combine data centre load, battery energy storage system (BESS) and gas-powered generation.

GPE has been operating as an energy transition advisory for six years, with significant expertise in connections, system modelling, operations and policy and regulation.

Overall, Celero and GPE view the Draft Determination as a step in the right direction and support:

a) the omission of a new classification framework for transmission-connected inverter-based loads (IBL), which are already covered by Schedule 5.3 access standards;
b) the consistent treatment of IBLs across the NEM and a tier-based classification of IBLs connecting to distribution networks in accordance with Schedule 5.3 access standards;
c) no requirement included for all inverter-based loads (IBL) to register with AEMO;
d) an ability for IBL to ride-through voltage and frequency disturbances, which the Celero projects can do.

The remainder of this submission provides further details about Celero's model and expands on the above points.

Consistency with the over-arching framework

The Australian Government has provided clear over-arching guidance to support an AI-enabled economy in the National AI Plan (December 2025). Celero and GPE believe that the technical considerations of the Rule change need to be consistent with these expectations.

The Commission has translated this into three expectations for data centres:

- bring new clean energy;
- be flexible in how you use power; and,
- pay your way when connecting to the grid.

Celero and GPE support the above expectations, while emphasising the need for all policy and regulatory frameworks to adapt to alternative and fast-changing technological and digital architectures.

Celero Infrastructure's precinct model

Celero's lead project connects to the 500kV line in Victoria and comprises 1000 MW of data centre load, three 500 MW BESS (1,500 MW total) and 500 MW of gas turbine generation. It connects to the VicGrid network under the Integrated Renewable Planning (IRP) framework. Three additional sites replicate the core architecture – 500MW data centre behind two 500MW BESS, without gas. The Celero hybrid BESS DC connection architecture combines a transmission-connected grid-forming battery coupled with a large data centre IBL.

Across all four sites, the data centre sits behind the BESS and operates as part of the BESS Dispatch Unit Identifier (DUID) enabling the battery to serve as the market and grid interface.

The benefit of this arrangement is that while the data centre load changes, transfer of load to UPS during faults would not be seen by the power system, when coupled to the BESS (which will manage the response).

The approach will satisfy the intent of the Commonwealth National AI Plan and Commission Draft Determination as well as automatic access standards to connect to the transmission system.

Hybrid models

While Celero and GPE appreciate the Commission's concerns about system security in the Draft Determination, we encourage the Commission to consider all possible data

centre integration architectures – the reason being that some models, such as the Celero approach, are grid-supportive and equipped to promote system security.

The Celero acts as grid-supportive by positioning the BESS alongside or aligned with the data centre. This hybrid connection, where the BESS couples to the load in parallel, provides smoothing and fault ride-through capability.

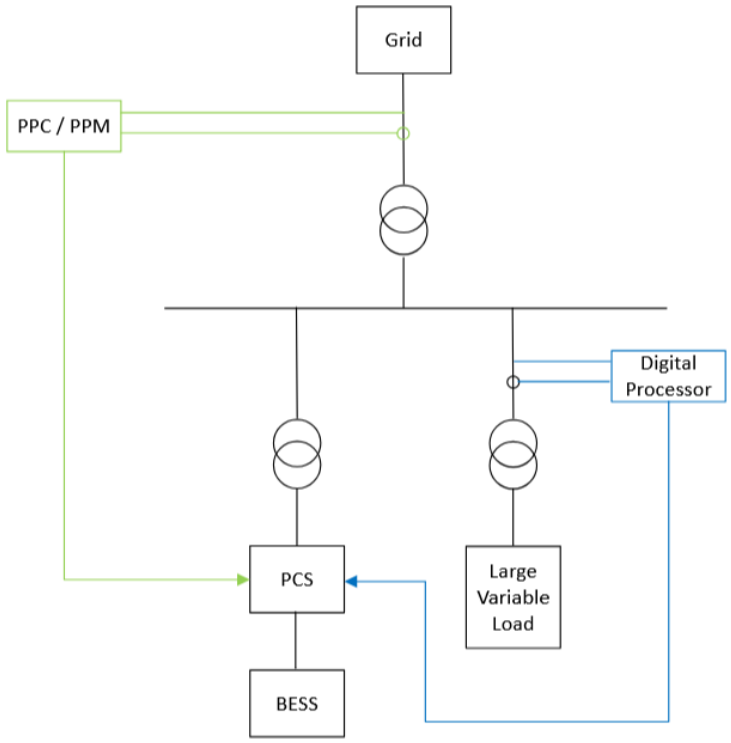
This model is emerging more broadly, including in the United States. In fact, data centres with 70% load swings are generally being deployed with a BESS to smooth the profile.

