Australian Energy Market Commission

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RULE

Rule determination

National Electricity Amendment (Improving the NEM access standards - Package 2) Rule 2026

Proponents

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12 November 2026

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About the AEMC

The AEMC reports to the energy ministers. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the energy ministers.

Acknowledgement of Country

The AEMC acknowledges and shows respect for the Traditional Custodians of the many different lands across Australia on which we live and work. The AEMC office is located on the land of the Gadigal people of the Eora nation. We pay respect to all Elders past and present, and to the enduring connection of Aboriginal and Torres Strait Islander peoples to Country.



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Summary

1 The Commission has made a more preferable final rule (the 'final rule') to improve the National Electricity Market (NEM) technical access standards framework so that it appropriately addresses the technical characteristics and system security impacts of inverter based loads (IBLs). These changes are made in response to three rule change requests submitted by the Australian Energy Market Operator (AEMO) and Rod Hughes Consulting.[1]

2 The NEM is experiencing significant growth in the connection of large IBLs, particularly data centres. This is driven by the expansion of cloud computing, artificial intelligence (AI), and other digital services. Based on AEMO's Electricity Statement of Opportunities (ESOO), data centre electricity consumption is projected to increase around sevenfold over the next decade, from approximately 5 TWh currently to around 34 TWh, increasing operational demand from around 3 per cent to approximately 13 per cent.[2]

3 The Commission recognises that data centre growth can deliver significant economic benefits, including supporting Australia's digital sovereignty, attracting high-value investment, enabling innovation and strengthening Australia's participation in the global digital economy.[3] Large data centre connections can also contribute to power system security where appropriate technical capabilities, operational visibility and flexibility are incorporated into their connection and operation.[4]

4 At the same time, the scale and characteristics of growing data centre demand present new challenges for power system security. These challenges reinforce the importance of ensuring that large data centres are connected and operated in ways that support the secure and reliable operation of the power system as demand grows.

5 Large data centres are predominantly connected using inverter-based technology, similar to that used for batteries, wind and solar generation. Unlike traditional, relatively passive loads, these power electronic systems can respond rapidly to changes in power system conditions and, depending on their control systems and the strength of the surrounding network, can interact dynamically with the power system during disturbances.[5]

6 These interactions can reduce the power system's ability to maintain stable operation following disturbances, especially when many IBLs are concentrated in the same area. In some circumstances, adverse interactions between IBL controls and power system conditions can contribute to the propagation or escalation of power system disturbances, increasing the risk of widespread or cascading IBL disconnections, resulting in significant load loss from the grid. The potential consequences include supply disruptions for other customers and, in severe cases, a major system disruption or a black system event.

7 We have already seen international examples of major disruption caused by data centres in jurisdictions such as Ireland, Virginia, and Texas, with some jurisdictions going so far as to impose moratoriums on new data centre development.[6]

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1 The Commission formally consolidated the rule change requests, as it is desirable to treat them as one request for the purposes of Part 7 of the National Electricity Law (NEL).

2 AEMO, 2026 Electricity Statement of Opportunities for the National Electricity Market, August 2026.

3 See Department of Industry, Science and Resources, National AI Plan, 2 December 2024.

4 See AEMC, Data centre advice to the Energy and Climate Change Ministerial Council (ECMC), 28 July 2026.

5 See AEMC, *Improving the NEM access standards - Package 2*, 12 March 2026, Chapter 2, for a detailed analysis on the power electronics commonly used by IBLs and how they tend to interact with the grid.

6 For example, on 14 July 2026, New York state enacted a temporary moratorium on new large scale data centres - see Executive Order No. 62. In 2021, Ireland placed a three-year moratorium on new data centre developments. See Commission for Regulation of Utilities, Large Energy Users connection policy, Proposed Decision Paper CRU/202504, February 2025.

8 These risks were not fully contemplated when the technical access standards in the National Electricity Rules (NER) were developed for a power system dominated by synchronous generation and relatively passive load. A fit-for-purpose access standards framework is fundamental to power system security and reliability, as it establishes the technical capabilities that connecting plant must have to operate safely and reliably within the power system, without adversely affecting other connected plant. Yet, the existing framework does not clearly distinguish between small or passive loads and large, power-electronic-controlled IBLs that may have material implications for power system security.

9 As the number and scale of large IBL connections have increased, industry understanding of their technical characteristics and potential impacts on the power system has also evolved. In considering the rule change requests, the Commission worked closely with AEMO, the Australian Energy Regulator (AER) and industry stakeholders to understand these emerging risks and how the access standards framework could proactively address them.

10 In response, the Commission has made a more preferable final rule that better meets the National Electricity Objective (NEO) by establishing a clearer and more comprehensive framework for large IBLs and other connections. The final rule establishes a clear and predictable framework for large IBLs connecting to the NEM, including new technical standards for disturbance ride-through and instability monitoring. These requirements are designed to strengthen the ability of large IBLs to remain connected and operate appropriately during system disturbances, reducing the risk of significant load loss from the grid and the potential impacts on system security.

11 Managing the risks associated with the scale and pace of large IBL connections will support their efficient integration into the power system, helping to realise the benefits these loads can provide — including the economic and digital benefits associated with data centres — while protecting the long-term interests of all electricity consumers.

12 The final rule was developed in close collaboration with stakeholders to deliver proportionate technical requirements and greater certainty for those connecting to the NEM. Drawing on stakeholder expertise and experience has helped the Commission develop a framework that supports investment in the NEM while maintaining appropriate technical requirements for power system security and reliability.

13 Stakeholder feedback has also informed simplifications and refinements made from the draft rule to the final rule. The key refinements are to the framework for classifying large IBLs, a strengthened emphasis on proportionate modelling requirements for demonstrating compliance with access standards, and the parameters of the new voltage disturbance ride-through requirements. For example, the final rule simplifies the classification framework by reducing the number of tiers that apply to IBLs, providing greater clarity and consistency for connection applicants and network service providers (NSPs). This is described in detail throughout this determination, including how stakeholder feedback has been addressed, and why the refinements to the final rule deliver practical benefits that better promote the NEO.

The final rule lays the foundation for the secure connection and operation of large IBLs and other connections

14 The access standards in Schedules 5.2, 5.3, and 5.3a of Chapter 5 of the NER establish the technical performance requirements that connection applicants must meet to connect to the power system. They play an important role in ensuring new connections operate reliably and do not adversely affect voltage, frequency or broader power system security. The process for determining how connection applicants will meet these standards, in consultation with NSPs and

AEMO, needs to be clear and predictable to support timely and efficient connections.

15 Ensuring this framework remains fit-for-purpose has become increasingly important as the generation and load mix evolves, particularly as more connections use inverter-based technology that can interact dynamically with the power system and other connected plant.

16 Accordingly, the Commission's final rule:

- **Establishes a clear framework for classifying large IBLs:** The final rule defines a large IBL as an IBL with a combined nameplate rating of 30 MW or more. This provides a clear and consistent threshold for determining automatic application of the Schedule 5.3 access standards to large IBLs, which are more likely to materially impact the power system. AEMO's data on the current data centre connection queue indicates that approximately 91 per cent of data centres seeking connection in the NEM, excluding Queensland, have a proposed capacity above 30 MW. This indicates that the threshold will appropriately capture most of the large IBL projects currently seeking connection. The threshold is complemented by proportionate modelling, testing and compliance requirements to account for the potential local and broader system impact of the connection. The Commission is also providing greater clarity on the application of Schedule 5.3 through an industry fact sheet published alongside this final determination. The fact sheet explains how loads are classified and which access standards apply, supporting a more consistent understanding of the framework among connecting applicants and NSPs and providing greater transparency and certainty for investment and connection decisions.
- **Harmonises the classification framework for distribution and transmission connected IBLs:** Consistent treatment across networks ensures that the broader system impacts of large IBLs are considered in the long-term interests of power system security, as increasing numbers connect to and cluster on distribution networks.
- **Introduces new disturbance ride-through access standards for large IBLs:** These standards require large IBLs to remain connected through specified voltage and frequency disturbances and to meet specified performance requirements following those disturbances. Connecting loads must also provide information about their ride-through capability at the NSP's request. These requirements address an emerging system security risk associated with the rapid disconnection of large IBLs, which can exacerbate power system disturbances and contribute to cascading disconnection, major supply disruption or, in extreme circumstances, black system events. The standards have been calibrated having regard to technical feasibility, proportionality and international developments.
- **Requires the potential aggregate impact of IBL connections to be assessed:** The final rule requires NSPs to consider IBLs collectively where their electrical configuration, proposed connection arrangements and intended operation indicate that they should reasonably be assessed together. This enables NSPs to assess the combined response of electrically proximate IBLs to disturbances and other system conditions, including whether their cumulative behaviour could materially affect system stability. This is particularly important where multiple IBLs may respond concurrently to the same disturbance and where their aggregate impact may not be apparent from assessing each connection individually.
- **Clarifies the disturbance ride-through access standard for Schedule 5.2 plant (generating systems, integrated resource systems and synchronous condensers):** The final rule defines the scope of credible contingency event to be the events used by the NSP for its network planning,[7] excluding any non-credible events that may be reclassified as credible. This change

7 As defined in NER clause S5.1.2.1.

improves transparency and predictability to support system security and an efficient connections process.

- **Introduces a new instability monitoring access standard for large IBLs:** The final rule requires large IBLs to detect and respond to specific forms of instability, thereby strengthening the power system's ability to manage emerging risks arising from interactions between power electronic devices and the power system.
- **Requires AEMO to develop and maintain modelling guidelines for Schedule 5.3 plant**: The final rule requires AEMO to publish guidelines for loads, filling the current gap in detailed guidance to support load connections. The final rule establishes six principles for AEMO to comply with when developing modelling guidance for loads — proportionality and scalability, materiality, consistency, practicability, efficiency and transparency — to ensure that modelling requirements are proportionate to potential system impacts, practicable and focused on the information necessary to assess compliance, while providing AEMO with flexibility to develop detailed requirements as modelling capability evolves.
- **Strengthens ongoing compliance arrangements for non-registered Schedule 5 Participants:** The final rule requires these participants to commit to ongoing compliance with their performance standards, with that commitment to be recorded in the connection agreement. Non-registered Schedule 5 Participants may use the Reliability Panel's *Template for Compliance Programs* as a means of supporting their compliance arrangements.
- **Provides clarity for Uninterruptible Power Supply (UPS) and protection systems:** The final rule clarifies that uninterruptible power supply UPS systems, commonly used by data centres, should be assessed under Schedule 5.3 of the NER. The final rule does this by ensuring UPS systems are not inappropriately captured by the definition of '*bidirectional units*' of the NER, which would require assessment under Schedule 5.2 of the NER.[8] The final rule also introduces new definitions for 'primary protection system' and 'back-up protection system', to reduce the potential for misinterpretation.[9]
- **Makes targeted improvements to other Schedule 5 access standards:** The final rule provides loads the option to carry out under-frequency load shedding by way of fast ramp down. It makes targeted improvements to the system strength framework by allowing high voltage direct current networks (HVDC links) to procure system strength services from third parties and including flexibility in the short circuit ratio (SCR) withstand access standard applicable to IBLs. The final rule also enables all Schedule 5 Participants (not just Registered Participants) to request testing of Schedule 5 plant, regardless of registration status.
- **Strengthens the framework for future review and development of access standards:** The final rule allows AEMO to extend the timeframe for future access standards reviews by up to three months when there are matters of material complexity or a material change in circumstances. AEMO must provide advance notice of the extension and explain the matters giving rise to it and how they will be addressed, including through stakeholder engagement. This will allow sufficient time for robust technical analysis and consultation while maintaining transparency and accountability.

8 NER Chapter 10, Glossary definition of '*bidirectional unit*'.

9 This is in response to the *New definitions for protection systems* rule change request submitted by Rod Hughes Consulting. We note that the Commission has made no rule for the *Conditions for generator protection systems* rule change request, submitted by Rod Hughes Consulting. Details on this decision are in chapter 6 of this determination.

The final rule comes into effect immediately, with a 6-month grace period for advanced connection applications

17 The final rule commenced on the date of publication, being 12 November 2026.

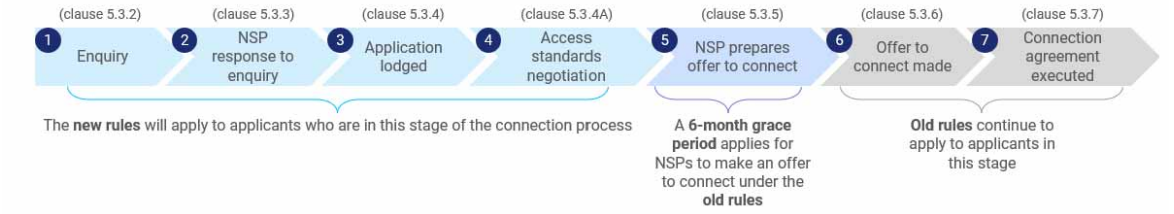
18 A six-month grace period applies to connection applicants who have already applied to connect and whose application has progressed to the stage where the NSP is preparing the offer to connect under clause 5.3.5 of the NER. Linking the grace period to this stage, rather than the earlier stages for lodging a connection enquiry (clause 5.3.2) or connection application (clause 5.3.4), provides certainty for applicants who are well advanced in negotiations, while avoiding incentives to submit premature or incomplete applications to access the savings arrangements. If an offer to connect is not made before the expiry of the 6-month grace period, the new access standards will apply to that connection application. See Figure 1 that provides an overview of the implementation arrangements for the final rule.

19 This approach recognises that some applicants are close to finalising negotiations as at the commencement date of the final rule. Allowing these applicants to continue under the existing access standards for a further six months minimises disruption to advanced connection applications, while ensuring that new and less developed applications are subject to the final rule from commencement. It therefore balances the need to strengthen system security with the practical implementation burden for connection applicants and NSPs.

20 If an applicant has received an offer to connect from an NSP, the old rules will continue to apply to applications in this stage of the connection process. This recognises that an offer to connect must be capable of acceptance by the connection applicant.[10]

21 For more information about the implementation arrangements for the final rule, see chapter 9 of this final determination.

Figure 1: Implementation arrangements for the final rule



The final rule will contribute to achieving the National Electricity Objective

22 The Commission assessed how the final rule contributes to the NEO[11] against three assessment criteria. In doing so, we considered the issues raised in the rule change requests and stakeholder feedback.

23 The more preferable final rule will contribute to achieving the NEO in the following ways:

- **Safety, security and reliability:** The final rule will promote the safe, secure and reliable operation of the power system by strengthening the technical requirements that apply to plant connecting to the NEM. A fit-for-purpose access standards framework is fundamental to

10 NER clause 5.3.6(b).

11 Section 7 of the NEL.

maintaining power system security and reliability, as it establishes the technical capabilities that connecting plant must have to operate reliably within the power system and to avoid adversely affecting other connected plant. This is increasingly important as the generation and load mix evolves and more connections use inverter-based technology, which can interact with the power system and with other inverter-based plant in ways that can adversely affect system security. The final rule will address identified gaps in the existing framework by establishing new and improved technical requirements for IBLs, clarifying the process for applying technical requirements, and improving modelling and compliance arrangements. These reforms will reduce the risk that new connections contribute to system security risks and support a more resilient power system throughout the energy transition.

- **Innovation and flexibility:** The final rule will promote innovation and flexibility by improving the access standards framework while retaining appropriate flexibility for connection applicants, NSPs and AEMO to develop solutions suited to individual connection circumstances. The reforms will provide greater clarity and consistency where standardised requirements are appropriate, while allowing technical requirements to be tailored where necessary to address system security risks. This approach will support efficient connection outcomes and allow the framework to adapt as technologies, connection types and power system conditions evolve.
- **Implementation considerations:** The final rule takes a practical and proportionate approach to implementation, having regard to the timing and sequencing of the reforms, their interaction with other regulatory processes, and the impacts on industry and consumers. The Commission has considered the costs and complexity of implementing the reforms, including ongoing regulatory and administrative costs for market bodies, participants and consumers. The final rule also provides greater clarity about the roles and responsibilities of market bodies and participants, supporting efficient investment and operational decisions while improving transparency and predictability. Transitional arrangements will support an orderly implementation of the reforms and reduce unnecessary disruption for connection projects already progressing through the connection process.

24 For more information, see chapter 2 of this final determination.

This rule change sits within a broader data centre reform program

25 The Commission acknowledges that the reforms in this rule change are part of a broader program of reforms responding to the implications of rapidly increasing electricity demand from data centres. That program spans renewable and firming energy obligations, grid connection and technical standards, network cost recovery and operational visibility, and planning and environmental frameworks. Together, these reforms seek to support the efficient connection and secure operation of large data centres, while ensuring that the costs of associated infrastructure are appropriately allocated, and emerging demand is visible to AEMO and network businesses.[12] Jurisdictions across Australia are also contemplating and addressing the broader impacts of data centres on energy, infrastructure, land, water and communities, to ensure that they are appropriately managed.

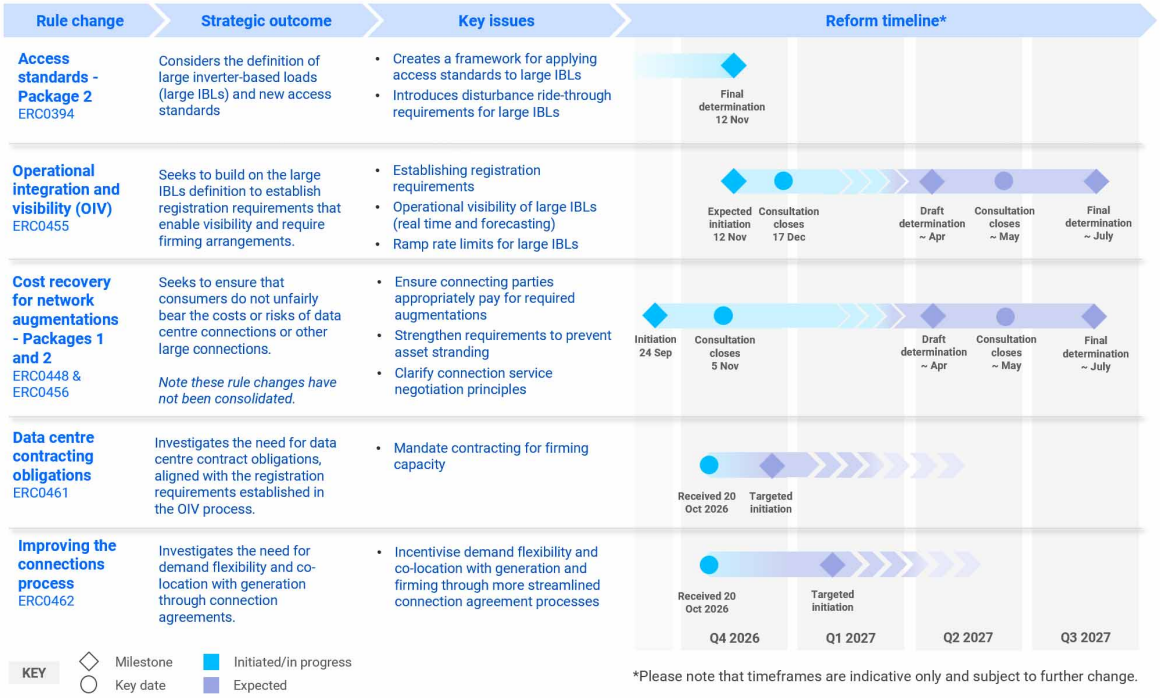
26 Figure 2 below provides an overview of the Commission's work program as it applies to data centres. The Commission notes that, alongside this final determination, it has also published a consultation paper on 12 November 2026 for the *Operational integration and visibility of large inverter based loads* rule change.[13] The consultation paper considers the need for enhanced

12 For more information, see the ECMC's website.

13 See our website for more information about the *Operational integration and visibility of large inverter based loads* rule change.

operational and long-term visibility of large IBLs in the system. The paper is seeking stakeholder feedback on proposed policy solutions that build on the reforms made in this final rule, including new registration requirements for large IBLs, as well as access standards for real-time communications and monitoring, and the rate of change of active power.

Figure 2: AEMC Data Centre Work Program



Source: AEMC.

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1 The Commission has made a final determination

Box 1: Summary of this chapter

This final determination is to make a more preferable final rule (also referred to as the final rule) in response to three consolidated rule change requests from the Australian Energy Market Operator (AEMO) and Rod Hughes Consulting to improve the technical access standards in the National Electricity Rules (NER) for connection to the National Electricity Market (NEM). The final rule improves the technical access standard requirements for loads and other plant types connecting to the NEM, as set out in Chapter 5 of the NER and its accompanying schedules. It also makes a series of corresponding changes to Chapter 10 of the NER (the Glossary) and consequential changes to a number of clauses throughout the NER.

The final rule is intended to strengthen power system security while supporting efficient investment and proportionate connection requirements. It includes a framework for classifying inverter based loads (IBLs), new disturbance ride-through requirements for large IBLs, and targeted changes to system strength, testing and compliance arrangements and requirements applying to other plant types.

At a high level, this chapter explains the need for reform, the origins and scope of the rule change, how consultation informed the final rule, how the final rule differs from the draft rule, how it relates to other reforms, and how it will be implemented. This is covered in greater detail throughout the remaining chapters of this final determination.

In this chapter:

- Section 1.1 explains how the final rule strengthens the NEM access standards to support power system security and efficient investment.
- Section 1.2 outlines how the final rule responds to AEMO's technical review and three consolidated rule change requests.
- Section 1.3 details how consultation informed the development of the final rule.
- Section 1.4 details how the final rule complements broader reforms affecting large loads and data centres.
- Section 1.5 explains that the Commission has published an industry fact sheet on the application of Schedule 5.3 access standards to different load types to support implementation.

1.1 The final rule strengthens the NEM access standards to support power system security and efficient investment

The Commission has made a final rule to improve the technical access standards applying to plant connecting to the NEM, including loads, generators, integrated resource systems, and high voltage direct current networks (HVDC links). The final rule responds to changes in the technologies connecting to the power system and the rapid growth in the scale and complexity of electricity demand, particularly from large IBLs, including data centres.

The Commission acknowledges that data centres present a significant economic opportunity for Australia. The expansion of cloud computing, artificial intelligence (AI) and other digital services is driving demand for data centre infrastructure. This growth can support Australia's digital

sovereignty, attract high-value investment, enable innovation and strengthen Australia's participation in the global digital economy.[14]

Realising these benefits will require a connection framework that can accommodate new sources of demand efficiently, while ensuring that their connection and operation support the secure and reliable functioning of the broader power system.

The technical characteristics of large data centres present challenges that the existing access standards framework was not designed to address fully. Large data centres commonly use inverter-based technology in their power supply and uninterruptible power supply (UPS) systems. Similar power electronic technology is used in batteries and renewable generation. Unlike traditional, relatively passive loads, inverter-based plant can respond rapidly to changes in power system conditions, and its behaviour can depend on the control systems used and the strength of the surrounding network. These characteristics can create complex interactions between connected plant, particularly where multiple large IBLs are concentrated in the same area.[15]

In some circumstances, these interactions could affect the power system's ability to maintain stable operation following a disturbance. If large IBLs disconnect rapidly or respond adversely to changing system conditions, the resulting loss of demand can exacerbate a disturbance and contribute to further disconnections. Where multiple connections respond similarly, the combined effect may be significant, potentially affecting supply to other customers and, in extreme circumstances, contributing to a major power system disruption. These risks reinforce the need for connection requirements that account for the technical characteristics and potential aggregate impacts of large IBLs, rather than treating each connection as an isolated addition to demand. While there has not been a significant known system security incident from large loads in the NEM, we have observed several incidents in international jurisdictions that we can learn from as detailed below.

Box 2: International experience highlights the importance of disturbance ride-through standards for large loads

Virginia, United States - PJM

- **10 July 2024:** A lightning-related fault on a 230 kV transmission line and subsequent reclosing attempts were associated with approximately **1,500 MW** of data centre load loss, affecting around 60 data centres. Operators observed a significant voltage rise and responded by disconnecting capacitor banks in the local area.
- **17 February 2025:** A further large load-transfer event occurred in the Dominion Energy service area, Virginia. PJM subsequently described the February 2025 and July 2024 events as each involving approximately **1,500 MW** of sudden load transfer. Some secondary sources report different figures, so the PJM figure is the preferable basis for this determination.
- **22 July 2026:** A fault on a 230 kV transmission line triggered two waves of load loss, totalling approximately **3,800 MW**. The initial transfer of around 2,970 MW contributed to high voltage conditions, followed by a further 1,099 MW transfer. System frequency and voltage deviated,

14 The scale of this growth is substantial. AEMO's 2026 Electricity Statement of Opportunities projects that, under the Step Change scenario, data centre electricity consumption in the NEM will increase around sevenfold over the next decade, from approximately 5 TWh to around 34 TWh. This would increase data centres' share of operational demand from around 3 per cent to approximately 13 per cent.

15 For more analysis on the technical characteristics of IBLs, see AEMC, *Improving the NEM access standards - Package 2*, draft determination, chapter 2. See also section 3.1.1 of this final determination.

requiring operator intervention. PJM reported that its balancing control limit recovered within nine minutes and that the data centres returned to grid supply within 30 minutes.

- These events demonstrate that protective controls designed to protect sensitive data centre equipment can disconnect substantial amounts of demand during credible network disturbances. The aggregate loss of load can create a secondary system disturbance, even when the initiating transmission fault is cleared successfully. PJM has explicitly identified the need to consider ride-through standards and other interconnection requirements for large computational loads.