The draft Rules for Schedule 5.3, however, currently frustrate the above connection architecture. Failure on the part of the Commission to correct this in its Final Determination will likely lead to delay and increased costs on grid-supportive projects, potentially providing a disincentive to connect IBL. Australia, in turn, risks not maximising its innovation potential in line with the Commonwealth's intent.

Grid-supportive architecture

The architecture of the load and BESS may be either parallel-connected or the load may be embedded with the BESS. Figure 1 below shows this architecture of a BESS and load in parallel.

Figure 1



In this configuration, the BESS will effectively compensate for the data centre load while the system security risks envisaged by the draft rule change are unlikely to be present in a well-engineered system.

However, in this arrangement, if revised rules in Schedule 5.3 take effect, the load must still be evaluated as if it is solely grid-facing and the technical standards will still apply.

Where a hybrid configuration is present, we consider that a complex set of connection arrangements are needed and that detailed solutions may require further consideration than allowed for in the timeframe of this change. We have considered the option of a single set of performance standards being allocated to the hybrid solution – but this would increase obligations on generator connections.

We also consider that a battery may not necessarily be co-located with the load it is intended to serve (especially in urban areas) and that designing these types of systems will require contracts and complex connection technical arrangements.

For the BESS to compensate for the load the Schedule 5.2 technical standards must therefore be considered, including whether a combined response can be facilitated

using current negotiated standards. We would expect that this would be discussed through further Technical Working Groups.

At this stage, we propose applying a clear set of considerations to the access standards in Schedule 5.3, as contemplated in this rule change, to enable a Schedule 5.2-compliant facility—or another suitable mechanism—to provide the required response, along the following lines:

- S5.3.12 – addition of wording to S5.3.12(d) or establishment of a Minimum Access Standard to allow for tripping of plant where a combined response at the connection point does not result in a frequency disturbance outside of the frequency tolerance bands (acknowledging that plant protection limits should also be set as widely as possible).
- S5.3.13 – addition of wording to the clause to allow for a combined response, including tripping of the plant, such that another service may provide active power recovery to compensate for the loss of load.

System Security Risks and Their Mitigation

As we agree with the security assessment of the impact of multiple large loads disconnecting at once, we support designing performance standards within a negotiable range to address the risks.

Whether the new technical standards deliver a balanced power system and an efficient economic outcome will hinge entirely on their implementation, so the Rules must be structured to ensure such an outcome.

Modelling Requirements

The Draft Determination has introduced the need to clarify the modelling requirements for load system in Section 2.3. In the interests of timely connections to support an energy system in transition, Celero and GPE advocate for reasonable modelling requirements.

While we acknowledge there will be a subsequent revision of the Power System Modelling Guidelines as required under S5.5.7, we believe that the final Rule should discourage detailed modelling from the requirements for all large inverter-based load.

We are concerned that the new Rules may set the system performance standards excessively high, requiring detailed modelling and connection studies, potentially imposing multiple upfront costs and potential time delays. We think these objectives can instead be covered by good engineering practice for connecting loads.