Ireland - EirGrid

- **7 January 2022:** A fault on the Killonan–Kilpaddoge 220 kV circuit in the Limerick area was associated with a **74 MW** reduction in data centre demand, approximately 16 per cent of the relevant demand.
- **13 December 2022:** A fault on the Kellystown–Woodland 220 kV circuit in Dublin was associated with a **204 MW** reduction, approximately 34 per cent of data centre demand.
- **26 January 2025:** A fault associated with a Poolbeg 220 kV reactor was followed by a **321 MW** reduction in data centre demand, approximately 44 per cent of the relevant demand.
- **8 May 2025:** A fault on the North Wall–Poolbeg 220 kV circuit was associated with a **387 MW** reduction, approximately 52 per cent of data centre demand.
- **6 June 2026:** A further Poolbeg 220 kV reactor-related disturbance was associated with a **480 MW** reduction, approximately 52 per cent of data centre demand. This is the largest of the Irish events in the identified record.

Texas, United States - ERCOT/FERC

- ERCOT has recorded repeated disturbances involving large power-electronic loads, principally cryptocurrency mining facilities rather than conventional data centres. Its November 2024 presentation identified **19 events since November 2023** in three areas of Texas, involving load reductions greater than 100 MW. Later NERC material reported **25 events through January 2025**.

What does this mean for the NEM?

These events demonstrate that protective controls designed to protect sensitive data centre equipment can disconnect substantial amounts of demand during network disturbances. The aggregate loss of load can create a secondary system disturbance, even when the initiating transmission fault is cleared successfully.

As large IBLs become more prevalent in the NEM, minimum disturbance ride-through requirements can help ensure that they remain connected during specified voltage and frequency disturbances, rather than disconnecting unnecessarily and compounding the effects of an initiating event. Such requirements support a more predictable response from large loads and help maintain power system security and reliability.

The incidents also illustrates the importance of assessing the potential aggregate impact of multiple large loads. Individual facilities may respond to a common disturbance in similar ways, resulting in a substantial and rapid change in demand. Connection requirements should therefore support both appropriate performance by individual loads and consideration of their combined impact on the power system.

Source: PJM, Dominion Review Large Load Transfer Event, website; PJM, Dominion Load Transfer Event, 22 July 2026, website; Commission for Regulation of Utilities (CRU), Grid Code Modification MPID 345 and Compliance and Derogation Framework, Request for further representations, 8 July 2026, website; NERC, Incident Review Considering Simultaneous Voltage-Sensitive Load Reductions, 8 January 2025, website; NERC, Characteristics and Risks of Emerging Large Loads, Large Loads Task Force White Paper, July 2025, website.

The existing technical access standards were developed in a power system with a different mix of generation technologies and relatively passive loads. As the generation and load mix evolves, the framework must keep pace with the capabilities and potential impacts of new connecting plant. A fit-for-purpose framework is fundamental to power system security and reliability. It establishes the technical performance that connecting plant must demonstrate, while providing a clear and predictable basis for connection decisions. Without appropriate requirements, the growth of large IBLs could introduce risks that are not adequately addressed through the existing connection process.

The Commission considers that these challenges can be addressed while supporting the efficient connection of new demand. Clear, proportionate and technically achievable access standards can provide greater certainty for connection applicants and network service providers (NSPs), support efficient investment and help ensure that new connections are compatible with the needs of the broader power system. Large data centres may also be capable of contributing positively to system security where appropriate technical capabilities, operational visibility and flexibility are incorporated into their connection and operation.

The final rule therefore strengthens the framework for connecting large IBLs and other plant to the NEM. It establishes a clearer classification framework for large IBLs regardless of whether they are connecting to the transmission or distribution network, introduces new disturbance ride-through access standards and instability monitoring requirements, and strengthens arrangements for assessing the aggregate impacts of connections. It also provides for proportionate modelling requirements to support the demonstration of compliance, alongside targeted improvements to system strength, testing, commissioning and other technical requirements.

These reforms have been developed with stakeholder input and are designed to balance the need for robust technical requirements with practical considerations, including technical feasibility, modelling capability and the costs of compliance. By improving the framework through which large loads connect and operate, the Commission seeks to support the secure integration of growing electricity demand, enable the economic and digital benefits associated with data centres, and protect the long-term interests of all electricity consumers.

Box 3: Access standards play an increasingly important role in the NEM

To establish a new connection under Chapter 5 of the NER (following the process in rule 5.3 or 5.3A), a connection applicant and the connecting NSP must agree on a set of performance standards for the connecting plant within the parameters set by the access standards in the applicable schedule (Schedules 5.2, 5.3 or 5.3a). Each access standard relates to a technical requirement for the performance of the connecting plant, regarding its impact on the broader power system. Most (but not all) access standards have two components:

- Automatic access standard (AAS) — a connection application cannot be refused if it meets this standard.
- Minimum access standard (MAS) — a connection application must be refused if the plant does not meet this.

The applicant may negotiate a negotiated access standard (NAS) below the AAS, provided it meets the minimum access standard (MAS).

This format with a permissible range of access standards was established after a 2001 review by the then National Electricity Code Administrator (NECA), which found that mandatory fixed access standards were inefficient. NECA noted that the cost of meeting those standards will vary dramatically for different types of plants. Some could significantly overachieve against a

mandatory standard at low cost, while others may only be able to achieve that standard at prohibitive costs. In addition, the need for plant to meet a mandatory level of technical performance was likely to vary between different locations within the NEM. In light of this, NECA introduced flexibility in access standards by specifying a negotiating range, subject to a mandated minimum.

Once the proposed access standards are agreed upon (with AEMO approval where required), they become the performance standards for the relevant plant and are included in the binding connection agreement between the connection applicant and the NSP. Where applicants are (or will be) registered participants, the performance standards must be registered with AEMO, and an ongoing compliance regime will apply under rule 4.15. This format of access standards has largely been preserved since this time.

1.2 The final rule responds to AEMO's technical review and three consolidated rule change requests

On 8 May 2025, the Commission initiated the *Improving the NEM access standards - Package 2* rule change in response to three consolidated rule change requests:

- AEMO: *Improving the NEM access standards – Package 2*.
- Rod Hughes Consulting: *Definitions of protection system requirements*.
- Rod Hughes Consulting: *Conditions for generator protection systems*.

The Commission consolidated the rule change requests from Rod Hughes Consulting (listed above) with AEMO's Package 2 rule change request because they are substantially related and can be considered more efficiently together. This has allowed stakeholders to engage with the three rule change requests via one process.

1.2.1 AEMO conducted a review of the NEM access standards

Pursuant to the NER, at least once every five years, AEMO must review some or all of the technical requirements (access standards) set out in schedules 5.2, 5.3, and 5.3a of the NER to assess whether they should be amended.[16] Each of those NER schedules that set out technical requirements applies to different connecting parties as follows:

- Schedule 5.2 — sets out technical connection requirements for generating systems, integrated resource systems, and synchronous condensers.
- Schedule 5.3 — sets out technical connection requirements for loads, which includes IBLs and non-IBLs.
- Schedule 5.3a — sets out technical connection requirements for high voltage direct current networks.

When conducting the reviews, AEMO must have regard to:[17]

- the national electricity objective (NEO)
- the need to achieve and maintain power system security
- changes in power system conditions
- changes in technology and capabilities of facilities and plant.

16 NER clause 5.2.6A. For more detail on the requirement for AEMO to review the technical requirements, see chapter 1, section 1.1 of the draft determination.

17 NER clause 5.2.6A(a)(1)-(4).

In December 2023, AEMO completed its first review of the technical requirements for connecting to the NEM and identified numerous opportunities to improve the NER access standards and their application. AEMO then submitted two rule change requests to the Australian Energy Market Commission (AEMC or Commission) in April 2024 to give effect to the final recommendations from the Access Standards Review.

- **Improving the NEM access standards — Request for a fast-tracked rule (Package 1 rule change)** — The Commission has completed AEMO's Package 1 rule change separately through our fast-track rule change process as AEMO had undertaken extensive public consultation on these measures. The final determination and final rule were published on 22 May 2025.[18] This modernised and clarified the technical performance standards that generators and other connecting plant must meet when connecting to the NEM, to support a more efficient connections process while maintaining system security.
- **Improving the NEM access standards — Request for a standard rule (Package 2 rule change)** — This final rule determination relates to AEMO's second request for changes to the NEM access standards, focusing on large loads. AEMO suggested that this be considered through the standard rule change process as the issues would benefit from additional consultation by the AEMC. An overview of AEMO's Package 2 rule change request is set out below.

1.2.2 Overview of AEMO's rule change request

AEMO's rule change request proposed a targeted set of amendments to the NER to address issues identified through its review of technical requirements for connection that required further consultation. The proposed reforms focused primarily on improving the technical requirements for large loads, alongside targeted amendments relating to HVDC links, generators and integrated resource systems, and a number of procedural changes.

The reforms were intended to improve power system security and resilience, support efficient investment and reduce unnecessary connection costs. In summary, AEMO's request proposed:[19]

- Five targeted changes, primarily to Schedule 5.3 of the NER, to better account for the power system impacts and capabilities of large loads, including data centres and hydrogen production facilities. This included:
  - Recording ride-through capability: Allow NSPs, in consultation with AEMO, to request information about a new load's ability to remain connected during power system disturbances and, where appropriate, require that capability to be recorded in its performance standards.
  - Protection systems and settings: Require NSPs and connecting participants to cooperate on protection system design and settings to maximise a load's ability to remain connected during disturbances, subject to safety, technical capability and good electricity industry practice.
  - Instability monitoring and prevention: Introduce access standards for monitoring and responding to instability for large IBLs where AEMO or the NSP considers that the load could contribute to instability. The proposed requirements would include relevant monitoring, communications and response capabilities, with thresholds to limit the minimum requirements where the potential impact is small.

18 AEMC, *Improving the NEM access standards - Package 1*, Final rule determination, 22 May 2025.
19 AEMO, Overview of rule change proposals to improve NEM access standards, April 2024.

    - Emergency under-frequency load shedding: Allow eligible loads to meet interruptible load requirements through rapid reductions in demand, as an alternative to relying solely on disconnection of load blocks. Disconnection capability would still be required.
    - Minimum short circuit ratio (SCR): Limit the existing SCR requirement to large IBLs, as defined by the System Strength Impact Assessment Guidelines, and allow AEMO and the NSP to agree on a higher minimum SCR than 3.0 where warranted by local system conditions and the load's technical requirements.
- Clarifying and limiting the scope of credible contingency events that generators and integrated resource systems must ride through under the automatic and minimum access standards.
- Allowing HVDC link owners and operators to procure system strength services from a third party where the link could not meet the applicable system strength requirements itself. This would provide an alternative to relying solely on other connection solutions, potentially reducing connection costs and delays.
- Extend testing and commissioning requirements under Chapter 5 of the NER to non-registered Schedule 5 participants, including extending rights to request testing and requiring compliance with relevant testing requests. The amendments would also extend AEMO's ability to request testing against performance standards relating to AEMO advisory matters, without extending the formal compliance testing program to non-registered participants.
- Amending clause 5.2.6A of the NER to allow AEMO to extend the 12-month timeframe for a future access standards review where the complexity or difficulty of the matters, or a material change in circumstances, made the existing timeframe insufficient. AEMO would need to publish a notice explaining the reasons for the extension.

Overall, the rule change request focused on targeted improvements to load connection requirements, greater flexibility for HVDC links to meet system strength requirements, and extending testing and commissioning requirements to non-registered participants. It also proposed greater flexibility in the timeframes for future access standards reviews. AEMO presented the load related reforms as initial measures, with more detailed technical requirements expected to follow further review and consultation by AEMO.

1.2.3 Overview of Rod Hughes Consulting's rule change requests

The Commission received two rule change requests from Rod Hughes Consulting that sought to clarify aspects of the NER relating to protection systems and their application to connecting plant.[20]

Definitions of protection system requirements

Rod Hughes Consulting proposed introducing and updating definitions in the NER to clarify the requirements for different types of protection systems, including primary, back-up and breaker fail protection systems. The request sought to address uncertainty about the distinction between these systems and the level of redundancy required, which the proponent considered could lead to inconsistent interpretations of the Rules, delays in connection negotiations and unnecessary connection costs.

20 Rod Hughes Consulting, *Conditions for generator protection systems*, rule change request, 10 January 2023; Rod Hughes Consulting, *Definitions of protection system requirements*, rule change request, 21 December 2022.

Conditions for generator protection systems

Rod Hughes Consulting proposed amending clause S5.2.5.9 of the NER to address an apparent drafting inconsistency in the automatic access standard for generator protection systems. The request sought to remove paragraph (b) of that clause, which the proponent considered redundant, and clarify that AEMO and the relevant NSP may require additional protection system redundancy under the minimum access standard where necessary to maintain power system security.

1.3 Consultation informed the development of the final rule

The Commission's final rule has been informed by collaborative stakeholder consultation, including with the market bodies, NSPs, large load customers, original equipment manufacturers (OEMs) and generators. While building on AEMO's original rule change request, the Commission developed a more comprehensive framework to address the potential system security impacts of large IBLs, including through clearer classification and access standard requirements, new disturbance ride-through standards, improved modelling guidance and assessment of the cumulative impacts of clustered connections.

Many stakeholder submissions expressed support for the Commission's policy direction throughout this rule change request. Stakeholders also proposed specific refinements to the draft rule, which the Commission has addressed for this final rule to provide greater certainty and consistency for connection applicants and NSPs, while ensuring requirements remain proportionate to the characteristics and potential impacts of connecting plant. The following sections discuss at a high level the key issues raised by stakeholders, the Commission's response and the resulting changes in the final rule.[21]

The Commission thanks our stakeholders for their eager engagement with this rule change process.

1.3.1 The draft rule was informed by stakeholder collaboration to address the impact of large IBLs

On 8 May 2025, the Commission initiated this rule change and published a consultation paper. We received 29 submissions in response to this consultation paper from a range of stakeholders across industry, including the market bodies, industry bodies, NSPs, and load operators, including data centres.[22]

A consistent theme across submissions was the need to improve the regulatory framework for applying technical access standards under Chapter 5 of the NER. Stakeholders also encouraged the Commission to work with industry to develop disturbance ride-through access standards for IBLs as part of the draft rule.

To support this work, the Commission established a technical working group (TWG), comprising more than 50 representatives from NSPs, market bodies, data centre load and generator operators, industry bodies, OEMs and technical consulting firms. We conducted three sessions ahead of the draft determination to:[23]

- develop a shared understanding of the technical characteristics of loads, particularly IBLs, and how these characteristics can affect power system security
- consider options for defining and classifying large IBLs

21 See the remaining chapters of this final rule determination for more detail.

22 Stakeholder submissions to the consultation paper are available on our website.

23 Materials from these TWG sessions are available on our website.

- explore whether new ride-through access standards for IBLs could better achieve the objectives of the rule change
- consider load modelling capabilities and how compliance with applicable access standards could be reasonably achieved
- examine the challenges and opportunities presented by large IBLs, including regulatory improvements in comparable international jurisdictions, to support alignment where practicable and reduce technical and regulatory incompatibilities that could deter investment in large loads in the NEM.

The Commission received detailed technical feedback from TWG representatives throughout these sessions, which informed the draft determination and rule.

1.3.2 The draft rule went further than AEMO's proposed amendments

We published our draft determination and draft rule on 12 March 2026.

AEMO's rule change request provided an important starting point for addressing the potential impacts of large loads on power system security. However, as the Commission considered the issues and consulted with stakeholders ahead of the draft determination, our understanding of the technical characteristics of IBLs and their potential impacts on the power system continued to develop.

Large IBLs differ from traditional, relatively passive loads. Their power-electronic interfaces and control systems can influence how they respond to disturbances and interact with surrounding network conditions and other connected plant. The effects may depend on the technology used, the strength of the network at the connection point, the configuration of the load and the behaviour of other nearby IBLs. As more large IBLs connect to the NEM, including in clusters, their collective behaviour may have implications for power system security beyond the immediate connection point.

These considerations highlighted that targeted improvements to existing requirements would not, on their own, provide a sufficiently comprehensive or predictable framework for managing the potential impacts of large IBLs. The Commission therefore developed a more preferable draft rule that went beyond AEMO's original proposals in several important respects:

- **It established a more comprehensive framework for classifying large IBLs:** Rather than relying on the definition in AEMO's System Strength Impact Assessment Guidelines (SSIAG) to determine which loads would be subject to particular requirements, the draft rule proposed a clear classification framework in the NER, using a 30 MW threshold to identify large IBLs. The draft rule contained a tiered approach to the application of Schedule 5.3 access standards for IBLs connecting to distribution networks, taking account of the size and connection characteristics of different loads. The intent was for the Schedule 5.3 access to apply automatically for IBLs with a nameplate rating of 100 MW or greater.[24]
- **It introduced new disturbance ride-through access standards for large IBLs:** AEMO had proposed measures to improve the visibility of loads' existing ride-through capabilities and promote cooperation on protection systems and settings. The Commission, in collaboration with AEMO and interested stakeholders, went further by proposing explicit technical requirements for large IBLs to remain connected through specified voltage and frequency disturbances and meet specified performance requirements following those disturbances. This would shift the framework beyond recording and maximising existing capability towards

24 See AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, chapter 3.

establishing the capability that large IBLs need to demonstrate to support power system security.[25]

- **It proposed a more systematic approach to understanding and assessing IBL impacts:**The draft rule included a framework for AEMO to develop and maintain modelling guidance to support the assessment of plant against Schedule 5.3 access standards. This recognised that assessing the behaviour of IBLs can require different modelling approaches and levels of technical detail, depending on the characteristics and potential impact of the connection. The approach in the draft rule was intended to support proportionate and practicable modelling requirements while improving the ability of NSPs and AEMO to assess how individual and clustered IBLs may behave under different power system conditions.[26]
- **It sought to address the potential cumulative impacts of IBL connections:** The Commission recognised that assessing connections individually may not adequately capture the potential effects of multiple IBLs connecting in the same area. The draft rule therefore proposed requirements for NSPs to consider the potential aggregate impact of IBL connections, including clusters of loads, particularly with respect to small IBLs connected on a distribution network that can behave collectively like a large IBL.[27] The Commission notes that the draft rule only contemplated assessment against the disturbance ride through and instability monitoring access standards proposed in the draft rule.
- **It proposed requiring non-registered Schedule 5 Participants to make a commitment to ongoing compliance with performance standards:** The draft rule proposed requiring connection agreements with non-registered participants to include terms and conditions that provide reasonable assurance from the connection applicant of ongoing compliance with the performance standards, in a manner consistent with good electricity practice. This was in response to stakeholder feedback that here are improvements that could be made to ensure non-registered participants are appropriately encouraged to comply with the rules and their applicable performance standards.[28]

Taken together, these changes in the draft rule represented a shift from AEMO's targeted amendments towards a more comprehensive framework for managing the potential system security impacts of large IBLs. The draft rule sought to establish clearer and more predictable requirements for connecting applicants and NSPs, while recognising that IBLs vary in their technical characteristics and that their impacts depend on both the individual connection and the wider power system.

The Commission's approach was informed by continued collaboration with AEMO and industry, including through stakeholder submissions, TWG discussions and bilateral engagement. This process helped the Commission refine its understanding of the technical challenges, identify practical implementation considerations and develop reforms intended to be technically robust, proportionate and adaptable as the scale and composition of load connections in the NEM continue to evolve.

1.3.3 The final rule refines the draft rule in response to consultation and further analysis

The Commission received over 30 submissions from a range of stakeholders to its draft determination and rule. Those submissions raised helpful ways to refine the draft rule. As such, the Commission held a fourth TWG meeting ahead of the final determination to refine the

25 See AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, chapter 4.
26 See AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, chapter 3.
27 See AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, chapter 3.
28 See AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, chapter 3.

proposed framework for classifying IBLs and applying the Schedule 5.3 access standards, as well as the proposed disturbance ride through standards.[29]

After considering those submissions and undertaking further technical analysis, the Commission has made a more preferable final rule. In summary, the final rule retains the objective of applying technical access standards in a way that appropriately reflects the characteristics and potential impacts of connecting plant. It also refines aspects of the draft framework to respond to stakeholder feedback and the Commission's further consideration of how to balance proportionate connection requirements with the need to maintain power system security.

Key changes between the draft rule and the final rule include:

- **The Schedule 5.3 access standards will apply automatically to large IBLs:** The final rule establishes a clear 30 MW threshold for automatic application of Schedule 5.3 to large IBLs. This provides greater certainty for connection applicants and NSPs, reduces reliance on case-by-case discretion for larger loads and simplifies the tiered framework proposed in the draft rule, while retaining proportionate requirements for smaller IBLs.
- **The classification framework is harmonised for transmission and distribution large IBL connections:** The final rule applies a consistent 30 MW threshold across transmission and distribution networks. This recognises that the potential system security impacts of IBLs are not determined solely by their connection voltage and supports consistent treatment of technically similar connections.
- **NSPs are required to assess the aggregated impact of clustered or electrically proximate IBLs:**The final rule requires NSPs to consider the combined impact of one or more IBL connections where their electrical configuration, proposed connection arrangements and intended operation indicate they should reasonably be assessed together. The draft rule only proposed this approach for smaller IBLs less than 30 MW to capture clusters that may behave collectively as a large IBL, and only with respect to the disturbance ride through access standards. Now, the final rule allows NSPs to consider the full range of Schedule 5.3 access standards in carrying out an assessment on aggregated impacts.[30]This change recognises that concurrent responses from multiple IBLs, regardless of size, may affect system stability or increase the risk of widespread disconnection, even where individual connections appear manageable in isolation.
- **AEMO must publish Schedule 5.3 Participant Modelling Guidelines:** The final rule introduces clearer and more consistent requirements for modelling by including a requirement for AEMO to develop guidelines for Schedule 5.3 Participants. The guidelines must be developed in accordance with principles provided in the final rule. While this was not included in the draft rule determination, it responds to stakeholder feedback to that determination which called on the Commission to better enable proportionate, transparent, and practical modelling requirement for loads. This Commission consulted on this reform at the 20 July 2026 TWG meeting.
- **We have refined the voltage disturbance ride-through access standard for IBLs:** In the final rule, we have strengthened the automatic access standard by lowering the temporary disconnection threshold to 0.5 p.u. and requiring ride-through at this voltage level for one second. This will enhance system security because IBLs meeting this standard will be more able to withstand distant, slowly cleared faults. We have also simplified the requirements for

29 Materials from the TWG meeting held on 20 July 2026 are available on our website.

30 The Commission notes that this means clauses S5.3.11 and S5.3.14 can apply to smaller IBLs, where the NSP considers it reasonable, having regard to their electrical proximity and configurations.

IBL behaviour during over-voltage disturbances to permit a 10% change in active power. Finally, we have relaxed the minimum access standard current limit that applies during voltage disturbances, such that the current must not exceed 120% of the rated current. This change provides more flexibility to accommodate IBLs with a range of technical characteristics.

- **The voltage disturbance ride-through access standard for generators and integrated resource systems only includes credible contingency events used by the NSP for its network planning:** The final rule clarifies and restricts the scope of credible contingency events for this access standard to those events used by the NSP for network planning. The draft rule also included non-credible contingency events likely to be reclassified as credible by AEMO, but the final rule excludes these. The final rule is simpler and easier to implement than the draft rule, while still supporting system security.
- **The voltage disturbance ride-through access standard for generators and integrated resource systems only includes credible contingency events used by the NSP for its network planning:** The final rule clarifies and restricts the scope of credible contingency events for this access standard to those events used by the NSP for network planning. The draft rule also included non-credible contingency events likely to be reclassified as credible by AEMO, but the final rule excludes these. The final rule is simpler and easier to implement than the draft rule, while still supporting system security.
- **Ongoing compliance for non-registered Schedule 5.3 Participants has been clarified:** The final rule provides that connection agreements must include details on how the connection applicant intends to comply with their applicable performance standards. The Commission encourages participants to have regard to the Reliability Panel's Template for Compliance Programs, which was recently revised to now consider additional plant types other than generators, such as integrated resource systems (including utility-scale batteries), synchronous condenser systems, loads and HVDC links.
- **The transitional arrangements have been tightened:** The final rule commences immediately, with a six-month grace period limited to applicants whose connection negotiations have progressed to the stage where the NSP is preparing an offer to connect under clause 5.3.5. This differs from the draft rule, which proposed a six-month grace period for applicants who had submitted a connection application under clause 5.3.4. This protects applicants with advanced connection processes from unnecessary rework while preventing premature applications from qualifying for transitional relief and ensuring the new requirements apply as soon as practicable.

The detailed analysis chapters explain the principal issues raised by stakeholders and the Commission's response to those issues.

1.4 The final rule complements broader reforms affecting large loads and data centres

The final rule forms part of a broader work program that across the market bodies and jurisdictions to address the significant growth in data centres connecting to the NEM.

At the time of publishing this final determination, reforms span across the NEM connection process, obligations to procure additional renewable energy supply and firming, network investment and cost recovery, market registration and operational visibility.