Overall, this comes down to finding a sensible balance between economic development benefits and system security risks. We recognise the importance of technical requirements, but they should not present a disincentive for grid-serving loads to connect to the network.

Our reasoning is based on the following principles.

- Specifics on loads:
    - Loads are facilitating economic work and cannot be easily modified.
    - The native physical requirement to supply loads within the standard voltage ranges inherently supports greater levels of system strength.
    - The reliability requirements of data centres typically connect these loads into heavily meshed parts of the power system, further reducing the risks.

- Purpose of modelling:
    - Whilst modelling is a useful design tool, it also introduces the opportunity to investigate an increasingly rare or unusual set of power system outcomes, where necessary.
    - Modelling is contradictory to how we understand ride-through requirements to have been implemented in other jurisdictions where settings and site testing is preferred.
    - We think that it is appropriate that a risk-weighted Short Circuit Ratio (SCR) is selected above which detailed modelling of facilities are not required. Modelling should also be used as a post connection activity, if and when real-time operation identifies a need.

- Practical experience:
    - Our modelling and connection processes cater for a negotiated position on these cases. However, that is often not how they are prosecuted, with all edge cases generally requiring control system tuning to rectify until a performance standard is considered satisfactory. This comes at considerable time and cost to all projects, which in our view is not commensurate with the power system risks being mitigated.
    - Outcomes can be gained with the majority of certainty by completing settings and factory and site testing of devices to ensure that their ride-through settings comply with the rules. This has been proven and validated in all load connections to this point in the NEM and is a position that load developers understand and can implement.
    - Instability detection now allows for real-time feedback on instabilities.

Performance Standards

We have reviewed the proposed performance standards and draw attention to the technical aspects outlined below.

Voltage Disturbance Ride-Through

We agree with the need to set protection as widely as possible within the plant capability in order for loads to ride through where possible.

While we do not accept the premise that increased voltage transients, as shown in Box 5 and 11 of the Draft Determination, are an issue that can be effectively addressed through this Rule, we acknowledge that the underlying risk remains. System planning should be the principal means of managing this risk, but we recognise that the current framework leaves elements of that risk unresolved.

Data centre loads will be made up of many different items, inclusive of UPS, cooling systems and IT hardware, with a scaling up implementation period. The setting and testing of voltage ride through must be coordinated in the design and staging of the plant. Negotiation of these clauses must be based on good engineering practices rather than detailed modelling of plants and systems.

Active Power and Current Limits During Disturbance

The proposed Rule drafting has introduced current limits during normal operation and disturbance ride through.

It is unclear what has driven this requirement. While the Draft Determination states concerns around current draw exacerbating undervoltage condition, we do not believe this is quantified elsewhere nor do we have a clear sense for how the plant will work in practice as the equipment is inherently current-limited.

Post-Fault Active Power Recovery

We agree with the need to recover active power post-fault. The settings drawn in the proposed Rule-change appear to be somewhat arbitrary and more work should be completed to ensure that the standard should be based on actual power system risk, including a position that doesn't cause cascading security risks, balanced with what is possible from manufacturer and developer experience. Unintended consequences may be caused where equipment cannot satisfy automatic standards, which has previously been experienced with reactive current and active power recovery times with generation.

For the Celero model, the battery will provide post-fault active power support and will need to recover to a level that is the sum of the pre-fault BESS and data centre operating levels (assuming the data centre load moves to UPS).

In this model there should also effectively be no minimum access standard for active power recovery as outlined in proposed S5.2.5.13(g)(3), as the plant may be allowed to move its load to UPS and resync when appropriate, provided the BESS maintains the response.

Frequency Disturbance Ride-Through

We agree that plant should be set so it can ride through the range of system frequency changes outlined in the frequency operating standard.

We believe that a view should be formed on the Minimum Access Standard for this clause, in alignment with Schedule S5.2.5.3, including a carve out for where a BESS may provide the response.

Instability Detection and Response

We agree with the implementation of instability detection and response, as proposed.