This section outlines key national reforms and the AEMC's work program as it relates to data centres. The Commission notes that other relevant work programs are underway, which are being led by the jurisdictions and market bodies.[31]

1.4.1 Key national reforms

National Expectations of Data Centres and AI Infrastructure Developers

The Australian Government has released its *Expectations of data centres and AI infrastructure developers*, setting out five national expectations that will guide approvals and regulatory prioritisation for new and expanded data centre developments in Australia. These include: prioritising Australia's national interest, supporting the energy transition, sustainable and efficient water use, investment in jobs and skills, as well as Australia's research, innovation and local capability.[32]

The expectations are intended to underpin the sector's social licence to operate. While the expectations do not create new legal obligations, proposals that closely align with them will be prioritised through Commonwealth regulatory processes, with implementation expected to occur in coordination with states, territories and energy market bodies. [33]

National AI standards for large data centres

The Australian Government has released a consultation paper that proposes national mandatory minimum standards for data centres, as part of its broader AI standards initiative. The Consultation Paper establishes a tiered framework governing energy, water, community and workforce obligations, and separately seeks feedback on conditions for frontier AI training in Australia.[34]

1.4.2 AEMC work program

The AEMC provided advice to the Energy and Climate Change Ministerial Council (ECMC) in July 2026 on a national framework to require data centres to offset their electricity demand and support the power system.[35] The four key recommendations were:

1. **Drive new renewable investment through the Renewable Electricity Guarantee of Origin (REGO) scheme** by mandating data centres to offset consumption using certificates linked to new renewable generation.
2. **Introduce a data centre contract obligation** to mandate contracting for firming capacity.
3. **Introduce market registration requirements** for data centres (or IBLs) to improve visibility, enable voluntary market participation, and provide a regulatory hook to mandate contracting for firming.
4. **Support demand flexibility and co-location** with generation through connection agreements.

Further work is underway to develop these policy recommendations into more detailed policy design by the Commonwealth and the AEMC.

The table below highlights AEMC rule changes relevant to data centres that are already underway.

31 For instance, AEMO is currently consulting on a market visibility framework. See more details on AEMO's website.

32 Australian Government Department of Industry, Science and Resources, Expectations of data centres and AI infrastructure developers, 23 March 2026, website.

33 Herbert Smith Freehills Kramer, Australian National Expectations for the development of data centres and AI infrastructure – what you need to know, 25 Mar 2026, website.

34 Australian Government Department of the Prime Minister and Cabinet, Getting it right: Building AI infrastructure that works for Australia, Consultation paper, September 2026, website.

35 AEMC, Data centre advice to ECMC, Market Review, 28 July 2026.

Table 1.1: AEMC rule changes that consider data centres

Rule change	Description	Status
Improving the NEM access standards - Package 2	This rule change, which is the subject of this final determination, addresses the technical performance of large IBLs, including data centres.	Final rule determination published, November 2026
Operational integration and visibility of large IBLs	AEMO submitted this rule change request on 21 July 2026. It seeks to improve the operational visibility and integration of large loads that use inverter based technology, including data centres.	Consultation paper published, November 2026
Cost recovery for network augmentations, Packages 1 and 2	On 24 September 2026, the AEMC published a consultation paper on two rule change requests that seek to ensure data centres and other large loads properly contribute to the network costs they cause or accelerate when connecting to the NEM.	Submissions to the consultation paper closed 5 November 2026. The draft determination is scheduled for publication in April 2027.
Data centre contracting obligation for use of firmed energy	On 18 September 2026, the Minister for Climate Change and Energy submitted this rule change request to support the development of sufficient firm electricity supply to meet data centres' growing demand.	Due for initiation Q4, 2026
Connection arrangements for integrated facilities, co-located plant and flexible loads rule change request	On 18 September 2026, the Minister for Climate Change and Energy submitted this rule change request to create a clear pathway for connection of large energy users, including data centres, where those users are co-locating with renewable generation and storage or offering demand flexibility to the grid.	Due for initiation Q1, 2027

1.5 The Commission has published an industry fact sheet to support implementation

The Commission has published an industry fact sheet alongside this final determination to help connection applicants and NSPs understand the application of the Schedule 5.3 technical access

standards. The fact sheet provides an accessible explanation of the new framework and complements the detailed legal requirements in the NER and the analysis in this determination.[36]

The fact sheet responds to stakeholder feedback that the reforms introduce significant change to an already technically complex connection process, and that clear, practical information would assist proponents in understanding what the changes mean for their projects.[37]

The Commission notes that the fact sheet does not constitute legal advice. Stakeholders will need to seek their own independent advice on what the changes might mean for their projects. Further, the fact sheet is intended to be an overview only; it is not designed to provide guidance on every potential scenario.

AEMO's guidelines will also provide further technical guidance within their respective scope.

36 The fact sheet is available on the Commission's website.

37 Submissions to the draft determination: Ausgrid, p 3; Endeavour Energy, p 3.

2 The rule will contribute to the National Electricity Objective

Box 4: Key points in this chapter

The Commission's more preferable final rule will address the system security impacts of large inverter based loads (IBLs) and improve the National Electricity Market (NEM) access standards. Accordingly, the Commission is satisfied that the final rule will contribute to the achievement of the National Electricity Objective (NEO) through:

- Promoting efficient investment and regulatory certainty through a clear and transparent framework for classifying large IBL.
- Ensuring transparent application of, and compliance with, the access standards regulatory framework.
- Enhancing system security and reliability by introducing new disturbance ride-through access standards to mitigate cascading outages and system black events.
- Improving power system stability and quality of supply through strengthened access standards and clearer technical definitions.
- Supporting efficient system strength outcomes by making requirements fit-for-purpose for IBLs and high voltage direct current networks (HVDC links).
- Promoting system security and regulatory clarity through targeted improvements for Schedule 5.3 Participants.

The Commission has made a more preferable final rule because we consider it would better contribute to the achievement of the NEO than the proposals in the rule change requests. The key differences between the final rule and the proposals in the rule change requests include:

- Establishing a framework for classifying large IBL connecting to the distribution network, to better support the transparent and proportionate application of new and existing access standards.
- Introducing new disturbance ride-through access standards for IBL to address the system security risk of large load disconnections in a more effective, clear and predictable way.
- Clarifying that credible contingency events, for the purposes of the Schedule 5.2 disturbance ride-through access standard, include events used by the network service provider (NSP) for its network planning only.
- Making incremental reforms to promote compliance with performance standards for non-registered Schedule 5 Participants.
- Creating a smaller, simplified set of protection system definitions, to improve clarity while retaining more flexibility than the *Definitions of protection system requirements* proposal.
- Not implementing the *Conditions for generator protection systems* proposal, as we consider it would not contribute to the NEO.

In this chapter:

- Section 2.1 explains that the Commission must make decisions that promote the NEO.
- Section 2.2 discusses other relevant factors that the Commission takes into account.

- Section 2.3 sets out the Commission's rationale for the more preferable final rule against our NEO assessment criteria.

2.1 The Commission must act in the long-term interests of energy consumers

The Commission can only make a rule if it is satisfied that the rule will or is likely to contribute to the achievement of the relevant energy objectives.[38]

For this rule change, the relevant energy objective is the NEO:

The NEO is:[39]

> to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system; and
>
> (c) the achievement of targets set by a participating jurisdiction—
>
> (i) for reducing Australia's greenhouse gas emissions; or
>
> (ii) that are likely to contribute to reducing Australia's greenhouse gas emissions.

The targets statement, available on the AEMC website, lists the emissions reduction targets to be considered, as a minimum, in having regard to the NEO.[40]

2.2 We must also take these factors into account

2.2.1 We have considered whether to make a more preferable rule

The Commission may make a rule that is different, including materially different, to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule is likely to better contribute to the achievement of the NEO.[41]

For this rule change, the Commission made a more preferable final rule. The reasons are set out in section 2.3 below.

2.2.2 We have considered whether to make a final rule for the Northern Territory

The NER, as amended from time to time, apply in the Northern Territory, subject to modifications set out in regulations made under the Northern Territory legislation adopting the NEL.[42] Under those regulations, only certain parts of the NER have been adopted in the Northern Territory.

38 Section 88(1) of the NEL.
39 Section 7 of the NEL.
40 Section 32A(5) of the NEL.
41 Section 91A of the NEL.
42 These regulations under the NT Act are the National Electricity (Northern Territory) (National Uniform Legislation) (Modifications) Regulations 2016.

In its draft determination, the Commission determined to make a differential rule that disapplies the entirety of the final rule from adoption in the Northern Territory. Since the draft determination and rule, there have been amendments to the NT Act and NT NER. As a result of these amendments, the Commission no longer has the power to make a final rule (whether it be a uniform rule or differential rule) for adoption in the Northern Territory.

See appendix C for more detail on the legal requirements for our decision.

2.3 How we have applied the legal framework to our decision

The Commission must consider how to improve the NEM access standards against the legal framework.

We identified the following criteria to assess whether the proposed rule change, no change to the rules (business-as-usual), or other viable, rule-based options are likely to better contribute to achieving the NEO:

- **Safety, security and reliability** — This criterion was selected to consider the secure, safe, and reliable operation of the power system at least cost. The operational security of the power system depends on whether the connecting plant and equipment can operate within the technical access standards contained in the NER and not present significant system security risks. Improving access standards can ensure alignment with the secure operation of the power system and improve power system resilience.
- **Innovation and flexibility** — This criterion was selected because innovation and flexibility are important principles to utilise when improving the NEM access standards contained in the NER. This is true both from the perspective of process innovations and innovations in finding solutions to system security issues uncovered through the application of the access standards to network user customers. Innovation and flexibility are promoted when the draft rule accommodates a range of technologies including evolving technologies, adapts to changing power system needs or needs that are location dependent, and supports timely investment.
- **Implementation considerations** — This criterion was selected to assess matters such as timing, interrelationships with other reforms and processes, and benefits or adverse consequences for industry and consumers. Further, we consider that the cost and complexity of implementation and ongoing regulatory and administrative costs to all market bodies, participants and consumers must be balanced. This includes being clear on the roles of market bodies and participants, supporting efficient investment and operational decisions, and promoting transparency and predictability.

These assessment criteria reflect the key potential impacts – costs and benefits – of the rule change request, for impacts within the scope of the NEO.

The Commission's more preferable final rule is largely consistent with the proposed amendments to the access standards in AEMO's rule change request and also incorporates some of the amendments proposed by Rod Hughes Consulting. However, the final rule is a more preferable rule, as the Commission has incorporated stakeholder feedback, and technical analysis to more effectively address the issues raised in the rule change request and achieve the intended policy outcomes, as explained below. This will better support the assessment criteria listed above than the proposed rule by increasing the likelihood that these criteria may be met.

Some of the key differences between the final rule and AEMO's rule change request include:

- Establishing a clear and transparent framework for classifying large IBLs that seek connection to a transmission or distribution network. The final rule establishes a clear 30 MW threshold for automatic application of Schedule 5.3 to large IBLs. This provides greater certainty for connection applicants and NSPs, reduces reliance on case-by-case discretion for larger loads and simplifies the tiered framework proposed in the draft rule, while retaining proportionate requirements for smaller IBLs.
- Requiring NSPs to consider the combined impact of one or more IBL connections where their electrical configuration, proposed connection arrangements and intended operation indicate they should reasonably be assessed together.
- Requiring AEMO to develop guidelines for Schedule 5.3 Participants, in accordance with principles provided in the final rule to ensure proportionality, consistency and transparency.
- Introducing new disturbance ride-through access standard requirements for IBLs. These standards will address voltage and frequency disturbances, as well as post-fault active power recovery, and are designed to mitigate the risk of cascading outages and sudden load disconnection during credible contingency events. This will have the effect of strengthening the resilience of the power system in an environment of increasing inverter based participation.
- Introducing targeted, incremental reforms that would promote compliance with access standards recorded in connection agreements for non-registered Schedule 5 Participants, including loads, generators, and integrated resource systems. Under clause 4.14(n) of the NER, AEMO is required to establish and maintain a formal register of the performance standards applicable to Registered Participants' plant. The final rule extends the application of this clause to all Schedule 5 Participants. Further, the final rule requires connection agreements with non-Registered Participants to include terms and conditions that provide reasonable assurance from the connection applicant of ongoing compliance with the performance standards, in a manner consistent with good electricity practice. The agreement must also specify how the non-registered Schedule 5 Participant will demonstrate ongoing compliance. The Commission encourages participants to have regard to the Reliability Panel's Template for Compliance Programs.[43]

The key differences between the final rule and Rod Hughes Consulting's rule change requests include:

- Introducing a smaller, simplified set of protection system definitions, to improve clarity while retaining more flexibility than the *Definitions of protection system requirements* proposal.
- Not making the changes proposed in the *Conditions for generator protection systems* rule change request. We consider the existing arrangements will continue to support system security while the proposed changes would not likely contribute to the achievement of the NEO.

The rest of this section explains why the final rule best promotes the long-term interest of consumers when compared to other options and assessed against the criteria.

43 The Template for Compliance, current at the time of publishing this final rule determination, is available here.

2.3.1 The final rule provides a clear and proportionate framework for classifying loads that supports investment and system security

A clear classification framework will support the secure and reliable operation of the power system

The Commission considers that a clear and consistent framework for classifying Schedule 5.3 plant is necessary to support the appropriate application of technical access standards and maintain power system security and reliability. As the number and scale of large IBLs connecting to the NEM increase, the potential for these loads to affect power system stability, including through their response to disturbances and interaction with system strength, becomes increasingly important.

The final rule establishes a clearer framework in the NER for determining when and how the Schedule 5.3 access standards apply to distribution and transmission connected loads, including large IBLs. By providing greater clarity on the circumstances in which access standards apply, the final rule will reduce uncertainty for connection applicants and NSPs, while supporting the consistent identification and management of material risks to the power system. This will also support AEMO's system planning and operational functions by promoting a more consistent approach to assessing the technical characteristics and potential system impacts of new connections.

A proportionate framework will support efficient investment and avoid unnecessary compliance costs

The Commission considers that technical requirements should be commensurate with the potential system security impacts of a connection. Applying the full suite of technical access standards and associated modelling requirements to all loads, irrespective of their characteristics and potential impact, could impose unnecessary costs and delays on connections that pose limited risks. Conversely, insufficient application of technical requirements could leave material risks unaddressed at the connection stage, potentially increasing the need for operational interventions and costs borne by other consumers.

The final rule addresses this by establishing a classification framework that combines clear capacity thresholds with consideration of the potential impact of a connection on network services. This approach provides greater certainty about the applicable regulatory requirements while retaining flexibility to account for local network conditions and the characteristics of individual connections. It is intended to ensure that the level of technical scrutiny and compliance costs is proportionate to the risks posed by the plant, supporting efficient investment while maintaining appropriate protections for power system security and reliability.

A technology-neutral framework will accommodate innovation and support investment certainty

The Commission seeks to develop regulatory arrangements that accommodate changes in technology and support efficient investment in the NEM. The final rule classifies plant according to its technical characteristics, including the use of power electronic equipment, rather than targeting particular end uses or industries. This approach recognises that data centres, hydrogen electrolysers and other emerging or evolving loads may have similar technical characteristics and potential system impacts, notwithstanding their different purposes.

By embedding the classification framework in the NER, the final rule also reduces reliance on informal or inconsistent interpretations of existing guidance to determine when the Schedule 5.3 access standards apply. This will provide connection applicants with greater transparency and predictability when planning new investments, while establishing a framework that can accommodate changes in load technologies and operating practices over time.

See chapter 3 for more information.

2.3.2 The final rule strengthens the modelling and compliance framework to support efficient connections and ongoing power system security

Clearer modelling requirements will support consistent and efficient connection assessments

The Commission considers that robust modelling is important to assessing whether Schedule 5.3 plant can meet the applicable access standards and to identifying potential impacts on power system security. However, modelling requirements need to be appropriate to the characteristics of the plant, the issues being assessed and the practical availability and maturity of modelling information. Unclear or inconsistent requirements can result in unnecessary modelling iterations, duplicated assessments, additional costs and delays to connections, without necessarily providing commensurate benefits for power system security.

The final rule requires AEMO to develop, publish and maintain Schedule 5.3 Participant Modelling Guidelines, supported by principles established in the NER by this final rule. These principles are intended to ensure that modelling requirements are proportionate to the size, complexity and potential impact of the plant, limited to information reasonably necessary to assess the connection and compliance with applicable obligations, and applied consistently to equivalent plant where reasonably practicable. They also recognise the practical availability, maturity and validation of modelling information, and seek to minimise unnecessary modelling iterations and duplication.

By establishing these principles in the NER while allowing AEMO to develop the detailed technical requirements through guidelines, the final rule provides a framework that is sufficiently clear to support consistent connection assessments while retaining flexibility to respond to evolving technologies and modelling practices. This will support more efficient connection processes and investment decisions, while ensuring that modelling remains adequate to identify and manage material risks to power system security and reliability.

See section 4.1 for more information.

Requiring modelling requests to be supported by a clear rationale will promote transparency and avoid unnecessary burdens

The Commission considers that requests for additional modelling should be directed at resolving material technical issues and assessing risks relevant to the connection and the power system. Without clear expectations about the information required and the reasons for requesting it, connection applicants may face repeated or duplicative requests, including where existing modelling information could adequately address the issue.

The final rule requires AEMO and NSPs to ensure that modelling requests are reasonably necessary, proportionate to the issue being assessed and directed at material matters relevant to power system security. Requests must have regard to the availability and suitability of existing modelling information, identify the issue or uncertainty to be assessed, explain why the modelling already provided is insufficient, and specify the additional information required.

These requirements will provide greater transparency for connection applicants and help ensure that modelling effort is directed towards resolving relevant technical uncertainties. The Commission does not intend for these requirements to create a prescriptive checklist or impose unnecessary administrative burdens. Rather, the level of explanation should be commensurate with the nature and significance of the issue being assessed. This will preserve the ability of AEMO and NSPs to exercise technical judgement while supporting efficient connection

assessments, reducing unnecessary costs and delays, and maintaining the modelling capability needed to manage material risks to power system security.

See section 4.1.3 for more information.

Clarifying AEMO's advisory role will support consistent technical advice while retaining flexibility

AEMO's advisory function plays an important role in supporting the consistent application of the Schedule 5.3 access standards, particularly where connection assessments involve matters affecting AEMO's system-wide responsibilities. At the same time, the advice required will depend on the technical characteristics of the plant, the applicable access standards and the potential impacts of the connection on the power system.

AEMO's Schedule 5.3 Participant Modelling Guidelines can elaborate on how AEMO's advisory function applies in practice. This will improve transparency about the technical matters AEMO expects to consider when advising on access standards, including the modelling information needed to assess relevant risks. By providing clearer guidance without prescribing an unnecessarily detailed or uniform assessment process in the NER, the final rule will support greater consistency across connections while retaining flexibility to account for different technical circumstances. This will promote efficient connection processes and help ensure that AEMO's advice appropriately informs the management of power system security risks.

See section 4.1.4 for more information.

Strengthening compliance arrangements will support ongoing adherence to performance standards

The Commission considers that the benefits of technical access standards depend on connected plant continuing to perform in accordance with its agreed performance standards. As the number of non-registered Schedule 5 Participants, including large IBLs, increases, it is important that the regulatory framework provides appropriate assurance of ongoing compliance, regardless of registration status.

The final rule strengthens these arrangements by requiring AEMO to maintain a register of performance standards for all Schedule 5 Participants and requiring connection agreements with non-registered participants to include a commitment to ongoing compliance with applicable performance standards, including details of how the connection applicant intends to comply, consistent with good electricity industry practice.

These changes will improve AEMO's and the AER's visibility of the performance standards applying to connected plant, supporting system planning, operational decision-making and the monitoring of compliance. Requiring connection agreements to address ongoing compliance also provides a practical and legally binding mechanism to support adherence to agreed technical requirements, without extending the full compliance and enforcement regime under rule 4.15 to non-registered participants. This preserves the distinction between registered and non-registered participants while strengthening the arrangements supporting compliance across the NEM.

The Commission considers this targeted approach achieves the NEO by supporting the secure and reliable operation of the power system, while avoiding regulatory obligations that may be disproportionate to the circumstances of non-registered participants. It also supports efficient investment and operation by providing clearer expectations for ongoing compliance and helping ensure that plant operates in a manner consistent with its agreed performance standards.

See section 4.2 for more information.

2.3.3 The final rule introduces new and improved disturbance ride-through access standards that will enhance power system security

The final rule will introduce disturbance ride-through access standards for IBLs

The new disturbance ride-through access standards will support system security as more IBLs connect to the NEM

The final rule disturbance ride-through access standards will mitigate system security risks by requiring new large IBL connections to have an appropriate level of ride-through capability. Improving the ride-through capability of large IBL will reduce the likelihood and severity of aggregate large load disconnections, which could have significant impacts on consumers such as disruption of supply. It will also enable AEMO and NSPs to manage these system security risks at a lower cost to consumers. In designing the final rule, we have set the access standards at a level we consider to be commensurate with the risk to system security. Accordingly, the new access standards will be aligned with the NEM system standards and will only apply to IBL.

The final rule will provide flexibility in applying the new disturbance ride-through access standards

The final rule will incorporate flexibility by using the IBL classification framework, as well as the existing negotiation framework, so that the new access standards are only applied to loads to the extent necessary for system security. While the disturbance ride-through access standards apply automatically to large IBL, NSPs will have discretion in whether to apply them to small IBL, taking into account the system impact of the IBL and the aggregate impact of electrically proximate IBLs. We have set less onerous minimum access standards to provide a range for negotiation, including no minimum access standard for frequency disturbance ride-through, and discretion for AEMO and NSPs to use a lower minimum access standard for voltage disturbance ride-through on a case-by-case basis. This flexibility will enable the final rule to better accommodate IBLs of different types and sizes, minimising barriers to connection and supporting efficient investment in data centres and other infrastructure.

The new disturbance ride-through access standards are designed to support a clear and efficient connections process

The Commission has considered how connection applicants will be impacted by the new access standards. In designing the new access standards, we have sought to promote regulatory certainty and consistency by setting clear technical standards that are numerically formulated wherever possible. In addition, the final rule aims to minimise the costs and regulatory burden of complying with the new access standards by aligning them with international large load ride-through requirements and taking into account the existing technical capabilities of IBLs such as data centres. This will promote an efficient and predictable connections process for applicants and NSPs, to support investment in data centres and other infrastructure.

See section 5.1.1 and section 5.1.2 for more information.

Information provision on the ride-through capability of loads will complement the disturbance ride-through access standards to enhance system security

The final rule will also enable AEMO and NSPs to manage system security risks in a more targeted and efficient way by improving visibility of large loads' ride-through capability. This will avoid unnecessary costs where AEMO and NSPs may otherwise have to make conservative assumptions about loads' capabilities. The final rule will give AEMO and NSPs better access to information about how large loads respond to disturbances by:

- for IBL where the disturbance ride-through access standards apply, recording the plant capability in its performance standards (with a copy provided to AEMO by default)[44]
- for all Schedule 5.3 plant connections, enabling NSPs (in consultation with AEMO) to request information about the plant's ride-through capability.

This enhanced information provision will support AEMO and NSPs in maintaining system security at an efficient cost to consumers.

See section 5.2.4 for more information.

The final rule for clarifying and restricting the scope of credible contingency events will improve regulatory certainty and transparency

The final rule will clearly define the set of credible contingency events captured by the access standards for disturbance ride-through of Schedule 5.2 plant. Both the minimum and automatic access standards will include credible contingency events used by the NSP in its network planning only. This is a change from the draft rule, where the automatic access standard would have also included non-credible contingency events likely to be reclassified by AEMO as credible.

Clarifying the scope of credible contingency events for the disturbance ride-through access standard in this way will provide a more predictable and consistent foundation for access standard negotiations. This will reduce interpretive ambiguity, support a more efficient and timely connections process, lower regulatory risk for connection applicants, and promote investment confidence.

The final rule is simpler and more transparent than the draft rule, while still supporting system security. The final rule will have lower implementation costs than the draft rule because it does not require NSPs and AEMO to create and maintain a list of events likely to be reclassified, and does not require connection applicants to demonstrate ride-through capability for events likely to be reclassified.

See section 5.3 for more information.

Clarifying that the response to disturbances following contingency events is an AEMO advisory matter will improve consistency and certainty

The final rule will clarify that clause S5.2.5.5A (the access standard for the responses of Schedule 5.2 plant to disturbances following contingency events) is an AEMO advisory matter. The Commission considers that deeming S5.2.5.5A to be an AEMO advisory matter is consistent with the intent of the clause and that it remains appropriate for AEMO to be consulted on the disturbance response of Schedule 5.2 plant. Making this clarification will improve regulatory consistency and certainty for connection applicants, NSPs and AEMO.

See section 5.3.3 for more information.

44 The final rule will expand AEMO's register of performance standards to non-registered Schedule 5 Participants as noted in section 2.3.1 and discussed further in section 4.2.

2.3.4 The final rule introduces new power system stability requirements and clearer technical definitions of protection requirements

The final rule will introduce an access standard for instability detection and response by large IBL

Creating a new instability access standard will support power system security

The final rule will introduce an instability detection and response access standard (instability access standard) for large IBL to help manage the impacts that IBL may have on system stability. This is important because instability in the power system can lead to plant disconnections and supply disruption to consumers if it is not managed effectively. As discussed in chapter 6, IBL or other plant with power electronic control systems may contribute to oscillations or other unstable behaviour, but there has been a gap in the access standards with no stability requirements that apply to loads.