Short Circuit Ratio

We acknowledge that only minor changes have been made to this performance standard during this Rule change. However, this standard drives a modelling requirement that is likely not within the control of large loads.

Loads pay a charge to networks to maintain the system to serve them, so a system strength charge drives this standard and it should likely be a system or planning standard, not a facility performance standard.

We also disagree with the assessment of thyristor controllers as 'susceptible to control instability' as per Figure 2.5 of determinations, where a controller is controlling a DC bus which may need to move to serve its underlying load movement requirements. We believe there is an unintended consequence of this interpretation such that large loads will select poorer control devices in order to avoid being subject to this interpretation, which leads to a lower technical outcome. There are also a number of existing power system loads that fall into this category and have not been subject previously to this interpretation.

We think that the risks that large loads create can be effectively mitigated by the selection of their locations. When loads locate in strong locations, they should be subject to less requirements for modelling and system strength assessment.

To that end we believe that the final Rule should consider an SCR threshold wherein loads do not present system risks and SCR withstand assessment. This is in line with our practicality recommendations regarding modelling,

Scheduling and dispatch

Whilst the Rule-change does not outline a position on scheduling and dispatch, a hybrid configuration with an unscheduled load and scheduled generator is unusual in the Australian power system. We would suggest the following as an efficient way of dealing with this is:

- Review of Clause 4.9, such that the BESS can respond to local frequency deviation (read active power deviation of the DataCentre) outside of its dispatch target;
- Development of a technical standard limiting load changes to a certain amount measured in MWs^{-1} or percent per unit per second. Whilst we acknowledge that customers must have the flexibility to operate their demand by doing work with a certain amount of change, there is a system risk in extreme changes to load. We would consider that $10\%s^{-1}$ would be an appropriate setting, such that the change is longer than Fast FCAS, but less then market dispatch levels.

To enable a hybrid configuration, the Rule-change may consider these additional items.

Data centres, decarbonisation and power system development

Data centres are a key feature in the next phase of decarbonisation and power system development. In the context of unprecedented and costly transmission build projects including HumeLink, VNI West, Marinus Link, EnergyConnect, Sydney Ring and the New England REZ, which will ultimately lie with consumers to fund, large data centres connecting through BESS would contribute materially to this revenue base. If driven off-grid by disproportionately-applied regulation, the burden will fall on remaining consumers – a transfer measured in the tens to hundreds of millions of dollars over asset lives, and contrary to the National Electricity Objective (NEO).

Improved coordination among market bodies and jurisdictions

Celero and GPE are supportive of the Commission's Draft Determination process and the opportunity to engage through consultation, to develop an approach that works for Australia's evolving energy sector. We encourage all market bodies to work together and support the Commission's process – including the Rule-change proponent, AEMO, which released the *Large Inverter Based Load (IBL) Interim Guideline* prior to the finalisation of this Rule.

We encourage all market bodies to let the Rule-change process run its course to enable the Commission to genuinely incorporate stakeholder feedback from this round of consultation. Also important is a consistent approach across jurisdictions, in a way that respects the national regulatory framework.

Conclusion

As the Commission rightly points out, data centres are expected to invest billions of dollars into grid infrastructure and renewable energy generation, contributing to Australia's emissions reduction goals.

As such, there are structural economy-wide issues at play in which the NEM exists to serve the Australian economy and consumers. As Australia enters a period of profound economic change driven by artificial intelligence, data sovereignty and advanced manufacturing, the access standards framework must accommodate the operational realities of modern loads. With this in mind, and as laid out in this submission, we support design of a power system and regulatory framework that integrates and supports the flexible and dynamic nature of loads that will help drive Australia's economic future.

Celero and GPE thank the Commission for the opportunity to comment on the Draft Determination and Rule. To discuss this submission further, please contact Antara Mascarenhas, General Manager Policy, Global Power Energy.