The new access standard will support the effective management of instability to maintain power system security by requiring relevant Schedule 5.3 Participants to:

- monitor instability and exchange instability information with AEMO and the NSP, to inform appropriate responses to instability
- agree with the NSP and AEMO on a process for responding to instability, and document it in the performance standards, which will support any centralised, coordinated response to instability
- have capabilities and control systems sufficient to ensure the plant's operation does not cause, exacerbate or contribute to instability, in accordance with any detailed requirements that AEMO may set out in the PSSG.

The final rule will apply the new access standard to all large IBLs (30 MW and above) that AEMO or the NSP considers could contribute to instability. NSPs will also be able to apply the access standard to smaller IBLs if appropriate, having regard to the aggregate impact of that IBL together with other electrically proximate IBLs. There are additional materiality thresholds for the application of the minimum access standard, and for the PMU requirements in both the automatic access standard and minimum access standard. This approach will appropriately target those loads that could have a material adverse impact on power system stability and security, avoiding unnecessary costs for smaller loads (and non-IBL).

The final rule will allow flexibility in applying and meeting the instability monitoring access standard

The new access standard will enable flexible approaches to managing instability by incorporating AEMO and NSP discretion, using the existing negotiation framework, and focussing on high-level requirements which AEMO may expand on in the PSSG. While this access standard generally applies to large IBL, NSPs and AEMO will have the discretion to only apply it where the large IBL has the potential to contribute to instability, and to apply it to smaller IBL if reasonable and appropriate to do so, having regard to their aggregate impact. Further, the final rule will not prescribe automatic disconnection in response to instability or detection of an IBL's own contribution to any instability. This flexibility (along with the materiality thresholds) will support the efficient implementation of the final rule by avoiding unnecessary costs, especially for smaller and lower-impact connections. It will also give connection applicants an opportunity to innovate and evolve their approach to complying with the new access standard.

See section 6.1 for more information.

New definitions for protection systems will support power system security by clarifying the existing requirements while maintaining flexibility

The final rule will support system security by introducing new definitions for 'primary protection system' and 'back-up protection system'. It also makes a minor clarification to the definition of 'breaker fail protection system' and removes the unused definition of 'breaker fail'. These definitional changes will clarify the existing protection requirements, and we consider those existing requirements remain appropriate for supporting system security.

The final rule introduces a smaller, simplified set of definitions compared to the rule change request. We consider this approach will better contribute to the NEO, compared to the existing rules or the rule change request. Clear definitions will better support system security and an efficient connections process. At the same time, the final rule will maintain flexibility and minimise complexity by avoiding overly detailed, prescriptive definitions.

See section 6.2 for more information.

We considered other changes to protection requirements but found they would not be likely to contribute to the NEO

The Commission has decided not to progress the *Conditions for generator protection systems* rule change request because the proposed changes would not contribute to the NEO. In our view, the existing arrangements are fit for purpose because they support system security while allowing flexibility, which enables NSPs to set proportionate, appropriate protection requirements for each new connection. We consider that the proposed changes would not be likely to contribute to the achievement of the NEO because:

- the proposed change to the automatic access standard for generator protection systems would reduce flexibility and potentially increase costs, with little or no benefits for system security
- the existing negotiation framework allows AEMO and NSPs to impose performance requirements as needed for system security, up to the level of the automatic access standard.

See section 6.3 for more information.

2.3.5 The final rule makes pragmatic changes to the system strength framework for IBLs and HVDC links to promote efficient system security and investment outcomes

The Commission's final rule to improve the system strength access standards for large IBLs and HVDC links will likely contribute to the achievement of the NEO for the reasons set out below.

Limiting short circuit ratio requirements to large IBL would support system security at a more efficient cost

The final rule limits the application of the short circuit ratio access standard in clause 5.3.11 to large IBLs (30 MW and above), rather than all IBLs regardless of size. This better targets loads most likely to have a material adverse impact on system strength and power system security. By aligning compliance obligations with the scale of system risk, the final rule also reduces unnecessary costs for smaller loads, avoids over-specification of plant capability in stronger parts of the network, and promotes efficient investment. At the same time, it maintains appropriate safeguards for system security by retaining the short circuit ratio requirement for large IBLs.

Increased flexibility would accommodate a range of technologies and local system needs

The final rule provides flexibility for AEMO and the relevant NSP to agree to a higher short-circuit ratio minimum access standard, having regard to expected three-phase fault levels at the

connection point. This flexibility would enable this access standard to reflect local system strength conditions and the technical characteristics of different load technologies. It would reduce unnecessary compliance burdens in strong network areas, lower barriers to efficient connection, and support timely investment.

The final rule would promote the efficient provision of system strength for HVDC links

The final rule enables HVDC link operators to procure system strength services from third parties to meet the SCR requirement under clause S5.3a.7, aligning their treatment with that of generators and IRS'. This promotes more efficient, coordinated and network-level solutions for system strength, avoiding duplication of assets and reducing connection costs and timeframes. System strength is a key factor to be considered in the secure operation of the power system. By aligning the application of system strength requirements across Schedules 5.2 and 5.3a, the final rule would also improve regulatory consistency and transparency. Greater clarity would reduce uncertainty for proponents and NSPs, facilitating efficient connection decisions and investment planning.

See chapter 7 for more information.

2.3.6 The final rule makes targeted improvements for Schedule 5 Participants to promote system security and clear regulatory requirements

The final rule promotes innovation and flexibility by allowing load shedding by way of fast ramp-down

The final rule promotes system security by improving the efficiency and precision of demand-side frequency response. Encouraging technically capable loads to provide fast, proportional reductions in consumption rather than binary disconnection will facilitate a more proportionate response to underfrequency events, supporting secure power system operation by reducing the risk of frequency overshoot and limiting secondary impacts on voltage and system stability. It will also minimise unnecessary load shedding and reduce unnecessary disruption to end-use consumers and industrial processes, as well as the costs associated with that disruption. This means that system security needs could be met more efficiently.

The final rule also provides flexibility to recognise the differing technical capabilities of modern loads, including IBLs. Rather than prescribing a single mode of compliance (block disconnection), the framework allows participants to utilise the most efficient and appropriate method, considering the characteristics of their plant and the needs of the power system. The final rule will incentivise load shedding by fast ramp down, but would not mandate it, in order to maintain flexibility for plant that is only capable of block disconnection. Moreover, the final rule will support transparency and operational certainty by requiring that the quantity and rate of fast-reduction capability be recorded in the plant's performance standards.

See section 8.1 for more information.

The final rule promotes system security by ensuring that all Schedule 5 Plant may be assessed or tested

By extending testing and assessment to all Schedule 5 plant, regardless of registration status, the Commission has acknowledged that any Schedule 5 plant may contravene the NER or performance agreement and have an adverse power system security impact. The final rule supports appropriate and proportionate use of the right of testing because it applies to plant larger than 30 MW where there are reasonable grounds to believe it is non-compliant, and requires the requesting party to cover direct costs unless non-compliance is found. This supports the safe, secure and reliable operation of the power system by efficiently addressing the potential security

impact of all Schedule 5 plant. It also supports the effective implementation of the other parts of the final rule (and existing access standards) by ensuring plant is compliant with its applicable performance standards.

See section 8.2 for more information.

The final rule promotes transparency and appropriate system security outcomes by allowing AEMO to extend the timeframe for future access standards reviews

Allowing AEMO to extend the timeframe for publication of a final report by up to six months, where there are matters of material complexity or a material change in circumstances, contributes to the achievement of the NEO by reducing the risk of incomplete analysis or conclusions based on outdated assumptions. This flexibility enables more comprehensive modelling, validation and risk assessment, supporting technically sound outcomes that would enhance the safety, security and reliability of the grid under the NEO.

Importantly, the extension power is constrained by procedural safeguards. AEMO must publish a notice of extension at least one month before the expiry of the original 12-month period, clearly identifying the matters of complexity or material change and outlining how it intends to address them, including through stakeholder engagement. This requirement contributes to the achievement of the NEO by ensuring transparency, accountability and regulatory certainty, which are critical to maintaining investor confidence and facilitating efficient operational and investment decisions.

See section 8.2 for more information.

2.3.7 The transitional arrangements for the final rule balance system security and implementation considerations

The immediate commencement of the final rule on 12 November 2026 will promote system security by applying the new and updated access standards for IBLs as soon as possible. This is important given the current pace of data centre connections to the NEM and growing size of those data centres. Immediate commencement will also allow the benefits of clearer and more flexible Schedule 5.2 and Schedule 5.3a access standards, as well as other improvements to the framework, to be realised sooner.

However, the Commission recognises that applying the new access standards immediately would disrupt ongoing connection applications and alteration proposals, leading to prolonged connection processes and increased costs. For this reason, the final rule provides a six-month grace period for connection applications where the technical requirements have been accepted under clause 5.3.4A of the NER before commencement. These connection applicants will be able to proceed using the old access standards until 12 May 2027. The final rule applies this grace period at a later point in the connection process than we proposed in the draft rule to better address system security risks associated with the current connection queue. The final rule also applies a similar grace period for valid proposals to alter plant under clause 5.3.9 or 5.3.12 of the NER that are submitted before the commencement date. This approach balances the need for improved access standards to maintain system security with the practical implementation burden for connection applicants, Schedule 5 Participants and NSPs.

See chapter 9 for more information.

3 The final rule provides a clear framework for classifying loads to determine application of the Schedule 5.3 access standards

Box 5: Key points in this chapter

The Commission's final rule establishes a clearer framework for identifying and classifying loads (otherwise known as Schedule 5.3 plant) connecting to a distribution or transmission network, and determining when the Schedule 5.3 access standards apply. A key change is the introduction of a threshold based definition for large inverter based load (IBL) in the National Electricity Rules (NER), capturing IBLs with a nameplate rating of 30 MW or greater. This provides a clear and consistent threshold for identifying large IBLs and supports a proportionate approach to connection requirements, recognising the potential for larger loads to have a material impact on the power system.

Previously, the NER did not define large IBLs. Instead, AEMO's System Strength Impact Assessment Guidelines (SSIAG) classified an IBL as large using a minimum capacity threshold of 5 MW or 5 MVA, alongside criteria relating to the use of power electronics and potential susceptibility to inverter control instability. This classification was originally intended to apply only to the system strength mitigation requirement. However, it has sometimes been used to determine the application of other Schedule 5.3 access standards, contributing to inconsistent outcomes.

By embedding the definition in the NER, the final rule provides greater regulatory clarity and consistency as the National Electricity Market (NEM) accommodates increasing numbers of IBLs, including large loads such as data centres. The classification framework better distinguishes loads that, by virtue of their size, may have a material impact on the power system, including through their dynamic interactions with the power system and other inverter-based plant.

These reforms achieve the National Electricity Objective (NEO) by improving the management of power system security risks associated with large and growing IBLs, while providing greater certainty about the application of connection requirements. This will support the efficient connection of new loads while helping to maintain a secure and reliable power system as the NEM evolves.

In this chapter:

- Section 3.1 explains how the final rule establishes clearer definitions for classifying Schedule 5.3 plant. It amends the definition of IBL to provide a more technology-neutral basis for identifying relevant plant, introduces a threshold-based definition of large IBL (30 MW or greater), and makes consequential amendments to the definition of large inverter based resource (IBR) and the application of Chapter 5A of the NER.
- Section 3.2 explains how the final rule clarifies the application of the Schedule 5.3 access standards to different load classifications. It provides for the automatic application of the Schedule 5.3 access standards to large IBLs, rather than relying on the discretion of the relevant Network Service Provider (NSP), regardless of whether the connection is to a transmission or distribution network. For smaller IBLs, and other Schedule 5.3 plant connecting to a distribution network, the NSP has discretion to apply the requirements where necessary to address impacts on the quality and security of network services. For other Schedule 5.3 plant connecting to a transmission network that does not contain IBL, the Schedule 5.3 access standards apply automatically. It also allows NSPs to consider the

aggregate impacts of electrically proximate IBL connections, clarifies the treatment of uninterruptible power supply (UPS) systems, and confirms that hybrid connections are classified according to their constituent plant types.

- Section 3.3 clarifies how the classification framework applies to staged developments, multi-connection campuses and modifications to existing load connections. It explains the role of clause 5.3.12 in assessing alterations to connected plant, including staged expansions, changes to operating profiles and upgrades incorporating IBL plant, and how new connections and aggregate-impact provisions interact with the classification framework. It also clarifies that clause 5.3.12 does not, of itself, require all existing plant to be reassessed against the standards applicable to a new connection.

The Commission has also developed an industry fact sheet alongside this final rule determination to support connecting parties with applying the Schedule 5.3 access standards to different load types, available on the website for this rule change, available on the Commission's website.

3.1 The final rule improves and introduces new definitions in the NER to support the framework for classifying loads

The Commission's final rule establishes a clearer framework for classifying Schedule 5.3 plant, including IBLs. Classifying loads is important as it determines when and how the Schedule 5.3 access standards apply. Accordingly, the final rule:

- amends the definition of IBL to provide a clearer and more technology-neutral basis for identifying what plant is IBL by focusing on the use of power electronic technology
- includes a new definition for large IBL that establishes a clear, objective and consistent threshold for determining when the additional requirements applying to large IBLs will apply
- makes consequential amendments to the definition of large IBR.

This section explains the Commission's rationale for the final rule and the minor changes made to the draft rule definitions in response to stakeholder feedback and further consideration.

Box 6: What is a Schedule 5 Participant?

"Schedule 5 Participant" is an umbrella term used to describe a person responsible for meeting the technical requirements that apply to Schedule 5.2, 5.3, or 5.3a plant under Chapter 5 of the NER, regardless of registration status. Accordingly:

- **Schedule 5.2 plant** includes:
  - generating systems
  - integrated resource systems comprising one or more bidirectional or generating units (this is not inclusive of any auxiliary load), and
  - synchronous condenser systems
- **Schedule 5.3 plant** includes:
  - loads, including IBLs, both standalone or as part of an integrated resource system (this is not inclusive of any auxiliary load),
  - distribution networks

- **Schedule 5.3a plant** is a system comprising high voltage direct current technology with a power transfer capability of 5 MW or more, used to transfer electricity to, from or between one or more alternating current networks (or parts of an alternating current network) of an NSP.

This terminology, introduced through the Commission's final rule determination for *Improving the NEM access standards - Package 1*, clearly identifies who is responsible for the technical performance of the connecting plant, independent of the participant's registration category. This is important because the access standards establish the technical capabilities that a plant must have to connect and operate reliably within the power system, and the relevant obligations need to be clearly allocated to the party responsible for the plant.

Note: See AEMC, *Improving the NEM access standards - Package 1*, Final rule determination, 22 May 2025.

3.1.1 The final rule improves the NER definition of IBL to promote clarity and consistency

The Commission has amended the definition of '*inverter based load*' in the NER to provide a technology-neutral basis for identifying IBLs. It now focuses on the use of power electronic technology, including inverters, converters and rectifiers. The definition is as follows:[45]

> *Plant (other than a production unit) that is supplied by power electronics, including inverters, converters or rectifiers, and potentially susceptible to power electronic control instability.*

Stakeholders broadly supported this approach, noting that improving the definition would promote clarity and consistency.[46]

The final rule recognises that the definition of IBL requires a degree of technology-neutrality

Before publication of this final rule determination, '*inverter based load*' was defined in the NER as:[47]

> *Plant (other than a production unit) that is supplied by power electronics, including inverters, and potentially susceptible to inverter control instability, and that is classified as an inverter based load applying criteria specified in the system strength impact assessment guidelines.*

Throughout the Commission's consultation on this rule change, it became clear that the prior definition of an IBL did not provide a sufficiently clear or technology-neutral basis for identifying loads whose power-electronic controls could affect power system security.[48] This is because it relied on the presence of inverters, including for control instability, rather than power electronics more broadly. Accordingly, the Commission's final rule uses the term 'power electronics' in the definition because while inverters are one type of power electronic device, IBLs may also use other devices, such as converters and rectifiers, whose controls may also be susceptible to control instability.

The prior definition also depended on further classification in AEMO's SSIAG, even though the SSIAG contained no further criteria to this effect.[49] As such, the Commission's final rule decouples the definition of IBL from AEMO's SSIAG.

45 Final rule, Chapter 10 Glossary definition of '*inverter based load*'.

46 Submissions to the draft determination: Antora Energy, p 1; Ergon Energy and Energex, p 5; EUAA, p 2. See also submissions to the consultation paper: EUAA, p 3; ENA, pp 2-4; EPEC, p 3; NextDC, pp 2, 6-7; AWS, p 3.

47 NER Chapter 10, Glossary definition of '*inverter based load*', v 256.

48 The Commission notes that this was key focus for discussion during the first TWG meeting, held on 31 October 2025. The TWG materials are available on our website.

49 AEMO, SSIAG, Section 2.2(e).

The SSIAG has a specific role in the application of the system strength framework, while the term 'inverter based load' is relevant to the broader application of the Schedule 5.3 access standards.[50] Establishing the definition directly in the NER provides greater certainty and consistency regarding the plant to which the Schedule 5.3 framework applies, while preserving the SSIAG's role in establishing the framework for assessing system strength impacts.

The role of power electronic control in classifying plant as an IBL

The Commission has retained the wording from the draft rule of *'potentially susceptible to power electronic control instability'* in the definition of an IBL. This reflects the Commission's view that IBLs should be distinguished by whether their power electronic interfaces and associated control systems actively determine the electrical behaviour of the load and its interaction with the power system, rather than by the mere presence of power electronic equipment.

The Commission recognises that stakeholders expressed differing views on the application of this concept and whether it is sufficiently clear. For instance:

- Antora submitted that the definition should capture loads whose grid-facing interface uses actively controlled power electronic converters, rather than loads with a purely resistive grid-facing interface.[51]
- Conversely, Transgrid, the Energy Users' Association of Australia (EUAA), and Ergon Energy and Energex and raised concerns that the reference to power electronic control instability could capture a broader range of facilities than intended, given that many traditional industrial loads contain power electronic equipment.[52]
- Transgrid and the Energy Networks Association (ENA) also considered that further guidance or criteria were needed to assess susceptibility to instability.[53]

The Commission acknowledges stakeholders' requests for greater clarity but considers that prescribing detailed criteria in the NER risks making the definition overly restrictive and less adaptable to evolving technologies and control systems.

Assessing susceptibility will require some engineering judgement, having regard to the extent to which a load's electrical behaviour is actively determined by power electronic controls and may interact dynamically with the power system. The distinction between actively and passively controlled power electronics provides a useful basis for this assessment.[54] Loads use a spectrum of front-end technologies, from relatively passive diode-bridge rectifiers to actively controlled converters using power electronic switching devices such as insulated-gate bipolar transistors (IGBTs). The more actively the interface controls the load's electrical behaviour, the greater its potential to interact dynamically with the power system, particularly during disturbances or under weak system conditions.

This distinction is relevant to the treatment of large industrial loads and modern facilities such as data centres. Traditional industrial loads may contain power electronic equipment while relying on relatively passive grid interfaces. By contrast, loads using actively controlled converters may have electrical behaviour that is substantially determined by control algorithms, making their

50 AEMC, *Improving the NEM access standards - Package 2*, Draft determination, 12 March 2026.

51 Antora submission to the draft determination, p 1.

52 Submissions to the draft determination: Transgrid, p 1; EUAA, p 2; Ergon Energy and Energex, p 2.

53 Transgrid submission to the draft determination, p 1; ENA submission to the consultation paper, p 4.

54 The Commission notes that this provides one lens through which 'control instability' may be interpreted, and does not seek to limit interpretation based on the active/passive distinction.

characteristics more analogous, from a power system security perspective, to those of batteries and wind and solar generation.[55]

Further, AEMO's Schedule 5.3 Participant Modelling Guidelines could provide indicative considerations to support consistent application, including whether a load has a passive front-end with little or no active control of current, or an actively controlled converter that determines the electrical behaviour seen by the grid.[56] For example, AEMO's Schedule 5.3 Participant Modelling Guidelines could set out indicative considerations, having regard to the *active* or *passive* nature of the power electronics used. For instance, the guidelines could consider whether the load has:

- a passive front-end with little or no active control of current (meaning it may not be treated as IBL); or
- an actively controlled front-end converter that determines the electrical behaviour seen by the grid (meaning it would be treated as IBL).

In summary, the Commission considers that retaining the susceptibility wording provides a technology-neutral basis for identifying loads whose power electronic controls may materially affect power system security, without automatically capturing every load that contains power electronic equipment. The Commission has also included a non-exhaustive list of examples below to help distinguish power electronics used primarily for electrical conversion from those that actively control a load's electrical behaviour and may interact dynamically with the power system.

Table 3.1: Illustrative examples of power-electronic loads and their potential IBL characteristics

Type of equipment	Likelihood of being classified as an IBL	Rationale
Electric Vehicle (EV) charging facilities	Potentially	Controlled charging converters can actively regulate the load's electrical characteristics and may therefore be classified as an IBL. The specific converter technology and controls would need to be considered
Drag chain conveyors/ conventional motor-driven conveyors	Unlikely	Conventional motor-driven conveyors are generally induction-motor loads rather than inverter-based technology
Variable-speed drives (VSDs)/variable-frequency drives (VFDs) with *passive* front ends	Unlikely	Where the drive uses a passive front end, such as a diode bridge rectifier, the power-electronic interface generally does not actively control the electrical characteristics seen by the network.
VSDs/VFDs with *active* front ends	Potentially	An active front end actively controls the electrical interaction between the load and the power system, including quantities such as current, active power, reactive power and power factor. This is more indicative of an IBL. However, in practice, many smaller fan drives use passive front ends, and individual installations are

55 It is important to note that data centres tend to use UPS systems that do not dynamically control reactive power in response to grid conditions. This means their susceptibility to control instability is somewhat lower as compared to many inverter based generators.

56 Final rule, clause S5.3.1aa.

Type of equipment	Likelihood of being classified as an IBL	Rationale
		generally small.
Heat pumps	Unlikely	Heat pumps commonly use inverter-controlled compressors, but many have passive front ends (for example, diode bridges).
Direct Current (DC) devices, such as LED/UV lamps	Unlikely	These devices typically use relatively small power-electronic converters with passive front ends and are unlikely to have the characteristics relevant to the IBL definition.
Induction furnaces	Unlikely	Smaller induction furnaces may use passive front-ends, such as diode-bridge rectifiers, and are therefore generally unlikely to be IBLs. Larger furnaces may use thyristor-based rectifiers or other controlled converters and could therefore exhibit IBL characteristics.
UPS systems with passive/uncontrolled rectifiers	Unlikely	Where the grid-side rectifier is passive, the power-electronic interface may not actively regulate the electrical characteristics seen by the network. The specific UPS configuration should nevertheless be considered. This is because the UPS can be supported by a range of power electronics that are likely to 'actively' respond to grid disturbances.
UPS systems with active front ends	Likely	An active rectifier can actively control the current drawn from the network and respond dynamically to network conditions, making the UPS more likely to fall within the IBL definition.
Other large industrial loads using controlled power converters	Potentially	Examples could include large rectifier loads, industrial drives or other converter-based equipment where the power electronics actively control the electrical characteristics of the load or its interaction with the power system.
Electrolyers	Likely	Electrolysers require power conversion equipment to convert AC electricity from the grid into the DC electricity needed by the electrolyser stack. Controlled rectifiers and converters can interact dynamically with the grid and, in some circumstances, cause oscillatory instability. However, some systems use relatively conventional rectifier arrangements, and the actual risk depends on the technology, control architecture, operating conditions and strength of the connecting network.

Source: AEMC

Note: The examples in this table are not exhaustive. They are illustrative only and are intended to assist in assessing whether a particular plant may exhibit the characteristics of an IBL. They are not intended to determine or prescribe the classification of any particular plant. The classification of a plant should be assessed having regard to its specific configuration, power-electronic interface and control characteristics.

3.1.2 The final rule introduces a new definition for large IBL in the NER

The Commission considers that the NER should contain a clear, threshold-based definition of a *large IBL* for the purposes of applying the Schedule 5.3 access standards. This will provide greater certainty for connecting parties and network service providers, while ensuring that the framework appropriately distinguishes IBLs according to their size and potential impact on the power system.

Consistent with that determination, the Commission's final rule defines '*large inverter based load*' in the NER as follows:[57]

> *An inverter based load with a nameplate rating of 30 MW or greater.*
>
> *To the extent an inverter based load comprises multiple elements or pieces of equipment covered by a single connection agreement, the nameplate rating must be measured as the aggregate consumption of those elements.*

The Commission received stakeholder support for its approach to include the definition of large IBL in the NER, as it provides a clear basis for applying the Schedule 5.3 framework consistently to large IBLs.[58] It also supports a more predictable and proportionate framework for managing the potential system impacts associated with the increasing scale of IBL connections. For instance, Canus Technologies submitted that:[59]

> *A clear, codified definition embedded in the National Electricity Rules supports investment certainty, consistent NSP assessment, and proportionate application of new obligations.*

The new definition for large IBL addresses a gap in the framework for applying Schedule 5.3 access standards

Prior to publication of this final rule determination, the NER did not contain a definition for large IBL. Consequently, the access standards framework in Schedule 5.3 did not clearly distinguish between IBLs according to their size and potential to have a material impact on the power system.

Although, AEMO's SSIAG provide a classification of large IBLs, based on a minimum capacity threshold of 5 MW and criteria relating to the use of power electronics and potential susceptibility to inverter-control instability.[60] The 5 MW threshold was developed by AEMO for the purpose of identifying plant that may require a system strength impact assessment.[61]

While the SSIAG classification of large IBLs was developed for the purposes of the system strength framework, some connecting parties have also used it to inform the broader application of the Schedule 5.3 access standards.[62]

The Commission recognises that, as IBLs connect to the NEM at pace, the absence of regulatory clarity has contributed to inconsistent treatment of IBL connections. Inconsistent treatment can create uncertainty for proponents and NSPs about the technical requirements that apply to individual connections. This can result in different requirements for connections with similar characteristics, increase connection costs and delays, and lead to requirements that are not

57 NER Chapter 10, Glossary definition of '*large inverter based load*'.

58 Submissions to the draft determination: Ergon Energy and Energex, p 1; CPU, p1; DCA, p 3; SA Power Networks, p1; VeriConnex, p 1; Canus Technologies, p 2; Antora Energy, p 3; Hydro Tasmania, p 1; Ausgrid, p 1; ElectraNet, p 1; Transgrid, p 1; Origin, p 1; APA, p 2; DAME, p 1; Syncline Energy, p 1; Powerlink, p 1; Tesla, p 1; AusNet, p 1; Sungrow, p 1; Akaysha, p 1; AEMO, p 2; Jemena, p 1; City of Melbourne, p 1; AWS, p 1; Endeavour Energy, p 1; VisIRGrid, p 1.

59 Canus submission to the draft determination, p 3.

60 AEMO, SSIAG, Section 2.2.

61 Pursuant to NER clause 4.6.6(a)(6), AEMO is required to prescribe for the purposes of the definition of large IBR in Chapter 10 of the NER the criteria for classification of an IBR as large. This must take into account plant type and size, as well as other relevant matters.

62 AEMC, *Improving the NEM access standards - Package 2*, Draft determination, 12 March 2026, chapter 3.

proportionate to the potential impact of an IBL on the power system. It may also result in gaps in the assessment and management of the impacts of IBLs on power system security and the quality of supply for other Network Users.

By embedding the definition of large IBL in the NER, the final rule reduces uncertainty about how Schedule 5.3 applies to IBLs, promotes more consistent treatment across the NEM, and better aligns technical requirements with the potential system security impacts of different sized connections. It also provides greater proportionality by avoiding the automatic application of the full Schedule 5.3 framework to all IBLs solely because they use power electronics, while ensuring that larger IBL connections are subject to the relevant access standards.[63]

The 30 MW threshold serves as an appropriate benchmark for classifying large IBL

The Commission considers that a clear size-based threshold is appropriate for identifying and classifying large IBLs. While the potential impact of an IBL connection on the power system will depend on factors such as its location, connection characteristics, technology and interaction with other plant, the size of an IBL is an important and readily identifiable indicator of its potential materiality. A threshold provides a practical screening point for identifying IBLs that warrant additional technical requirements, while providing greater certainty and consistency than a case-by-case approach.

The Commission has determined that an IBL with a nameplate rating of 30 MW or greater will be classified as a large IBL. The 30 MW threshold is appropriate and proportionate for the reasons outlined below.

The threshold is well targeted to the emerging scale of IBL connections in the NEM

AEMO's data on the current data centre connection queue indicates that approximately 91 per cent of data centres seeking connection in the NEM, excluding Queensland, have a proposed capacity above 30 MW. In total, 223 data centres in the available data exceed 30 MW. This indicates that the threshold will capture the vast majority of the large IBL projects currently seeking connection. The Commission considers that this provides a useful, practical check that 30 MW is not set at a level that would exclude the emerging cohort of IBLs most relevant to the reforms made in the final rule determination.

63 For more information on how Schedule 5.3 applies based on load classification, see section 3.2.

Figure 3.1: MW size of data centres in the connection queue

Range	NSW	SA	TAS	VIC	Total
1-30 MW	18	2	1	1	22
31-50 MW	3	0	1	21	**25**
51-100 MW	23	2	0	28	53
101-200 MW	31	0	1	15	47
201-500 MW	30	22	1	22	75
501-800 MW	2	2	0	4	8
801-1000 MW	4	1	0	4	9
1001-1200 MW	2	2	0	0	4
1201-1400 MW	1	1	0	0	2
1401-5000 MW	1	0	0	1	2

Source: AEMO.
Note: Data from Queensland was not available at the time of drafting.
Note: Where projects were reported in multiple development stages, each stage was treated as a separate project and counted independently.

30 MW is broadly consistent with the scale of thresholds used in other electricity systems, when compared with system size

International practice does not indicate that a single MW threshold is appropriate across all electricity systems. Rather, thresholds for technical assessment tend to reflect the size and characteristics of the relevant power system. On this basis, the 30 MW threshold is broadly comparable with the 75 MW threshold used by the Electric Reliability Council of Texas (ERCOT) when expressed relative to peak demand.[64] It is also less conservative, on a system-size-adjusted basis, than the threshold used for connection studies in Ireland. This provides supporting evidence that 30 MW is within a reasonable range for a system of the NEM's scale.[65]

Figure 3.2: International large load thresholds as a percentage of peak demand

Market	Approx. peak demand	Large-load trigger	% of peak demand
NEM	~34 GW	30 MW	**~0.09%**
ERCOT	~90–95 GW	75 MW	**~0.08%**
PJM	~150–165 GW	no single formal "large load" threshold; many planning discussions use 50–100 MW as the scale of concern	~0.03–0.07%
Ireland (EirGrid)	~5.5–6 GW	10 MVA (connection studies)	~0.17%

Source: AEMC.

30 MW provides a clear and proportionate distinction between smaller and larger IBLs

The existing 5 MW threshold in AEMO's SSIAG was developed for the purposes of the system strength framework, but has increasingly been relied upon more broadly to inform the application

64 ERCOT defines large loads as facilities at a single site with an aggregate peak demand of 75 MW or more, per its Nodal Protocol Revision Request (NPRR) 1234. See also Texas Register, 16 TAC §25.370 – ERCOT Large Load Forecasting Criteria.

65 See AEMO, Quarterly Energy Dynamics Q1 2026, April 2026, p 3.

of Schedule 5.3 access standards. Stakeholder feedback to the Commission indicated that the 5 MW threshold was too low for this broader purpose. For example, submissions to the consultation paper argued that continuing to use the 5 MW threshold could result in significant additional administrative, engineering and modelling costs for relatively small connections without commensurate system security benefits.[66] Stakeholders such as Ausgrid, AusNet, Data Centres Australia, and SA Power Networks considered 30 MW to be considerably more proportionate than the existing 5 MW threshold, and Jemena submitted to the draft determination that:[67]

> *"In our view, the move away from a broad 5 MW threshold towards a more proportionate framework is a positive and practical improvement. The proposed distinction better reflects the different risk profiles of these connections and should help avoid imposing unnecessary compliance costs on projects that are unlikely to have a material system security impact. 30 MW threshold provides a practical and transparent proxy for the potential materiality of an IBL's impact on the power system. While the actual impact of an IBL will depend on factors including its location, connection characteristics and technology, larger IBLs have the potential to have a greater influence on power system behaviour. As such, a defined size-based threshold provides an appropriate first step in identifying connections for which the potential system impacts warrant comprehensive application of the technical requirements under Schedule 5.3 of the NER."*

30 MW is consistent with existing thresholds used by AEMO for registration and modelling - including for generation

The NER uses 30 MW as the default breakpoint for distinguishing scheduled and non-scheduled generating units.[68] Generating units below 30 MW are generally classified as non-scheduled unless AEMO determines otherwise.[69] The Commission considers that using the same value as an established NER threshold provides a familiar and administratively straightforward basis for distinguishing larger plant, while recognising that the purpose of the large IBL threshold is different from the registration framework for generating units. Similarly, in Section 2.1 of the Power System Model Guidelines (PSMG), AEMO uses a 30 MW threshold to mandate the provision of modelling by generators.[70]

The Commission recognises that the 30 MW threshold does not always correlate with system security impact

In submission to the draft determination, some stakeholders highlighted that MW size is not necessarily determinative of system security impact. For instance, VicGrid submitted that a MW-based classification may not adequately capture the potential system security risks associated with a connection's location and network characteristics, local fault levels, and the cumulative impact of multiple IBL connections.[71] Ausgrid proposed using connection voltage rather than MW size to classify large IBLs, on the basis that lower-voltage connections are generally more electrically and geographically remote from the transmission network and therefore less likely to give rise to the broader system security risks the framework is intended to address.[72]

66 See AEMC, *Improving the NEM access standards - Package 2*, Draft determination, 12 March 2026, pp 27-28.
67 Jemena submission to the draft determination, p 1.
68 NER clause 2.2.3(a).
69 AEMO, Guide to Registration Exemptions and Production Unit Classifications, Section 5.3, p 17.
70 AEMO, Power System Model Guidelines, 25 September 2025, Section 2.1.
71 VicGrid submission to the draft determination, p 1.
72 Ausgrid submission to the draft determination, p 2.

While the 30 MW threshold helps determine the likely system impact of the IBL connection, the potential impact of an IBL is assessed through the access standards negotiation framework, which considers the relevant technical characteristics and circumstances of the connection.

A fixed MW threshold provides a clear and transparent basis for identifying IBLs warranting additional consideration, while the technical assessment of individual connections can continue to account for location, connection characteristics and other relevant factors. As discussed during the technical working group (TWG) sessions,[73] the Commission also considers that a voltage-based threshold would introduce additional complexity and could risk under-capturing materially significant IBLs.

The definition clarifies that the 30 MW threshold captures all IBL plant within a connection

The second limb of the definition clarifies how the 30 MW threshold applies where an IBL comprises multiple elements or pieces of equipment covered by a single connection agreement.[74] In these circumstances, the nameplate rating is determined by aggregating the consumption of those elements, rather than assessing each element separately.

This ensures that the classification of an IBL reflects the aggregate scale of the connection, rather than the size of its individual components. It also reduces the risk of connections comprising multiple smaller units being treated differently from single units with an equivalent aggregate consumption, supporting the consistent application of the new access standards.

The Commission notes that the second limb of the definition serves a different purpose from the final rule's provisions for assessing the aggregate system impacts of electrically proximate IBL connections.[75] The definition clarifies how the 30 MW threshold is applied to multiple elements or pieces of equipment covered by a single connection agreement, ensuring the classification reflects the aggregate consumption of the connection. By contrast, the aggregate assessment provisions allow NSPs to consider the potential combined system impacts of multiple electrically proximate IBL connections, including connections covered by separate connection agreements.

Accordingly, the definition determines whether a connection meets the threshold for classification as a large IBL, while the aggregate assessment provisions help ensure that the potential system impacts of clustered connections are not overlooked when individual connections are assessed.

3.1.3 The final rule makes consequential amendments to the definition of IBR and affects the application of Chapter 5A of the NER

The final rule makes consequential amendments to the definition of large IBR

The final rule amends the definition of *large inverter-based resource* to clearly distinguish between IBLs and asynchronous production units (inverter-based generators). Under the final rule, IBLs will no longer be classified as large IBLs by applying the criteria specified in the SSIAG. Instead, their classification will be determined in accordance with the definition of *large IBL* introduced by the final rule. Asynchronous production units will continue to be classified as large IBRs in accordance with the criteria specified in the SSIAG (that is, having capacity of at least 5 MWunder the current guidelines).

73 For information from the TWG sessions, see our website.

74 NER Chapter 10, Glossary definition of '*large inverter based load*'.

75 Final rule, clause S5.3.1a(b); See also section 3.2.3 of this determination which explains how clustered connections are to be assessed.

The final rule impacts the application of Chapter 5A

The final rule also impacts the application of the Chapter 5A framework, which principally provides the connection framework for retail customers and eligible non-registered DER providers connecting to distribution networks.

Clause 5A.A.2(a1) stipulates that Chapter 5A does not apply to applicants seeking connection services for a large IBR, except for the provisions in Part E, which continue to apply.[76] Under the final rule, Chapter 5A (except Part E) will:

- not apply to IBLs classified as large pursuant to the new NER definition, which uses a 30 MW threshold, as opposed to the 5MW threshold previously applied in the SSIAG
- continue to not apply to IBR classified as large under the SSIAG, which currently uses a 5 MW threshold.[77]

The Commission also notes that Chapter 5A requires technical and safety requirements to be addressed in connection arrangements. However, the application of Chapter 5A does not displace the technical requirements in Schedule 5.2 or Schedule 5.3 where those requirements apply, nor does it displace the operation of clause 5.3.4A of the NER. For example, where a retail customer is a Schedule 5.2 or Schedule 5.3 Participant, the relevant access standards in Schedule 5.2 or Schedule 5.3 continue to apply to the extent specified in the NER.[78]

3.2 The final rule clarifies how the Schedule 5.3 access standards apply to different load classifications

The Commission's final rule provides a clear and consistent framework for applying the Schedule 5.3 access standards to different load classifications, in a manner that is proportionate to the potential system impacts of those loads and supports the safety, security and reliability of the power system. The application framework builds on the new and revised definitions of IBL and large IBL, outlined in section 3.1 of this chapter.

The Commission recognises that, prior to publication of this final rule determination, the NER did not provide a clear and consistent framework for determining when the access standards in Schedule 5.3 should apply across different load types and sizes. This has contributed to differences in how NSPs have applied Schedule 5.3.

Where the potential system impacts of loads are not consistently recognised, the access standards applied to the connection may not sufficiently manage the risks associated with that connection. Conversely, applying onerous technical requirements to smaller or less system-significant loads may impose costs disproportionate to the risks they pose.

The Commission considers that these issues are increasingly important as the number and size of IBLs connecting to the NEM increase. In particular, the emergence of large loads such as data centres means that individual connections, and clusters of connections in a particular area, can represent a material change in the electrical characteristics of the power system.

In summary, the final rule:

- Simplifies application of the Schedule 5.3 access standards to IBLs by using the definition for large IBL, rather than the tiering framework proposed in the draft rule determination. This means the Schedule 5.3 access standards apply to IBLs less than 30 MW at the NSP's

76 NER Chapter 5A, Part E. See also AER, Connection charge guidelines for electricity customers, October 2024.
77 AEMO, SSIAG, section 2.2.
78 NER clause 5.3.1A(d).

discretion, and automatically to those 30 MW or greater, subject to the Chapter 5 access standards negotiation framework.

- Harmonises application of the Schedule 5.3 access standards to IBLs across transmission and distribution networks.
- Requires NSPs to conduct aggregated assessments for clustered or electrically proximate IBLs, where appropriate.
- Maintains the existing framework for applying the Schedule 5.3 access standards to non-IBLs, commonly known as 'traditional loads' such as smelters and refineries.

The Commission has developed an industry fact sheet alongside this final rule determination to support connecting parties with applying the Schedule 5.3 access standards to different load types.[79]

This section explains the Commission's rationale for the final rule and the substantial changes made to the draft rule in response to stakeholder feedback and further consideration.

Table 3.2: An overview of the application of Schedule 5.3 access standards

Plant type	How Schedule 5.3 applies – distribution connections	How S5.3 applies – transmission connections
Large IBL (30 MW +)	Schedule 5.3 applies automatically Clause S5.3.1a(a1)(2)(i)(A)	Schedule 5.3 applies automatically Clause S5.3.1a(a1)(2)(i)(A)
IBL (< 30 MW)	The NSP has discretion to determine the extent to which the Schedule 5.3 access standards apply. The NSP must consider whether connecting or operating the IBL could affect the quality or security of supply to other Network Users. Clause S5.3.1a(a1)(2)(i)(B)	The NSP has discretion to determine the extent to which the Schedule 5.3 access standards apply. The NSP must consider whether connecting or operating the IBL could affect the quality or security of supply to other Network Users. Clause S5.3.1a(a1)(2)(i)(B)
Integrated IBL (part of an integrated resource system)	*Schedule 5.3 applies to an integrated IBL that consumes electricity from a network (other than for auxiliary purposes). Clause S5.3.1(a), and (a1)(1). See also S5.2.1(a)	*Schedule 5.3 applies to an integrated IBL that consumes electricity from a network (other than for auxiliary purposes). Clause S5.3.1(a), and (a1)(1). See also S5.2.1(a)
Non-IBL (regardless of MW size)	*The NSP has discretion to determine the extent to which the Schedule 5.3 access standards apply. The NSP must consider whether connecting or operating the load could adversely affect the quality or	*Schedule 5.3 applies automatically Note: the IBL-specific access standards (clauses S5.3.11-14) do not apply to non-IBLs. ClauseS5.3.1a(a1)(2)(ii)(A)

79 The fact sheet is available on our website.

Plant type	How Schedule 5.3 applies – distribution connections	How S5.3 applies – transmission connections
	security of supply to other Network Users. Note: the IBL-specific access standards (clauses S5.3.11-14) do not apply to non-IBLs. Clause S5.3.1a(a1)(2)(ii)(B)	

Source: AEMC.
Note: *This is consistent with the status quo prior to publication of *Improving the NEM access standards – Package 2* final rule determination.

3.2.1 The final rule simplifies how Schedule 5.3 access standards apply to IBLs

Under the final rule, the Schedule 5.3 access standards will apply to IBL connections to a network as follows:

- **Small IBL with a nameplate rating of less than 30 MW:** at the *discretion* of the NSP, to the extent the NSP considers that the connection or operation of the plant would adversely affect the quality or security of services to other Network Users.[80]
- **Large IBL with a nameplate rating of 30 MW or greater:** all the Schedule 5.3 access standards apply *automatically*.[81]

In both cases, the application of access standards remains subject to the Chapter 5 negotiation process and may also involve AEMO's advisory matters function. [82]

The final rule simplifies the framework proposed in the draft rule by removing the distinction between Tier 2 and Tier 3 IBLs for the purposes of applying Schedule 5.3 access standards. Under both the draft and final rules, IBLs with a nameplate rating of 30 MW or greater are classified as large IBLs. However, under the draft rule, the application of Schedule 5.3 access standards to Tier 2 IBLs (30 MW or greater but less than 100 MW) would have remained at the NSP's discretion, while the standards would have applied automatically to Tier 3 IBLs (100 MW or greater).[83] The final rule removes this distinction, such that all large IBLs are automatically subject to all Schedule 5.3 access standards, reducing the scope for NSP discretion in determining whether the standards apply to connections of 30 MW or greater.

The Commission considers this approach achieves the NEO by providing a simpler and clearer framework for NSPs and connection applicants. It also responds to stakeholder feedback that urged the Commission to simplify the framework, outlined below. Removing the distinction between Tier 2 and Tier 3 IBLs reduces the complexity of determining whether Schedule 5.3 access standards apply automatically, promotes more consistent application of the standards to large IBLs, and provides greater certainty for proponents about the technical requirements that will apply to their connections. This can support more efficient connection processes and reduce uncertainty for proponents, while maintaining appropriate technical requirements to support the secure and reliable operation of the power system. At the same time, retaining NSP discretion for smaller IBLs allows connection requirements to be tailored where necessary to protect the quality or security of services to other Network Users. Together, these features support the efficient

80 Final rule, clause S5.3.1a(a1)(2)(i)(B).
81 Final rule, clause S5.3.1a(a1)(2)(i)(A).
82 See section 4.1.4 of this determination for further information on AEMO's advisory matters function.
83 See Figure 3.3 for an overview of the tiering framework proposed in the draft determination.

connection of new loads while maintaining power system security and reliability, consistent with the NEO.

Stakeholders supported limiting NSP discretion to promote consistent application of Schedule 5.3 access standards

The final rule reflects stakeholder feedback on the draft determination and the Commission's further consideration of how the classification framework can provide proportionate connection requirements while maintaining power system security.

While many stakeholders generally supported introducing a tiered framework for classifying IBLs,[84] they questioned the extent to which the Schedule 5.3 access standards should apply automatically, rather than at the discretion of NSPs, particularly for IBLs connecting to distribution networks. Stakeholders raised concerns that discretion could lead to inconsistent connection requirements for IBLs with similar technical characteristics and system impacts.[85]

For example:

- Ergon Energy and Energex recommended removing provisions allowing discretionary application of the access standards to improve transparency, consistency and regulatory certainty.[86] SA Power Networks and AusNet similarly cautioned that NSP discretion for Tier 1 and Tier 2 connections could lead to inconsistent interpretation and application of the access standards across jurisdictions.[87]
- Data Centres Australia (DCA) reported that differing distribution network service (DNSP) approaches to technically equivalent loads can result in different costs, timelines and obligations for multi-site operators.[88] Tesla cautioned that allowing NSP discretion for Tier 2 connections would create uncertainty in the connection process.[89]
- Transgrid considered the 100 MW threshold between Tier 2 and Tier 3 too high, noting that modular data centres may use similar equipment and have similar disturbance ride-through capabilities regardless of their overall capacity. It considered that disturbance ride-through requirements could reasonably apply to data centres of 30 MW.[90]
- Citipower, Powercor and United Energy (CPU) submitted that DNSPs are best placed to assess local network conditions.[91] However, SA Power Networks and Transgrid submitted that assessing the broader implications for bulk power system security can be better achieved through automatic application of the Schedule 5.3 access standards to large IBLs, rather than relying on DNSP discretion.[92]
- Multiple smaller IBLs may aggregate to produce an impact that is equivalent to a single large load, potentially creating system security risks that are not adequately captured when connection requirements are assessed individually.[93] AusNet also expressed concern that transmission operators may lack sufficient visibility to manage these aggregate impacts.[94]

84 Submissions to the draft determination: Ergon Energy and Energex, p 1; CPU, p 1; Celero and GPE, p 1; DCA, p 4; SA Power Networks, p 2; AusGrid, p 2; ElectraNet, p 2; Powerlink, p 1; Enedeavour Energy, p 1; Tesla, p 1; AusNet, p 2; Sungrow, p 1.

85 Submissions to the draft determination: Ergon Energy and Energex, p 1; VicGrid, p 2; DCA, p 4; SA Power Networks, p 2; Transgird, pp 1, 4, 6; Tesla, p 2; AusNet, p 2; AWS, p 5; VisIRGrid, p 7.

86 Ergon Energy and Energex submission to the draft determination, p 1.

87 Submissions to the draft determination: SA Power Networks, p 2; AusNet,p 2.

88 DCA submission to the final determination, p 4.

89 Tesla submission to the draft determination, p 1.

90 Transgrid submission to the draft determination, p 4.

91 See submissions to the draft determination: CPU, p 1; Ausgrid, p 2.

92 Submissions to the draft determination: SA Power Networks, p 2; Transgrid, pp 1, 6.

93 Submissions to the draft determination: VicGrid, p 2; AusNet, p 2.

The Commission recognises that the draft rule's approach was intended to allow NSPs to tailor the application of Schedule 5.3 access standards to individual IBL connections, having regard to local network characteristics. However, the feedback highlighted that this flexibility could result in different requirements for connections with similar technical characteristics and system impacts. This could undermine regulatory certainty, increase connection costs and delays, and lead to inefficient investment and connection outcomes.

The Commission has also considered the implications of inconsistent application for power system security. In particular, assessing connections individually and primarily by reference to local network conditions may not adequately account for the cumulative impacts of multiple IBLs or their effects on the broader power system. These concerns are particularly relevant as data centre demand grows and a substantial proportion of this demand connects to distribution networks.

Consistent application of the Schedule 5.3 access standards will help maintain power system security

The Commission's consultation has highlighted the importance of ensuring that the connection framework addresses not only the local impacts of IBLs, but also their potential effects on upstream networks and the broader power system. Evidence on the location of data centre demand illustrates why this is important.

According to an Oxford Economics report commissioned by AEMO, more than 98 per cent of data centre demand was connected to distribution networks in FY25. Only 1.5 per cent of data centre electricity consumption was connected to the transmission network in FY25, although this share is projected to increase to 32 per cent by FY30.[95]

Although an individual IBL may connect to a distribution network, its operation can affect upstream networks. Multiple IBLs connecting in the same or different parts of the distribution network may also have cumulative impacts on the transmission network and broader power system. Connection assessments that focus on individual facilities or local network conditions may therefore fail to capture these wider impacts.[96]

As discussed in the draft determination, this creates a potential misalignment between responsibility for assessing connection impacts and responsibility for managing the resulting risks. NSPs are primarily accountable for managing impacts within their own networks. Where the upstream transmission-level impacts of an IBL, or the cumulative impacts of multiple IBLs, are not adequately identified at the connection stage, the burden of managing those risks may fall to transmission network service providers (TNSPs) or AEMO. This may require operational interventions, such as constraints or frequency control ancillary services (FCAS) procurement, increasing costs that may ultimately be borne by consumers rather than being efficiently reflected in connection decisions.[97]

Inconsistent application of connection requirements can compound these challenges by limiting the consistency of information available to AEMO. AEMO relies on connection frameworks and technical standards to understand and assess the potential impacts of connected plant. Divergent DNSP practices and differing assumptions about load behaviour can make it more difficult to assess aggregate impacts, plan for emerging risks and make informed operational decisions as large, technology-enabled loads grow.

94 AusNet submission to the draft determination, p 2.

95 Oxford Economics, Data Centre Energy Demand, Final Report, July 2025, pp 3, 9.

96 For instance, see: AusNet, Integrating Data Centres: Prioritising Power System Integrity Challenges in the NEM, White Paper, June 2026; AEMO, 2026 General Power System Risk Review Report, July 2026; Oxford Economics, Data Centre Energy Demand, Final Report, July 2025.

97 AEMC, *Improving the NEM access standards - Package 2*, draft determination, 12 March 2026, p 28.

The final rule responds to these concerns by providing a more consistent framework for applying Schedule 5.3 access standards and requiring consideration of the aggregate impacts of IBL connections. This supports more consistent assessment of connection impacts across the NEM and helps ensure that the potential effects of IBLs on both local networks and the broader power system are appropriately considered.

The Commission considers that this approach promotes the NEO. By improving consistency in the application of access standards and supporting the management of cumulative and upstream risks, the final rule reduces the likelihood that avoidable costs of managing power system security are borne by consumers rather than being appropriately considered in connection decisions.

Removing the distinction between 30 MW and 100 MW IBL connections represents the simplest approach

Stakeholders proposed several alternatives to the draft rule to support the proportionate and consistent application of Schedule 5.3 access standards, including:

- A national DNSP guideline on the exercise of discretion under the new framework, covering trigger thresholds, process timelines, documentation requirements and a review pathway.[98]
- Additional subclasses or scalable requirements for ultra-large IBLs, to improve clarity for industry participants and NSPs.[99]
- Criteria in the final rule for how NSPs must exercise their discretion for Tier 2 IBLs, having regard to the connection point, local network conditions, proximity to other large IBL concentrations, and the ratio of IBL to traditional load at the facility.[100]

The Commission considers that these alternatives would introduce additional complexity into the regulatory framework without necessarily providing a more durable or effective means of managing the system security impacts of IBLs. A national DNSP guideline would add another layer of guidance to support the exercise of discretion, while additional subclasses or scalable requirements could require further regulatory refinement as the size, configuration and technical characteristics of data centres continue to evolve. Similarly, prescribing detailed criteria for the exercise of NSP discretion could reduce flexibility to respond to differences in local network conditions and the evolving characteristics of connecting loads.

The Commission considers that the final rule achieves the underlying objectives of these alternatives through a simpler and more consistent framework. This was largely supported by stakeholders who attended the Commission's 20 July 2026 TWG meeting.[101] By removing the distinction between Tier 2 and Tier 3, the final rule requires all IBLs with a nameplate rating of 30 MW or more to meet the applicable Schedule 5.3 access standards, rather than leaving their application to NSP discretion. This provides greater regulatory certainty, reduces the risk of inconsistent application across networks and ensures that potentially material system security impacts are assessed, irrespective of whether an IBL is connected to a transmission or distribution network. For smaller IBLs, NSP discretion is retained to support proportionate requirements that reflect local network conditions, while the framework continues to recognise the potential aggregate impacts of multiple smaller connections.

Moreover, this approach is supported by:

98 DCA submission to the draft determination, p 4.

99 Submissions to the draft determination: Sungrow, p 1; VisIRGrid, p 2.

100 AWS submission to the draft determination, p 5.

101 The TWG meeting materials are available on our website.

- The negotiated access standards framework under Chapter 5 of the NER,[102] which preserves flexibility for NSPs and connecting parties to negotiate access standards that reflect the technical characteristics of the connection and relevant network conditions.
- The modelling guidelines to be developed by AEMO under the final rule, which will apply to Schedule 5.3 plant, including IBLs, and be informed by principles outlined in the final rule.[103] These principles include proportionality and scalability, materiality, consistency, practicability, efficiency and transparency. They are intended to ensure modelling requirements are commensurate with the nature and potential impacts of the connecting plant, account for the practical availability and maturity of modelling information, and reduce unnecessary or iterative modelling. This will support more efficient connection assessments, reduce avoidable costs and delays, and promote consistent application of modelling requirements across NSPs. More information about this part of the final rule is outlined in chapter 4 of this final determination.

Figure 3.3: Superseded tiering framework for classifying loads in the draft determination

	Tier	Size	Plant type	Application of S5.3
LARGE IBL	Tier 1	< 30 MW	IBL connections to **distribution networks**	• NSP must apply the applicable S5.3 access standards to the extent that the plant would otherwise adversely affect the quality or security of network service *Note: this maintains the existing NSP discretion* *Note: **Non-IBL load connections to distribution networks**, regardless of MW size, would be considered as being like a Tier 1 connection, consistent with the existing framework* • Regarding the new disturbance ride through access standards under the draft rule, the NSP may apply them only to the extent that there may be an **aggregate** of Tier 1 loads that may have an adverse system security impact.
	Tier 2	30 – < 100 MW	Large IBL connections to **distribution networks**	• NSP must apply the applicable S5.3 access standards to the extent that the load would otherwise adversely affect the quality or security of network service. • Regarding S5.3 access standards that only apply to IBL, including the new proposed standards, **the NSP may apply those access standards to the extent it considers appropriate**, having regard to the expected impact of the connection on the quality and security of network services to other network users *Note: this maintains the existing NSP discretion*
	Tier 3	> 100 MW	Large IBL connections to **distribution networks**	• All S5.3 access standards automatically apply, including (for IBL) any IBL specific access standards. *Note: This removes existing NSP discretion* *Further note: all load connections to **transmission networks**, or registered loads, regardless of MW size, would be considered as being like a Tier 3 connection, consistent with the existing framework*

Source: AEMC.
Note: This is included for readability, to help contrast the final rule with the draft.

3.2.2 The final rule harmonises the application of the Schedule 5.3 access standards to IBLs across transmission and distribution networks

The final rule harmonises the application of the Schedule 5.3 access standards to IBLs across both transmission and distribution networks.[104]

The Commission's proposed tiering framework in the draft rule determination was only intended to apply to distribution network connections. This was because the Schedule 5.3 access standards were being applied inconsistently by DNSPs, owing to the absence of a clear framework for classifying loads to determine when and how the Schedule 5.3 access standards would apply.[105] Conversely, if an IBL were to connect to a transmission network prior to the commencement of

102 NER clause 5.3.4A.
103 Final rule, clause S5.3.1aa.
104 Final rule, clause S5.3.1a(a1)(2)(i).
105 AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, p 26.

this final rule, the existing Schedule 5.3 access standards would have applied automatically, regardless of size.[106]

AEMO and DAME raised concerns that applying the tiering framework only to distribution-connected IBLs could result in inconsistent treatment of IBLs connecting at similar voltage levels across transmission and distribution networks. Specifically:

- AEMO noted that minimum transmission network voltages vary across jurisdictions and may be comparable to those of some distribution networks. In particular, AusNet, ElectraNet and TasNetworks operate transmission assets at or below 132 kV. AEMO considered that, under the draft rule, IBLs connecting to lower-voltage transmission networks could be treated differently from equivalent connections to distribution networks, and suggested that the Commission consider extending the tiering framework to transmission networks.[107]
- Similarly, DAME considered that applying the full suite of Schedule 5.3 access standards to all transmission-connected IBLs, regardless of size, could result in disproportionate requirements. DAME noted that a sub-30 MW data centre connecting to a transmission network would face more onerous requirements than an equivalent facility connecting to a distribution network, despite potentially connecting to a stronger network. DAME recommended that the Commission consider a proportionate tiering framework for transmission-connected IBLs, with thresholds appropriate to the characteristics of transmission networks. It also highlighted the potential benefits of facilitating transmission-connected IBLs, particularly those co-located with existing variable renewable energy generation.[108]

In light of those submissions, and consultation during our 20 July 2026 TWG meeting, the Commission's final rule applies the classification framework for IBLs to both distribution and transmission network connections. Harmonising the classification framework across transmission and distribution networks promotes the NEO by supporting consistent and proportionate application of the access standards, reducing the risk of inefficient investment and connection outcomes while ensuring that technical requirements appropriately reflect the size and characteristics of connecting IBLs.

3.2.3 The final rule allows NSPs to consider potential aggregate impacts from clustered IBLs

The final rule allows NSPs to consider the aggregate impact of an IBL connection together with other electrically proximate IBL connections, including existing and planned connections, when determining whether the load should be treated as a large IBL. In doing so, the NSP must consider whether it is reasonable and appropriate to assess the combined impact of the connections, having regard to their electrical configuration.[109]

Aggregate assessment example

Where several data centres each have a connection capacity of less than 30 MW but are electrically proximate, the NSP may consider their combined impact when determining whether the relevant connection should be treated as a large IBL. This approach recognises that multiple smaller connections may have a material combined impact on the power system, while allowing the NSP to account for the electrical characteristics of the

106 NER, clause S5.3.1a(a1)(1)(iii), v 256.
107 AEMO submission to the draft determination, p 6.
108 DAME submission to the draft determination, p 1.
109 Final rule, clause S5.3.1a(b)(2).

connections rather than applying aggregation solely on the basis of their proximity.

The Commission's final rule is consistent with the intent of the draft rule, which required NSPs to consider the expected aggregate impact of IBL connections below 30 MW on their networks.[110] However, this has been adjusted for the final rule so that aggregate assessments may be undertaken for clustered IBL connections, regardless of size, where reasonable to do so, and against any of the relevant Schedule 5.3 access standards.[111]

Stakeholders called for the framework to account for the cumulative system security impacts of clustered IBLs and prevent proponents from circumventing large IBL thresholds

In response to the draft determination, stakeholders highlighted that a capacity-based classification framework may not adequately capture the system security risks posed by clusters of smaller IBLs, particularly where connections are electrically proximate and have coincident control systems and settings.[112] Several stakeholders also cautioned that proponents may split projects or size connections below the tier thresholds proposed in the draft determination to avoid more stringent technical requirements, despite the potential for significant cumulative impacts on power system security. Stakeholders emphasised the importance of ensuring the framework accounts for aggregate impacts while maintaining proportionate requirements that reflect the characteristics and risks of individual connections. This feedback is summarised below:

- **Aggregate system security impacts of clustered IBLs:** VicGrid noted that network characteristics, fault levels, connection location and the cumulative impact of multiple IBLs may not be adequately captured by a MW-based classification approach.[113] Hydro Tasmania similarly emphasised the importance of allowing NSPs to recognise the potential for clusters of smaller IBLs to cause system disturbances.[114] Tesla cited AEMO's preliminary dynamic modelling, which indicated that the aggregate reduction in IBL demand following a credible voltage disturbance could be comparable to, or exceed, a major credible contingency event. Tesla emphasised that this risk is not confined to Tier 3 connections, as smaller IBLs concentrated in the same part of the network may exhibit similar responses and produce significant combined impacts.[115] AusNet also cautioned that the system security implications of individual or clustered IBLs depend on the characteristics of the relevant power system, including network size, system strength, power flows and the availability of frequency control ancillary services.[116] ElectraNet similarly observed that the aggregate behaviour of increasingly large, concentrated and technically complex IBLs could materially affect power system security. They emphasised that credible emergency or alternate network operating configurations be considered where they may materially influence aggregate system behaviour or power system security outcomes.[117]
- **Avoidance of tier thresholds and integrated facilities:** SA Power Networks suggested proponents may size projects just below regulatory thresholds to avoid step changes in

110 AEMC, *Improving the NEM access standards - Package 2*, draft rule determination, p 33.

111 As noted in chapter 1 of this final determination, the draft rule only contemplated aggregate assessments with respect to the new disturbance ride through and instability monitoring access standards. Further rationale is also included at the end of this section.

112 For more information on coincident IBL behaviour, see: AusNet, Integrating Data Centres: Prioritising Power System Integrity Challenges in the NEM, White Paper, June 2026, website.

113 VicGrid submission to the draft determination, pp 1-2.

114 Hydro Tasmania submission to the draft determination, p 1.

115 Tesla submission to the draft determination, p 2.

116 AusNet submission to the draft determination, p 5.

117 ElectraNet submission to the draft determination, p 1.

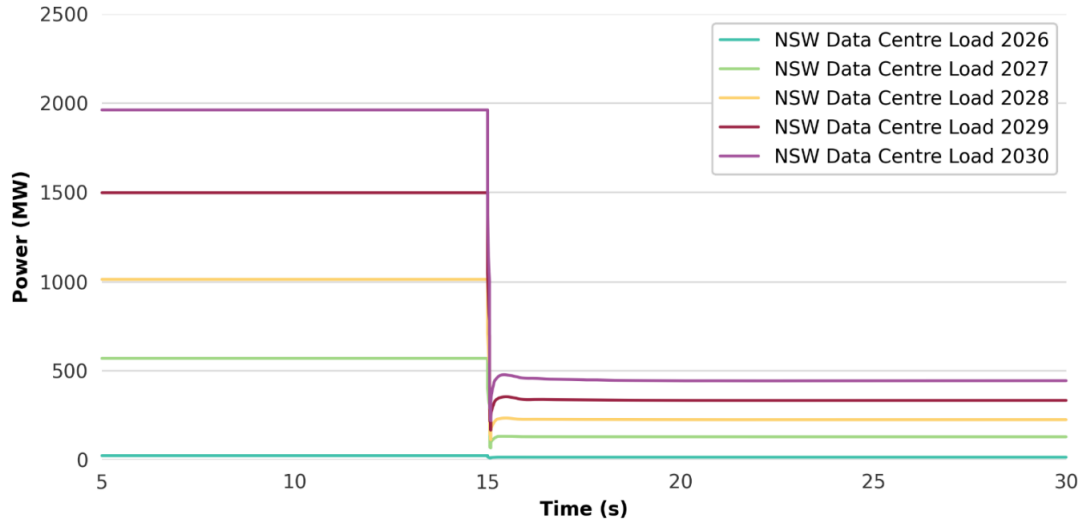
technical requirements, noting the potential implications for system security.[118] Akaysha raised a similar concern that applicants may split projects into multiple connections below the relevant thresholds if compliance requirements become too onerous.[119] Similarly, ElectraNet identified a particular risk for campus-style developments and integrated facilities comprising multiple smaller load blocks, which may operate as a single entity despite being connected through separate connection points. It recommended assessing electrically or operationally integrated load units on an aggregate capacity basis for tier classification and access standard application, supported by interaction studies examining coordinated behaviour across the facility.[120]

Allowing NSPs to consider potential aggregate impacts from clustered IBLs will promote power system security and stability

The Commission agrees that the impact of an IBL connection cannot always be assessed in isolation from other IBL connections. Multiple IBLs that are electrically proximate may exhibit similar or correlated behaviour following a power system disturbance, including through common control systems, protection settings, equipment or operating characteristics. As the number and size of IBL connections increase, these interactions may result in a material aggregate impact on the power system that would not be apparent from assessing each connection individually.

AEMO modelling of smaller IBLs in New South Wales (NSW) found that, while an individual load may have a relatively small impact in isolation, multiple loads may reduce consumption or disconnect in response to a disturbance at approximately the same time. As the number of such connections increases, the aggregate change in demand can become progressively larger and, by 2029–30, could be comparable to or greater than the loss of a single large industrial load.[121] AEMO also modelled the potential contingency sizes associated with smaller data centre connections, shown in Figure 3.5 below.

Figure 3.4: New South Wales data centre disconnections in the absence of ride through access standards following a credible contingency (MW)



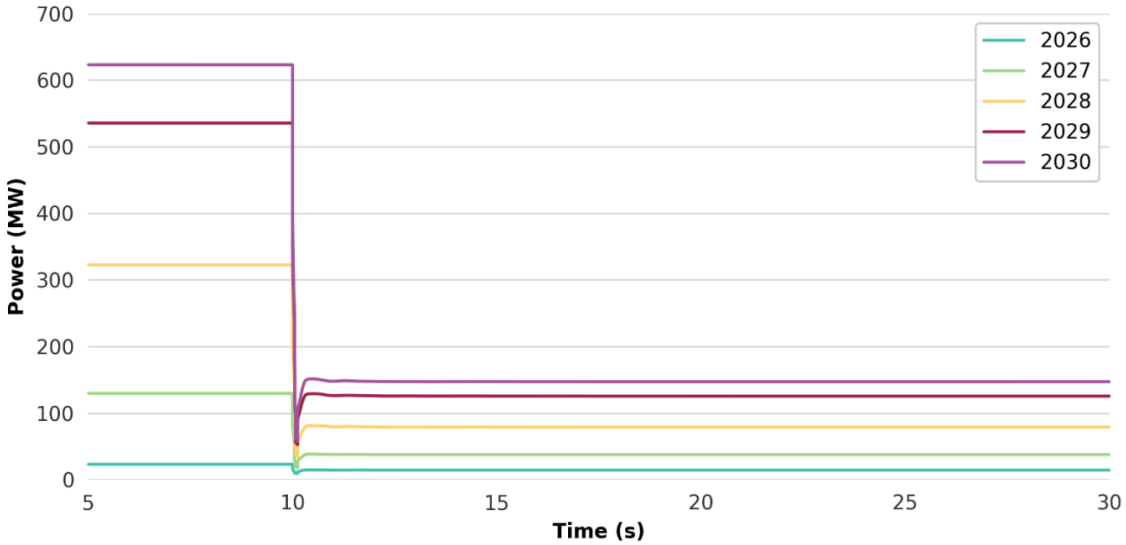
Source: AEMO, 2026 General Power System Risk Review (GPSRR), Final Report, July 2026, p 24.

118 SA Power Networks submission to the draft determination, p 2.
119 Akaysha submission to the draft determination, p 3.
120 ElectraNet submission to the draft determination, p 4.
121 See Figure 3.4 below.

In light of these risks, the final rule ensures that the application of the access standards reflects the material system impact of connected IBLs, rather than allowing the impact of multiple connections to be assessed solely on the basis of each connection's individual size. This improves visibility of emerging aggregate impacts for NSPs and AEMO, supports more consistent connection assessments and reduces the potential for regulatory avoidance through the development of multiple smaller IBL connections that collectively have a material system impact. It also provides greater clarity and consistency about when aggregate impacts should be considered.

The final rule uses the concept of 'electrical proximate' connections to ensure that assessments can appropriately capture clustered IBLs that are reasonably likely to have an aggregated impact on the power system.[122] The Commission has not prescribed granular detail in the rules for this assessment, so that it is sufficiently flexible to accommodate the different network configurations and characteristics of IBL connections. However, the Commission expects NSPs to apply the requirement proportionately, having regard to the circumstances of the connections and the potential materiality of their aggregate impact on the power system. For example, it may be appropriate for an NSP to consider multiple IBLs collectively where they are connected to the same or electrically related parts of the network, form part of a common development or campus, or have technical characteristics that could result in correlated behaviour. Relevant considerations may include the electrical configuration of the connections, their connection arrangements and the nature of their intended operation.

Figure 3.5: Contingency sizes associated with less than 40 MW data centre connections



Source: AEMO, 2026 General Power System Risk Review (GPSRR), Final Report, July 2026, p 27.

Note: As noted in AEMO's GPSRR, ride-through requirements should be applied to IBLs that may materially impact system security, whether this is for large individual connections or the aggregate response of multiple smaller connections. Further, the analysis using a threshold of 40 MW was conducted prior to the publication of the draft rule with a proposed large IBL threshold of 30 MW. However, similar conclusions can be drawn from these results and applied to the 30 MW threshold.

122 The term 'electrically proximate' is also used by the Federal Energy Regulatory Commission (FERC). They describe electrically proximate loads as loads that are not located on the same site, but are connected to or served by the transmission system in close electrical distance to an existing power plant. See more information on FERC's website.

The aggregate assessment applies to all relevant Schedule 5.3 access standards

The draft rule determination only contemplated aggregate assessment in relation to the new disturbance ride-through access standards.[123] The final rule goes further by allowing NSPs to consider the aggregate impact of electrically proximate IBL connections when assessing any relevant Schedule 5.3 access standard.[124]

This broader approach recognises that, as highlighted in stakeholder submissions to the draft determination,[125] the potential system security impacts of clustered IBLs are not limited to their response to disturbances. Multiple IBLs may have similar technical characteristics, control systems or operating behaviours that result in cumulative impacts on the power system.

Extending aggregate assessment to all relevant access standards under Schedule 5.3 allows NSPs to consider the combined impact of clustered IBLs and apply technical requirements that appropriately reflect the nature and materiality of those impacts. This provides a more comprehensive and flexible framework for managing system security risks, while allowing NSPs to determine which access standards are relevant to the circumstances of particular connections.

3.2.4 The final rule provides a definition for uninterruptible power supply (UPS) systems

UPS systems are commonly used in data centres to condition grid-supplied electricity and provide backup power. They protect IT equipment from damage and help prevent downtime or data loss during power outages and voltage fluctuations, including while backup generators start. However, the term was not previously defined in the NER. The absence of a definition could lead to confusion as to whether a UPS should be assessed under Schedule 5.2 or Schedule 5.3 of the NER.

Accordingly, the final rule introduces a new definition of *uninterruptible power supply* in Chapter 10 of the NER, to clarify that they should be assessed pursuant to Schedule 5.3 of the NER. [126]

The definition is as follows:

> **Uninterruptible power supply**
>
> Equipment that is:
>
> (a) designed and operated primarily to maintain continuity of *supply* to a *connected load*, including when the normal *supply* to that *load* is interrupted or is outside specified operating limits; and
>
> (b) not designed or intended to export *active power* to the *national grid* through the *connection point*.

The definition will ensure UPS systems are not inappropriately classified as BDUs

In its submission to the draft determination, AEMO highlighted the need to clarify the regulatory treatment of UPS systems, including whether they should be classified as bidirectional units (BDUs) for market registration and technical assessment, or treated as integral components of an

123 Draft rule, clause S5.3.1a(a1)(2)(iii)(B).
In addition, the draft rule instability access standard would have applied to a single integrated facility as a whole, even if the facility had multiple connection points - see draft rule, clause S5.3.14(b).

124 Final rule, clause S5.3.1a(b)(2).

125 Submissions to the draft determination: AusNet, p 5; ElectraNet, p 4.

126 Final rule, Chapter 10 glossary definition of'*uninterruptible power supply*'.

IBL.[127] AEMO's concern reflects the potential for UPS systems to fall within the existing NER definition of a BDU, which incorporates the broad definition of a *production unit*.[128]

Because a UPS both consumes electricity and can supply electricity from stored energy, it could potentially meet these definitions, even where its sole purpose is to maintain supply to a connected load rather than export electricity to the grid. This could create uncertainty about whether the UPS is subject to the Schedule 5.2 access standards, which apply to production units, or is assessed as part of an IBL connection under Schedule 5.3. This uncertainty arises because the definitions do not clearly distinguish between equipment that provides continuity of supply to a connected load and equipment designed for bidirectional energy flows, including for market participation or the provision of grid services.

The Commission's final rule addresses this uncertainty by expressly defining UPS systems according to their primary function and intended interaction with the grid.[129] The definition is narrowly targeted at systems that are not designed or intended to export active power through the connection point. This clarifies that UPS systems providing continuity of supply and backup power can be treated as integral components of an IBL, rather than being classified as BDUs solely because they can supply electricity from stored energy. At the same time, the definition preserves the application of the BDU framework to systems designed or intended to export active power to the grid. This provides greater certainty for proponents and NSPs when determining the appropriate classification and regulatory treatment of UPS systems, including those integrated into large IBLs.

3.2.5 The final rule maintains the existing framework for applying the Schedule 5.3 access standards to non-IBLs

The Commission has decided to retain the existing framework for applying the Schedule 5.3 access standards to Schedule 5.3 Participants with non-IBL plant. Under this framework, the standards apply differently depending on the type of network connection:

- **Transmission network connections:** the Schedule 5.3 access standards apply automatically.[130]
- **Distribution network connections:** the NSP determines whether the Schedule 5.3 access standards apply, to the extent it considers the plant would otherwise adversely affect the quality or security of network services to other network users.[131]

The Commission considers it appropriate to retain the existing framework for applying the Schedule 5.3 access standards to Schedule 5.3 Participants with non-IBL plant, because the final rule is intended to address the specific technical challenges associated with large IBLs and their potential impact on power system security. The Commission considers that extending the changes to non-IBL plant is not necessary to achieve this objective. The existing framework provides for the application of Schedule 5.3 access standards to transmission-connected plant and allows DNSPs to determine their application to distribution-connected plant, having regard to the potential impact on the quality or security of network services to other network users.

127 AEMO submission to the draft determination, pp 6-7.
128 NER Chapter 10 Glossary definitions of '*bidirectional unit*'; '*production unit*'.
129 Final rule, Chapter 10 glossary definition of'*uninterruptible power supply*'.
130 Final rule, clause S5.3.1a(a1)(2)(ii)(A).
131 Final rule, clause S5.3.1a(a1)(2)(ii)(B).

Retaining this framework avoids introducing broader changes to connection requirements where a need for reform has not been established, while preserving the existing arrangements for managing the potential impacts of non-IBL plant on network service quality and security.

3.2.6 'Hybrid' load configurations should be assessed based on the plant types within that connection

Where a connection comprises both IBL and non-IBL plant, the classification of a large IBL applies only to the IBL plant, and does not extend to the non-IBL plant simply because it forms part of the same connection.

This distinction ensures that the new requirements for large IBLs are targeted at the plant that gives rise to the technical considerations addressed by the final rule. The presence of IBL plant within a connection does not, of itself, mean that other plant forming part of that connection should be subject to the same requirements.

The Commission has made this clarification in response to stakeholder feedback on the draft rule determination.[132] For instance, CPU were concerned that:[133]

> *"The definition of large inverter-based load does not appear to include 'hybrid' loads that include some inverter-based and some non-inverter-based loads. The definition needs to be clearer on the assessment of size, such that it only applies to inverter-based components. The definition of large inverter-based load applies per plant, which would be interpreted in relation to a connection point, not many connection points."*

The Commission considers that the classification of a large IBL should reflect the scale of the IBL components, rather than the combined consumption of all plant forming part of a connection. Accordingly, only consumption attributable to the IBL components is relevant to determining whether the 30 MW threshold is met. For example, a connection comprising 20 MW of IBL and 20 MW of non-IBL plant would not meet the threshold solely because its total consumption is 40 MW.

This approach ensures that the new requirements are targeted at the IBL plant to which the reforms are directed, without inadvertently extending them to non-IBL plant. The non-IBL plant remains subject to the existing framework for applying the Schedule 5.3 access standards.

Importantly, the framework for classifying IBLs does not prevent NSPs from considering the potential impacts of the connection as a whole, including the combined system impacts of electrically proximate IBL connections where relevant. The classification of an IBL for the purpose of applying the new access standards is distinct from the assessment of the potential system impacts of connecting that plant.

The Commission considers that this approach supports the NEO by promoting the proportionate and efficient application of access standards. By making clear how the 30 MW threshold applies to mixed-plant connections, it provides greater certainty for connection applicants and NSPs about the requirements applicable to IBL and non-IBL plant. It also avoids extending the new IBL-specific requirements to non-IBL plant solely because the plant shares a connection, limiting unnecessary compliance costs while preserving the existing framework for managing the impacts of non-IBL plant on network service quality and security.

132 Submissions to the draft determination: EUAA, p 2; Antora, p 1; Ergon Energy and Energex, p 5.

133 CPU submission to the draft determination, p 3.

3.3 The Commission seeks to clarify the application of the classification framework to staged developments, multi-connection campuses and modifications to existing load connections

In this section, the Commission clarifies how the classification framework applies where an IBL is developed incrementally, comprises multiple connections, or is modified or altered after its initial connection. These circumstances are especially relevant to data centres, which may be developed over several years as demand grows, with additional buildings, electrical infrastructure, computing capacity and connection points introduced at different stages. It is also relevant for legacy plant that is upgraded or modified to include inverter based plant. This section clarifies how the framework applies in these circumstances, including where modifications or alterations are assessed through the modification and alteration process under clause 5.3.12 of the NER.

3.3.1 Stakeholders sought clarification from the Commission

Stakeholders raised concerns that the draft rule did not expressly address how load classification would apply where a staged expansion or additional connection causes a development to exceed a classification threshold. For instance:

- DCA submitted that the draft rule determination did not include an express distinction between new (greenfield) builds and expansions of existing sites.[134]
- ElectraNet and VisIRGrid suggested that the Commission should clarify the regulatory treatment of campus style developments where the aggregate capacity eventually meets the threshold for large IBL.[135]
- Endeavour Energy called for greater clarity regarding the approach to assessing multi-staged data centre connections. They considered this would be critical for when a load ramps up over many years. Endeavour Energy submitted that the treatment of this scenario should be standardised across all networks to create a consistent experience and expectation for loads.[136]
- AWS noted that data centre capacity growth will partly occur through staged expansions of existing campuses, rather than new connections. It considered that the draft rule does not clarify how access standards apply when an expansion crosses a classification threshold, creating uncertainty about whether the entire site would need to be reassessed. This could require legacy UPS and power conversion equipment to demonstrate compliance with new standards, despite the absence of suitable dynamic models. AWS cautioned that retrofitting or replacing functioning plant could impose significant costs and operational disruption to critical infrastructure for limited system security benefits.[137]
- Tesla noted that IBLs can significantly change their load profile after connection. This includes shifts from stable load like cloud computing to less stable load profiles like AI training. Such changes can materially alter power system outcomes beyond the individual plant, so should consider how AEMO and NSPs can model the impact of these changes that protect grid security without being overly onerous on the proponent.[138]
- Sungrow submitted that many data centre projects may be developed in stages over multiple years. Additional clarification regarding how staged augmentation, future expansion, and

134 DCA submission to the draft determination, p 5.
135 Submissions to the draft determination: ElectraNet, p 5; VisIRGrid, p 3.
136 Endeavour Energy submission to the draft determination, p 2.
137 AWS submission to the draft determination, p 5.
138 Tesla submission to the draft determination, p 5.

incremental capacity increases will be assessed under the proposed framework would improve predictability for proponents and NSPs. This is important where cumulative impacts may materially differ from initial connection assessments.[139]

- EUAA sought clarity from the Commission on the treatment of legacy non-IBL plant that is upgraded and altered to include IBL plant. They cautioned against imposing unnecessary regulatory burden that could discourage reinvestment and expansion, and hinder electrification and decarbonisation.[140]

3.3.2 Modifications to existing connections will likely be captured by the clause 5.3.12 process in the NER

Clause 5.3.12 of the NER establishes a process for assessing proposed alterations to connected plant where the alteration will affect the plant's performance against a technical requirement in Schedule 5.3 or Schedule 5.3a that is an AEMO advisory matter.

Where the clause applies, the relevant Schedule 5.3 or Schedule 5.3a Participant must submit details of the proposed alteration to its NSP, with a copy to AEMO. This includes a description and implementation timetable for the alteration, relevant design and settings data, any proposed amendments to the plant's existing performance standards and, where applicable, proposed system strength remediation arrangements or an election to pay the system strength charge. The proposed amendments to performance standards and system strength arrangements are subject to the processes in clauses 5.3.4A and 5.3.4B, respectively.

This process may be relevant to staged expansions of existing facilities, additional connections within a campus, changes to the composition of connected plant and changes to plant associated with increases in capacity. However, its application depends on the nature of the proposed works and their effect on the plant's performance against the relevant technical requirements.

The application of this process to different development scenarios is discussed below.

Box 7: Summary of the procedure to be followed for alterations to connected loads

Clause 5.3.12 sets out the process that a Schedule 5.3 or Schedule 5.3a Participant must follow when proposing an alteration to connected plant that affects its performance against a relevant technical requirement identified as an AEMO advisory matter.

1. **Proposed changes must be submitted:** Under clause 5.3.12(b)(3), the Participant must submit any proposed amendments to the existing performance standards for the relevant technical requirements to the NSP, with a copy to AEMO.
2. **The performance standards amendment process applies:** Clause 5.3.12(c) provides that clause 5.3.4A applies to that submission. This means the proposed amendments are subject to the applicable process for assessing changes to performance standards; they are not simply changed by notifying AEMO.
3. **AEMO must be notified of the outcome**: Under clause 5.3.12(h), if the alteration changes information previously provided to AEMO under clause 5.3.7, the NSP and Participant must jointly notify AEMO immediately, including details of any performance standards amended under clause 5.3.12.

Note: The Commission notes that this is intended as a summary of clause 5.3.12. Connecting parties should refer directly to clause 5.3.12, where necessary.

139 Sungrow submission to the draft determination, p 5.

140 EUAA submission to the draft determination, p 2.

Staged expansion or delivery of an existing data centre

Where an existing data centre is expanded or delivered in stages, clause 5.3.12 may apply if an expansion involves an alteration to connected plant that affects its performance against a relevant technical requirement that is an AEMO advisory matter.[141] In that case, the Participant must submit the proposed alteration for assessment in accordance with the clause, including any proposed amendments to the relevant existing performance standards.

The proposed amendments to performance standards and system strength arrangements are subject to the processes in clauses 5.3.4A and 5.3.4B, respectively.

Under the final rule, an IBL with a nameplate rating of 30 MW or more is a large IBL.[142] Where an expansion results in the combined IBL plant for that connection meeting this threshold, the applicable access standards must be determined in accordance with the Schedule 5.3 classification provisions.[143]

Campus-style developments involving multiple connections

Where a data centre campus comprises multiple connections, the applicable regulatory process depends on whether the proposed development involves an alteration to existing connected plant or a new connection. If an existing connection is altered and the requirements of clause 5.3.12 are met, the Participant must follow the process set out in that clause. Alternatively, where additional capacity is delivered through a separate, new connection application, this would not enliven the clause 5.3.12 process, and would be assessed pursuant to the application process in Chapter 5 of the NER. This may trigger application of the new requirement for NSPs to have regard to the aggregate impact of that connection together with any other IBL connections, including existing and planned new connections.[144]

Changes to the operating profile of connected plant

A change in a plant's operating profile, such as a shift from relatively stable cloud-computing operations to more variable artificial intelligence workloads,[145] may affect its impact on the power system. Clause 5.3.12 may apply where the change involves an alteration to connected plant that affects its performance against a relevant technical requirement that is an AEMO advisory matter.[146] However, a change in operating profile does not necessarily constitute an alteration to connected plant for the purposes of the clause. Its application depends on the nature of the change and its effect on the plant's performance against the relevant technical requirements.

Upgrades to existing facilities to incorporate inverter-based plant

Where an existing facility containing non-inverter-based plant is upgraded to incorporate inverter-based plant, clause 5.3.12 may apply if the alteration affects the plant's performance against a relevant technical requirement that is an AEMO advisory matter. In these circumstances, the Participant must submit the proposed alteration and any proposed amendments to the relevant existing performance standards for assessment. The clause does not, by itself, require all existing plant at the facility to be reassessed against the access standards applicable to a new

141 NER clause 5.3.12(a).
142 Final rule, NER Chapter 10, definition of '*large inverter based load*'.
143 Final rule, clause S5.3.1a(a)-(b).
144 Final rule, clause S5.3.1a(b)(2).
145 This example was considered in Tesla's submission to the draft determination, p 5.
146 NER clause 5.3.12(a).

connection. However, this will depend on the nature of the upgrade and whether it has an effect on the plant's performance against the relevant technical requirements.

3.3.3 The alteration and modification process supports power system security and reliability

The operation of clause 5.3.12 promotes the NEO by providing a structured process for assessing certain alterations to connected plant and determining whether existing performance standards need to be amended. This helps ensure that changes to plant are assessed for their potential effects on power system security and reliability, while providing a clear and proportionate process for connection parties and NSPs. It also supports efficient investment by allowing existing connections to be modified through an established process, rather than requiring them to be treated as entirely new connections in every case.

However, clause 5.3.12 does not independently determine the classification of a connection, establish how capacity across multiple connections must be aggregated, or require all existing plant to be reassessed against the standards applicable to a new connection. These matters must be considered under the classification and access standards provisions introduced by the final rule.

Read together, these provisions help ensure that staged expansions, campus-style developments, changes to operating profiles and upgrades incorporating inverter-based plant are assessed in a way that appropriately reflects their potential impact on the power system. Specifically, the aggregate-impact provision in clause S5.3.1a(b)(2) of the final rule allows an NSP to consider the combined impact of electrically proximate IBL connections where it is reasonable and appropriate to do so, having regard to their electrical configuration. This helps address the risk that the cumulative effects of multiple connections may not be adequately captured when each connection is considered in isolation, supporting secure and reliable power system operation while facilitating efficient connection and investment decisions.

4 The final rule introduces a robust and proportionate modelling and compliance framework

Box 8: Key points in this chapter

The Commission has made a final rule to strengthen the framework for modelling and compliance with performance standards for Schedule 5.3 plant. The final rule introduces clearer and more consistent requirements for modelling, including new guidelines for AEMO to develop, and strengthens arrangements to support ongoing compliance with applicable performance standards, regardless of registration status. These reforms respond to the increasing scale and complexity of loads connecting to the National Electricity Market (NEM), including large inverter based loads (IBLs), and support the secure and reliable operation of the power system.

These reforms promote a more transparent, proportionate and efficient connection framework. By improving clarity around modelling requirements and strengthening assurance of ongoing compliance, the final rule supports effective management of power system security risks while avoiding unnecessary modelling costs, administrative burdens and connection delays. This promotes the efficient operation of electricity services for the long-term interests of consumers with respect to the safety, security and reliability of the national electricity system, consistent with the National Electricity Objective (NEO).

In this chapter:

- Section 4.1 explains how the final rule requires AEMO to develop, publish and maintain Schedule 5.3 Participant Modelling Guidelines, in accordance with principles established in the National Electricity Rules (NER). These principles promote proportionate, consistent and efficient modelling requirements, having regard to the characteristics of the plant, the materiality of the issues being assessed and the practical availability and maturity of modelling information. The final rule also requires AEMO and NSPs to support modelling requests with a clear rationale, helping to avoid unnecessary or duplicative requests while maintaining the modelling needed to assess material risks to power system security. This section also clarifies that AEMO's advisory role will be outlined in greater detail in the Schedule 5.3 Participant Modelling Guidelines.
- Section 4.2 explains how the final rule strengthens arrangements for ongoing compliance with applicable performance standards. It requires AEMO to maintain a register of performance standards for all Schedule 5 Participants, regardless of registration status, and requires connection agreements with non-Registered Participants to include a commitment to ongoing compliance and details of how the connection applicant intends to comply. These changes improve visibility of applicable standards and strengthen contractual arrangements supporting compliance, helping ensure that connected plant operates in a manner that supports power system security and reliability.

4.1 The Commission's final rule requires AEMO to develop, publish and maintain guidelines on modelling requirements for Schedule 5.3 Participants

Modelling plays an important role in assessing and demonstrating the ability of Schedule 5.3 plant to meet the applicable access standards under Schedule 5.3 of the NER. It enables AEMO and network service providers (NSPs) to assess the performance of loads under normal operating

conditions and during disturbances, including their potential interactions with the power system. This supports the assessment of whether plant can meet the applicable access standards, identifies potential risks to power system security and stability, and informs connection decisions. Robust and fit-for-purpose modelling is important to ensuring that the performance of connected loads is consistent with the requirements of the NER and does not adversely affect the secure and reliable operation of the power system.

Throughout the Commission's consultation on this rule change, stakeholders identified gaps in the existing framework for modelling Schedule 5.3 plant, particularly large IBLs, including data centres. They noted uncertainty about the modelling requirements applicable to different loads, as well as practical challenges associated with the availability, maturity and completeness of models, including those provided by original equipment manufacturers. Stakeholders' feedback, along with the Commission's analysis, highlighted the need for clearer and more consistent guidance on modelling requirements, while ensuring these are proportionate to the characteristics of the plant and the potential implications for power system security.[147]

The Commission's final rule builds on the draft determination's recommendation that AEMO clarify modelling requirements for large IBLs.

- In submissions to the consultation paper, stakeholders highlighted challenges with the modelling capabilities of large loads and called for greater guidance from AEMO and the Commission.[148]
- The draft determination acknowledged this feedback, and stipulated that AEMO would need to update its PSMG in light of the reforms from this rule change that address the power system security impacts of increasing IBL connections.[149]
- However, stakeholder submissions to the draft determination for greater clarity to be embedded in the NER.

Accordingly, the final rule:

- Introduces clause S5.3.1aa of the NER, requiring AEMO to develop, publish and maintain, in accordance with the Rules consultation procedures, guidelines for modelling to be undertaken by Schedule 5.3 Participants (Schedule 5.3 Participant Modelling Guidelines).[150] The guidelines must be consistent with the principles in the final rule that promote proportionate and efficient modelling requirements, having regard to the size, complexity and potential impact of Schedule 5.3 plant on power system security. They must also limit modelling to information reasonably necessary to assess connections and compliance with applicable access standards and Chapter 5 obligations, promote consistency for equivalent plant, recognise the practical availability and maturity of modelling information, and minimise unnecessary modelling iterations and duplication.[151]
- In addition, the final rule introduces clause S5.3.1aa(c), which requires AEMO and NSPs to ensure that requests for modelling by Schedule 5.3 Participants must be necessary, proportionate and directed at material issues relevant to power system security. Requests must consider the availability and suitability of existing modelling information and explain the

147 AEMC, *Improving the NEM access standards - Package 2*, Draft determination, 12 March 2026, chapters 2 and 3.

148 Submissions to the consultation paper: Ergon Energy and Energex, p 5; Transgrid, p 12; ENA, p 8; EPEC, p 2; ENA, pp 3, 8; TM Advisory, p 4; SA Power Networks, p 1; Ausgrid, p 3; Jemena, p 2; NextDC, p 3; AWS, p 5.

149 Draft rule, clause 11.[XXX].6(a)(1).

150 Final rule, clause S5.3.1aa(a). See also chapter 3 of this determination for details on what is a Schedule 5 Participant.

151 Final rule, clause S5.3.1aa(a)-(b)(5).

issue to be addressed, why existing models are insufficient and what stipulate what additional information is required.[152]

- The final rule clarifies that AEMO may publish the Schedule 5.3 Participant Modelling Guidelines in the same document as the Power System Model Guidelines.[153] This provides flexibility in how AEMO publishes its modelling guidance while establishing a framework intended to support proportionate, consistent and efficient modelling requirements for Schedule 5.3 Participants.

This section describes the final rule and Commission's rationale in detail. It also explains how stakeholder feedback has been addressed.

4.1.1 AEMO is required to develop Schedule 5.3 Participant Modelling Guidelines that are drafted in accordance with the NER modelling principles

The Commission's final introduces a specific requirement for AEMO to develop, publish and maintain Schedule 5.3 Participant Modelling Guidelines.[154]

Prior to this final rule, the NER provided limited guidance on modelling requirements for Schedule 5.3 Participants. This created a gap in the compliance framework, making it difficult to demonstrate that Schedule 5.3 plant is capable of meeting and complying with the relevant access standards.

The Commission notes that under clause S5.5.7(a)(3), AEMO is required to develop and maintain the Power System Model Guidelines (PSMG), which describe AEMO's requirements for developing mathematical models of plant, including the effects of plant control and protection systems on power system security.[155]

Section 3.2 of the PSMG provides for generic, site-specific detailed and hybrid load models, and requires AEMO and the relevant NSP to determine the appropriate modelling approach on a project-specific basis. In doing so, they must consider factors including the size and susceptibility of load components to controller instability, the facility's operating philosophy and its electrical proximity to other plant. Appendix C.5 also identifies the components that may need to be represented in IBL models, depending on the plant configuration and the phenomena being studied.[156]

However, the PSMG leaves significant discretion to AEMO and NSPs to determine the appropriate modelling approach and level of detail for individual connections. Now that the scale and complexity of loads connecting to the NEM has increased, especially for large IBLs, detailed modelling requirements and guidance has become more necessary.

The final rule addresses these limitations by introducing a specific requirement for AEMO to develop, publish and maintain Schedule 5.3 Participant Modelling Guidelines.[157] This will ensure that AEMO develops guidance that is specific to schedule 5.3 plant, in consultation with industry.

152 Final rule, clause S5.3.1aa(c).
153 Final rule, clause S5.3.1aa(d).
154 Final rule, clause S5.3.1aa(a).
155 See AEMO's Power System Model Guidelines (PSMG) and Data Sheets Consultation website, for information about v3.0 of the PSMG.
156 The Commission also notes clause 5.3.1 of the NER, which requires Schedule 5.3 Participants to provide AEMO and the relevant NSP with models of the control systems of the participant's equipment in accordance with the PSMG.
157 Final rule, clause S5.3.1aa(a).

The guidelines must be consistent with the principles in the final rule

To address stakeholder feedback and promote consistent modelling requirements, the Commission's final rule introduces new modelling principles. AEMO's guidelines must be consistent with these principles, which are as follows:[158]

> (1) modelling requirements should be proportionate to the size, complexity and potential impact of the *schedule 5.3 plant* on *power system security*, having regard to the type of the *connection* and the applicable access standards
>
> (2) modelling requirements should be limited to information that is reasonably necessary to assess the impact of the *connection* on the *power system* and compliance by the *Schedule 5.3 Participant* with the applicable access standards and its obligations under this Chapter 5
>
> (3) equivalent *schedule 5.3 plant* should, where reasonably practicable, be subject to consistent modelling requirements
>
> (4) modelling requirements should have regard to the practical availability, maturity and validation of modelling information
>
> (5) modelling requirements should support an efficient *connection* process by:
>
> (i) minimising the need for unnecessary modelling iterations
>
> (ii) facilitating staged provision of modelling information where appropriate
>
> (iii) recognising existing validated models, where suitable
>
> (iv) avoiding duplication of modelling requirements; and
>
> (v) identifying the criteria against which the model or modelling information will be assessed or accepted.

The principles are intended to support requirements that are proportionate to the plant characteristics and the significance of the issue being assessed, while having regard to the practical availability, maturity and validation of modelling information.

This will provide greater clarity for connection applicants, AEMO and NSPs, whilst recognising that guidelines are the appropriate instrument for specifying detailed, technical modelling requirements for power system studies, including assumptions, methodologies, and data inputs. Modelling requirements evolve over time in response to changes in system conditions, technology, and emerging risks, particularly in a power system with increasing levels of IBL. Embedding prescriptive modelling requirements in the NER would reduce flexibility and risk the requirements becoming outdated. By contrast, guidelines can be updated more readily to reflect contemporary modelling practices and system needs, while remaining consistent with the framework established in the NER.

Stakeholder feedback informed the Commission's final rule

Stakeholder submissions to the draft determination, which informed development of the final rule, called for greater clarity on modelling expectations and requirements applicable to Schedule 5.3

158 Final rule, clause S5.3.1aa(b).

Participants for demonstrating compliance with the Schedule 5.3 access standards.[159] For example:

- Sungrow submitted that "the modelling framework is one of the most critical aspects of successfully integrating large IBLs into the NEM... If modelling gaps remain unresolved, the true impact of data centres on system security, stability, and network interactions may not be properly assessed".[160] Similarly, ElectraNet, Syncline, Ausgrid and SA Power Networks called on the Commission to clarify the standard of modelling necessary to support the clear assessment of Schedule 5.3 plant against the relevant access standards. They also submitted that the PSMG must clearly explain what modelling a connection applicant can be asked to provide, and when detailed requests for modelling should be expected.[161]
- Transgrid highlighted that the PSMG should remain the primary instrument for specifying detailed technical modelling requirements and supported the alignment of modelling requirements for large IBL with that of generators.[162] Conversely, Tesla submitted that IBLs are still emerging in their modelling capabilities. High-fidelity dynamic modelling of data centres is extremely challenging due to the large number of internal components, nonlinear controls, and diverse operating modes. In practice, it may be infeasible to develop data centre dynamic models with a level of accuracy and validation comparable to conventional generator models, especially given the difficulty of benchmarking against measured responses.[163] SA Power Networks, DCA, Celero and GPE, AusNet, AWS and VisIRGrid also submitted that modelling expectations must recognise the current maturity of the sector and avoid imposing obligations that are impractical for proponents or Original Equipment Manufacturers (OEM) to meet.[164]
- Akaysha raised concerns about the risk of multiple rounds of modelling requests from NSPs for all possible variations of fault scenarios.[165] Likewise, Jemena recommended avoiding duplicated assessments, establishing clear timeframes for reviewing and accepting technical material, and enabling practical approaches such as template models, staged validation and recognition of previously assessed equipment, where consistent with system security. Jemena and Endeavour Energy's submissions also emphasised that unclear or inconsistently applied modelling and assessment requirements could undermine the benefits of the classification framework.[166]

The Commission collaborated with stakeholders to develop the modelling requirements and principles

In response to this feedback, the Commission hosted a further Technical Working Group (TWG) on 21 July 2026 to consult with stakeholders on modelling principles and how they should guide the development and application of modelling requirements.[167] The consultation explored how modelling requirements could be applied proportionately, having regard to the materiality of the issue being assessed, the practical availability and maturity of modelling capabilities, and the need to avoid unnecessary or duplicative requests. Stakeholder feedback through the TWG informed the principles included in the final rule to guide AEMO in developing the Schedule 5.3

159 Submissions to the draft determination: SA Power Networks, p 1; VicGrid, p 2; Ausgrid, pp 2–3; ElectraNet, pp 9, 18; Transgrid, p 7; Syncline, p 5; Tesla, p 2;AusNet, pp 5, 10; Sungrow, p 2; Akaysha, p 2; AEMO, pp 5–6; Jemena, pp 2–3; AWS, pp 4, 6; Endeavour Energy, p 2; VisIRGrid, pp 2–3; Celero and GPE, pp 5–6; DCA, p 5.

160 Sungrow submission to the draft determination, p 2.

161 Submissions to the draft determination: ElectraNet, 18; Syncline, 5; Ausgrid, p 2; SA Power Networks, p 1.

162 Transgrid submission to the draft determination, p 7.

163 Tesla submission to the draft determination, p 2.

164 Submissions to the draft determination: SA Power Networks, p 1; DCA, p 5; Celero and GPE, pp 5-6; AusNet, p 5; AWS, p 4; VisIRGrid, pp 2-3.

165 Akaysha submission to the draft determination, p 2.

166 Submissions to the draft determination: Jemena, pp 2-3; Endeavour Energy, p 2.

167 The 20 July 2026 TWG materials are available on the Commission's website.

Participant Modelling Guidelines and promote greater clarity and consistency for Schedule 5.3 Participants, AEMO and NSPs.

The final rule promotes efficient connections while maintaining power system security

The final rule achieves the NEO by supporting a more efficient, consistent and transparent connection process, while maintaining appropriate protections for power system security. Requiring AEMO's guidelines to be consistent with the modelling principles will help ensure that modelling requirements are proportionate to the characteristics and potential impact of the plant, and limited to information reasonably necessary to assess the connection and demonstrate compliance with applicable access standards. This will reduce the risk of unnecessary or duplicative modelling requests, support more efficient connection assessments and provide greater predictability for connection applicants, while ensuring that modelling requirements remain sufficiently rigorous to identify and manage risks to power system security.

The final rule also balances the need for consistent modelling requirements with the flexibility to respond to changes in technology, modelling capabilities and power system conditions. By establishing the principles in the NER while leaving detailed technical requirements to AEMO's guidelines, the final rule provides a durable regulatory framework that can adapt to emerging risks and evolving modelling practices. These arrangements are expected to facilitate efficient investment and connection of new load, while promoting the secure and reliable operation of the power system, consistent with the NEO.

The Commission will consider extending the modelling principles to other Schedule 5 Participants

While consulting on the modelling principles for Schedule 5.3 Participants, some stakeholders considered it would be appropriate to extend the principles to other Schedule 5 Participants. The Commission notes that the Minister for Climate Change and Energy's rule change request on *Connections framework enhancements for integrated facilities, co-located plant and flexible loads*, submitted on 20 October 2026, noted that "consideration may also be warranted on whether modelling principles should apply across all connection configurations under Chapter 5 of the NER, as this could help reduce complex iterative modelling that is sometimes experienced in the connection process, which causes delays.[168]

4.1.2 The Commission has provided AEMO with flexibility in where the modelling guidance is published

As explained earlier in this section, the final rule stipulates that AEMO may publish the Schedule 5.3 Participant Modelling Guidelines in the same document as the Power System Model Guidelines.[169] This provides flexibility in how AEMO publishes its modelling guidance while establishing a framework intended to support proportionate, consistent and efficient modelling requirements for Schedule 5.3 Participants.

This flexibility is important because it allows AEMO to organise its modelling guidance in a way that best supports its users and aligns with its existing guidance framework. Publishing the guidelines alongside the PSMG may promote consistency between modelling requirements for Schedule 5.3 Participants and other connecting plant, reduce duplication and make relevant guidance easier to locate.[170] Alternatively, publishing the guidelines separately may allow AEMO to tailor the guidance to the specific characteristics and modelling needs of Schedule 5.3

168 Minister for Climate Change and Energy, *Connections framework enhancements for integrated facilities, co-located plant and flexible loads*, rule change request, p 14.

169 Final rule, clause S5.3.1aa(d).

170 See Table 4.1, which lists AEMO's current range of guidelines applicable to access standards.

Participants. Allowing AEMO to determine the most appropriate approach avoids unnecessarily prescribing the structure of its guidance, while ensuring the guidelines remain subject to the principles established in the NER.

Table 4.1: List of AEMO guidelines on modelling requirements for access standards

Guideline	Current version/status	NER basis	Description
Power System Model Guidelines (PSMG)	v3.0, 25 September 2025 – current	Clause S5.5.7	Primary modelling document. Specifies the models, data, model quality, validation and information that applicants/participants must provide to AEMO/NSPs. Covers root mean square (RMS) and electromagnetic transient (EMT) modelling, including modelling requirements for IBL, converter-based storage, high voltage direct current networks (HVDC links), synchronous plant, etc. AEMO explicitly states that these models are used to assess technical performance standards. It also includes Power System Design Data Sheets.
System Strength Impact Assessment Guidelines (SSIAG)	v2.2, 28 June 2024 – current	Clause 4.6.6	Primary system strength modelling and assessment guideline. Specifies the methodology for system strength impact assessments, system strength quantity (SSQ), available fault level (AFL), system strength locational factor (SSLF) and short circuit ratio (SCR)/withstand SCR assessments. It also contains guidance on modelling to verify plant stability and expressly links the models used for Withstand SCR testing to the models used for performance-standard negotiation.
Power System Stability Guidelines (PSSG)	v3.0, effective 12 January 2026 – current	Clause 4.3.4(h)	Primary stability-assessment guideline. Sets policies and technical methods governing power-system stability and expressly applies to Schedules 5.2, 5.3 and 5.3a participants in relation to performance standards and connection/alteration processes. It contains modelling requirements and guidance for stability studies used in assessing plant performance.
Dynamic Model Acceptance Test (DMAT) Guideline	v3.0, 3 June 2024 – current	Not required under the NER	Model validation/acceptance rather than study methodology. Specifies the tests AEMO applies to RMS and EMT dynamic models and the criteria for model acceptance. Accepted models are used for assessment of generator and IRS performance standards. The guideline expressly requires models to comply with the

Guideline	Current version/status	NER basis	Description
			PSMG and Data Sheets.
NER 5.3.9 Process Guideline	16 December 2025 – current	Not required under the NER	Alteration-specific modelling guidance. Sets out the modelling/data requirements and assessment process where an existing generating system or integrated resource system is altered. It distinguishes existing/"legacy" modelling from current PSMG requirements and therefore has direct relevance to whether and how modelling is required when existing performance standards are altered.
Access Standard Assessment Guide / formerly Guidelines for Assessment of Generator Proposed Performance Standards	v2.0, 31 January 2019	Not required under the NER	Direct access-standard assessment guidance. Explains how AEMO assesses proposed access standards and, importantly, has a dedicated section on "Model requirements and model use". It identifies the PSMG, Data Sheets and DMAT guideline as the underlying modelling requirements and describes the RMS/EMT models and benchmarking required for access-standard assessment. AEMO's current connection pages still list the Guidelines for Assessment of Generator Proposed Performance Standards among relevant documents.

The transitional arrangements in the final rule require AEMO to review and make any necessary or desirable amendments to the PSMG following guidelines within 12 months after the commencement date of the final rule:[171]AEMO must also publish the new Schedule 5.3 Participant Modelling Guidelines within 12 months from the commencement date of the final rule.[172]For more information on the implementation arrangements for the final rule, see chapter 9 of this final rule determination.

AEMO will publish an interim guideline for IBL connections

AEMO indicated in its submission to the draft determination that it would develop and publish interim guidance to help IBL proponents navigate the connection process ahead of updates to the PSMG.[173]

In developing the interim guideline, AEMO is seeking to work with NSPs to establish a standard and efficient approach to provide the required visibility without introducing unnecessarily onerous modelling or assessment requirements. This is intended to minimise the need for AEMO

171 Final rule, clause 11.197.6.

172 Final rule, clause 11.197.7 and S5.3.1aa(d).

173 AEMO submission to the draft determination, p 10; AEMO also discusses the interim guideline in its 2026 General Power System Risk Review Report, p 38.

involvement in performance standard negotiations, promote transparency and streamline the connection process.[174]

4.1.3 Modelling requests must be supported by a clear rationale

The final rule introduces clause S5.3.1aa(c), which establishes requirements for AEMO and NSPs when requesting modelling from a Schedule 5.3 Participant.

Requests must be reasonably necessary, address a material issue relevant to the plant, connection or network conditions, and be proportionate to the significance of the issue and its potential implications for power system security. They must also have regard to the practical availability, maturity and validation of modelling information, including whether existing, representative, generic or aggregated models can adequately address the issue. AEMO and NSPs must identify the issue or uncertainty to be assessed, explain why the modelling already provided is insufficient, and specify the additional information or model fidelity required.[175]

These requirements respond to stakeholder concerns about unnecessary, duplicative or unclear modelling requests. As outlined above, Akaysha raised concerns about the risk of multiple rounds of modelling requests covering all possible variations of fault scenarios. Jemena recommended avoiding duplicated assessments and enabling practical approaches such as template models, staged validation and recognition of previously assessed equipment, where consistent with power system security.[176]

The Commission considers these requirements important to ensuring that modelling requests are targeted at resolving material uncertainties and assessing relevant compliance and power system security risks, rather than imposing unnecessary costs and delays on connection applicants. Requiring AEMO and NSPs to explain the rationale for additional modelling will achieve the NEO by improving transparency and providing Schedule 5.3 Participants with greater certainty about what information is required and why. It will also encourage the efficient use of existing modelling information and reduce unnecessary iterations and duplication, while preserving the ability to request additional modelling where reasonably necessary to assess material risks.

Applying the modelling requirements proportionately

The Commission does not intend for the requirements in clause S5.3.1aa(c) to create a prescriptive checklist or impose unnecessary administrative burdens on AEMO, NSPs or Schedule 5.3 Participants. The requirements are intended to support a proportionate, risk-based approach to modelling requests, rather than require a formal or extensive justification for every request, irrespective of its nature or complexity.

The level of explanation and consideration required should be commensurate with the nature and significance of the issue being assessed. For example, a straightforward request for additional information to resolve a clearly identified technical uncertainty may require only a brief explanation. A request for more extensive or complex modelling may warrant a more detailed explanation of the issue, the limitations of existing modelling and the additional information required.

The Commission considers that this approach will provide appropriate transparency and accountability without creating unnecessary process or delaying connection assessments. It will allow AEMO and NSPs to exercise technical judgement in determining the modelling required,

174 AEMO submission to the draft determination, p 10.
175 Final rule, clause S5.3.1aa(c).
176 Submissions to the draft determination: Akaysha, p 2; Jemena, pp 2-3.

while ensuring that requests remain consistent with the requirements of the NER. This supports efficient connection processes and avoids imposing unnecessary costs on connecting parties, while maintaining the modelling capability needed to assess compliance with access standards and manage risks to power system security, consistent with the NEO.

4.1.4 Clarifying AEMO's advisory role for Schedule 5.3 access standards

Under the NER, AEMO holds an 'advisory matters' responsibility, requiring AEMO to provide advice to NSPs on connection matters relevant to its system-wide functions and its roles under the NER technical schedules, including matters affecting power system security and the applicable access standards.[177] For a negotiated access standard, the NER also requires AEMO to advise on AEMO advisory matters. However, the NSP remains responsible for negotiating and determining the connection's access standards.[178]

Ausgrid and Endeavour Energy considered that AEMO's advisory role for Schedule 5.3 access standards should be more clearly defined to support consistent modelling and assessment of IBLs.[179]

The Commission considers that the NER should establish clear obligations and principles governing AEMO's advisory role, without unnecessarily prescribing the detailed methodology by which that role must be exercised.[180] AEMO's advice needs to account for the technical characteristics of the relevant plant and its potential impacts on the power system. The information reasonably necessary to assess compliance with the applicable access standards may therefore vary between connections. Prescribing a uniform and overly detailed assessment process in the NER could limit the ability to respond to these differences and result in unnecessary modelling, testing and administrative costs for connection applicants.

The Commission considers that the Schedule 5.3 Participant Modelling Guidelines provide an appropriate mechanism to elaborate on how AEMO's advisory function applies in practice. The guidelines can clarify the technical matters AEMO expects to consider when advising on Schedule 5.3 access standards, including the modelling information needed to assess relevant technical risks and how the scope of modelling and assessment may vary according to the characteristics and potential system impacts of the plant. This would provide greater transparency and support more consistent approaches across connections, while retaining the flexibility needed to account for different technical circumstances.

Box 9: What is an AEMO advisory matter?

Under the final rule, an AEMO advisory matter is a matter that relates to *AEMO's* functions under the *NEL* and a matter in which *AEMO* has a role under clause 5.3.4B (system strength mitigation requirement) or in schedules 5.1a (system standards), 5.1 (network performance requirements to be provided or coordinated by NSPs), 5.2 (technical connection requirements for generating systems, integrated resource systems and synchronous condensers), 5.3 (technical connection requirements for loads) and 5.3a (technical connection requirements for high voltage direct current networks).

Below, the Commission lists clauses that are now AEMO advisory matters under this final rule:

177 NER Chapter 10, Glossary definition of '*AEMO advisory matter*'.

178 NER rule 5.3. See also Box 9 below for more detail on what an AEMO advisory matter is.

179 Submissions to the draft determination: Ausgrid, p 2; Energy, 3.

180 This is consistent with the approach taken for AEMO advisory matters that relate to other Schedule 5.3 Participants, particularly generators and integrated resource systems.

- S5.2.5.5A - Response to disturbances following contingency events
- S5.3.12 - Response to frequency disturbances
- S5.3.13 - Response to voltage disturbances
- S5.3.14 - Detection and response to unstable operation

Source: NER, Chapters 5, 10.

4.2 The final rule strengthens requirements for compliance with applicable performance standards

Compliance with applicable performance standards is important to maintaining power system security and reliability. The NER establishes a framework to support ongoing compliance with these standards, including through compliance monitoring, contractual obligations and regulatory oversight.

Rules 4.14 and 4.15 establish requirements relating to performance standards and compliance with those standards. However, these requirements only apply to Registered Participants and do not extend to all Schedule 5.3 Participants. As a result, non-Registered Participants may not be subject to the same express obligations and compliance arrangements under these rules, despite being required to meet applicable performance standards under the NER and their connection agreements. This creates a gap in the arrangements supporting ongoing compliance by non-registered participants.

In the draft determination, the Commission identified the need to address this gap, particularly in light of the increasing number of non-registered Schedule 5.3 Participants, including data centres. The final rule strengthens the arrangements supporting compliance by:

- requiring AEMO to maintain a register of performance standards for all Schedule 5.3 Participants; and
- requiring connection agreements with non-registered participants to include terms and conditions that provide reasonable assurance of the connection applicant's ongoing compliance with applicable performance standards, consistent with good electricity industry practice.

These changes are intended to improve the visibility of applicable performance standards and strengthen the contractual arrangements supporting ongoing compliance by non-Registered Participants. This helps ensure that the growth in IBL connections is accompanied by appropriate arrangements to support compliance with the technical requirements necessary for power system security and reliability.

This section outlines the Commission's rationale for the final rule, how the ongoing compliance requirement has been clarified since the draft determination, and how the Commission has addressed stakeholder feedback.

4.2.1 AEMO must maintain a register of performance standards for all Schedule 5 Participants

Under clause 4.14(n) of the NER, AEMO is required to establish and maintain a formal register of the performance standards applicable to Registered Participants' plant. The final rule extends this requirement to all Schedule 5 Participants,[181] ensuring AEMO and the AER have visibility of all

181 Final rule, clause 4.14(n).

performance standards established under Schedules 5.2, 5.3 and 5.3a, regardless of registration status. Consistent with clause 4.14(n1), AEMO must provide the AER with an up-to-date copy of the register, including the corresponding performance standards, by 1 July each year.

This change promotes the NEO by improving the transparency of applicable performance standards and supporting more effective monitoring of compliance across the NEM. Greater visibility of the technical requirements applying to connected plant will support AEMO in exercising its power system security functions, including by informing its assessment of power system conditions and secure operating limits and helping it identify potential risks arising from plant performance.[182] It will also assist the AER in monitoring compliance with applicable performance standards. Together, these changes support the secure and reliable operation of the power system and the efficient operation of electricity services in the long-term interests of consumers.

The Commission's final rule is consistent with the draft rule determination, for which we received no feedback on this reform. However, as noted in the draft determination, CitiPower, Powercor and United Energy (CPU) supported extending enforceability and compliance requirements under rule 4.14 to all Schedule 5 Participants.[183]

4.2.2 Non-registered Schedule 5 Participants need to provide reasonable assurance of ongoing compliance with performance standards

The final rule requires non-registered Schedule 5 Participants to commit to meeting the proposed performance standards and explain how they will do so, consistent with good electricity industry practice. Specifically, the final rule stipulates that:[184]

> The *connection agreement* must include... a commitment to ongoing compliance with the proposed *performance standards*, including how the *Connection Applicant* intends to comply with those standards, consistent with *good electricity industry practice*.

This will improve compliance outcomes for unregistered Schedule 5 Participants by leveraging private contractual arrangements as a practical enforcement mechanism. Specifically, embedding enforceable compliance obligations within connection agreements creates a clear and legally binding pathway to secure ongoing adherence to agreed access standards. Importantly, this approach aligns incentives without fundamentally altering the registration framework established under Chapter 2 of the NER. It preserves the distinction between registered and non-Registered Participants, while ensuring that plant connected to the power system, regardless of registration status, continues to operate in a manner that supports system security. Moreover, the Commission understands that, in practice, connection agreements are already the primary vehicle for ensuring enforceable commitments to technical performance standards.

The Commission has clarified how ongoing performance may be demonstrated

In response to the draft determination, stakeholders broadly agreed that the draft rule created meaningful ongoing performance standard obligations for large IBLs.[185] However, stakeholders such as VeriConnex, Transgrid and Origin sought clarity on how the ongoing commitment for complying with performance standards could be demonstrated on a continuous basis.[186]

182 AEMO's power system security responsibilities and obligations are contained in rule 4.3 of the NER.
183 AEMC, *Improving the NEM access standards - Package 2*, Draft determination, 12 March 2026, chapter 3, p 43.
184 Final rule, clause 5.3.7(b).
185 Submissions to the draft determination: VeriConnex, p 1; Origin, p 3; AEMO, p 3.
186 Submissions to the draft determination: VeriConnex, p 1; Origin, p 3.

To address this feedback, the Commission revised the draft rule to include that the connection agreement must include details on how the connection applicant intends to comply with their applicable performance standards.[187]The Commission encourages non-registered applicants to have regard to the Reliability Panel's Template for Compliance Programs, which was recently revised to now consider additional plant types other than generators, such as integrated resource systems (including utility-scale batteries), synchronous condenser systems, loads and HVDC links.[188] It is noted that, for Registered Participants, it is *compulsory* to use the compliance template. The Commission will consider issuing a terms of reference for the Reliability Panel to commence a targeted review of compliance template following this final rule.

This approach achieves the NEO by supporting system security and reliability through encouraging ongoing compliance with agreed performance standards, promoting efficient investment and operation by providing a practical and proportionate framework for managing compliance, and avoiding unnecessary regulatory burden by encouraging, rather than mandating, the use of the compliance template for non-Registered Participants. This approach also preserves the distinction between registered and non-registered participants by avoiding the extension of the AER's enforcement powers under rule 4.15 to non-Registered Participants, while helping ensure that plant connected to the power system operates in a manner that supports system security, regardless of registration status.[189]

The Commission are considering registration of large IBLs in the *Operational integration and visibility for large IBLs* rule change

The Commission recognises that throughout consultation on this rule change, stakeholders have raised whether large IBLs should be Registered Participants under the Chapter 2 framework of the NER, which would in turn attract the compliance obligations in rule 4.15 of the NER.[190] For instance, Transgrid submitted that rule 4.15 of the NER should be extended to non-Registered Participants, and encouraged the Commission to consider whether operators of transmission connected Schedule 5.3 plant should be formally registered, noting that such facilities are likely to have a material system or market impact.[191]

The Commission is consulting on the question of registration in the *Operational integration and visibility of large IBLs* rule change, as outlined in chapter 3 of consultation paper for that rule change.[192] The Commission welcomes engagement from stakeholders in that process.

187 Final rule, clause 5.3.7(b)(2).

188 AEMC Reliability Panel, *Compliance Template Review 2026*, Final report, 30 July 2026. The 2026 Template for Compliance Programs is available here.

189 The AER's submission to our consultation paper recommends that the Commission extend rule4.15 of the NER to all Schedule 5 Participants, including non-registered participants. As stated in the draft determination, the Commission's view is that the AER's approach may be inappropriate for non-registered Schedule 5 Participants, as it could be too onerous, given that such participants have not undergone the registration process under Chapter 2 of the NER. See AEMC, *Improving the NEM access standards - Package 2*, draft determination, chapter 3, p 42.

190 Submissions to the draft determination: Tesla, p 3; Transgrid, p 2; AusNet, pp 7-8.

191 Transgrid submission to the draft determination, p 2.

192 AEMC, *Operational integration and visibility of large inverter based loads*, Consultation paper, 12 November 2026, chapter 3.

5 The final rule introduces disturbance ride-through access standards for loads and clarifies requirements for generators

Box 10: Key points in this chapter

The Commission has made a final rule to introduce disturbance ride-through access standards for inverter based loads (IBLs). The final rule also clarifies the disturbance ride-through access standard for Schedule 5.2 plant (generators and integrated resource systems).

How IBLs respond to disturbances is becoming increasingly important as more data centres connect to the National Electricity Market (NEM). The behaviour of large IBLs, or several smaller IBLs, following a disturbance or contingency event can create risks for system security. The disconnection of multiple loads due to a disturbance could result in significant supply disruptions for consumers if this risk is not managed.

The new disturbance ride-through access standards for IBLs will promote the National Electricity Objective (NEO) by managing these system security impacts. Requiring IBLs to stay connected and continue operating during credible disturbances will reduce the risk of supply disruptions and make it easier for AEMO and Network Service Providers (NSPs) to operate the system securely. Clear and predictable technical standards will also support a transparent, efficient connections process.

The new disturbance ride-through access standards in the final rule include the following:

- voltage ride-through requirements, including active power recovery after disturbances
- frequency ride-through requirements
- limits on how IBL protection systems can operate following phase shifts or multiple disturbances.

We have made changes from the draft rule to refine these access standards in response to further analysis and feedback from stakeholders.

The final rule also requires all connecting loads (IBL and non-IBL) to provide information about their ride-through capability to the NSP and AEMO upon the NSP's request. This will improve visibility of the ride-through behaviour of all loads, to support the secure operation of the power system.

The final rule clarifies and restricts the scope of credible contingency events for the Schedule 5.2 ride-through access standard (clause S5.2.5.5) to events used for network planning only. This is a change from the draft rule, which also included non-credible contingency events likely to be reclassified by AEMO as credible. Our new approach is simpler and easier to implement than the draft rule, while still supporting system security.

The final rule also clarifies that the Schedule 5.2 access standard for responses to disturbances following contingency events (clause S5.2.5.5A) is an AEMO advisory matter.

In this chapter:

- Section 5.1 explains the Commission's rationale for introducing the disturbance ride-through access standards and what we have considered in designing the access standards.
- Section 5.2 sets out the new access standards in detail and addresses stakeholder feedback.
- Section 5.3 explains how and why we have clarified the disturbance ride-through access standard for Schedule 5.2 plant.

5.1 The final rule will introduce disturbance ride-through access standards for IBLs

The final rule will create new access standards that apply to IBLs for the ride-through of voltage and frequency disturbances.[193] It also requires connecting loads to provide information about their ride-through capability to AEMO and the NSP on request.[194]

These disturbance ride-through requirements will support system security by reducing the risk of large or multiple IBL disconnections following a power system disturbance. They will also increase clarity and consistency for all parties involved in the connection process. We have made refinements to the design of the disturbance ride-through access standards for this final rule, following feedback on the draft rule and our further technical analysis.

The Commission has gone beyond AEMO's initial rule change proposal by making a more preferable rule that introduces explicit disturbance ride-through access standards for IBLs.[195] We consider clear and consistent disturbance ride-through requirements are needed now due to the rapid growth of data centres in the NEM, and stakeholder feedback supports this.

In this section:

- Section 5.1.1 explains the Commission's rationale for introducing disturbance ride-through requirements for IBL.
- Section 5.1.2 discusses the key factors we have considered in designing the ride-through access standards, including how we have consulted with industry stakeholders.

A full explanation of the final rule and discussion of detailed stakeholder feedback is provided in section 5.2.

5.1.1 Disturbance ride-through requirements for IBLs will enhance system security as more data centres connect to the NEM

The ride-through capability of IBLs is becoming increasingly important for system security. With an increasing number of IBLs, including data centres, connecting to the NEM, new system security risks are emerging. One key risk is the potential for disconnection of multiple IBLs following a disturbance, which could impact power system stability and lead to a large loss of load, resulting in disruption of supply to consumers. Without requirements for IBL ride-through capability in the National Electricity Rules (NER), the costs of managing these system security risks may also increase, and these costs would be passed on to consumers.

By introducing ride-through access standards for IBLs, the final rule seeks to address the system security risks associated with the disconnection of IBLs following a power system disturbance. Clear, predictable technical standards will also support an efficient connections process.

A secure power system must withstand disturbances, including generator and load disconnections

Like any power system, the NEM must be able to withstand reasonably possible power system disturbances in order to operate securely.[196] Following a power system disturbance, the response of all plant connected to the network, including generators, storage, and loads, can impact the secure and stable operation of the system.

193 Final rule, clauses S5.3.12, S5.3.13.

194 Final rule, clause S5.3.1(a1)(2A).

195 AEMO rule change request overview, 4 April 2024, website, pp 69-71.

196 The NER requires AEMO to operate the power system such that it will return to a satisfactory operating state following any credible contingency event, which is a contingency event that AEMO considers to be reasonably possible. (NER clauses 4.2.3(b), 4.2.4(a), 4.2.6(a).)

Box 11: Overview of the final rule disturbance ride-through requirements for loads

The final rule introduces new access standards that will require IBLs to ride through voltage and frequency disturbances. These disturbance ride-through access standards will apply to IBLs according to the final rule classification framework. That is:

- Disturbance ride-through access standards will always apply to large IBLs included in a Schedule 5.3 connection.
- The NSP may apply disturbance ride-through access standards to small IBLs, if it considers the plant may affect the quality or security of supply to other network users. (Final rule, clause S5.3.1a(a1)(2)(i)).
- The NSP may also apply the disturbance ride-through access standards to a small IBL as if it were a large IBL, if the NSP considers it reasonable and appropriate having regard to the aggregate impact of that IBL together with other electrically proximate IBL connections. (Final rule, clause S5.3.1a(b)(2)).

The new access standards consist of:

- **A voltage disturbance ride-through access standard,** which requires IBLs to withstand voltage variations of a certain size and duration, specified by the voltage ride-through envelopes (Figure 5.1). IBLs must stay connected and operate within certain limits during shallower disturbances, but may temporarily disconnect during deeper disturbances. This access standard also includes requirements for active power recovery following a disturbance. See section 5.2.1. (Final rule, clause S5.3.13).
- **A frequency ride-through access standard,** which requires IBLs to stay connected during frequency disturbances aligned with the Frequency Operating Standard (FOS). See section 5.2.2. (Final rule, clause S5.3.12).
- **Limits on how IBL protection systems can operate** for phase angle shifts and multiple successive faults. See section 5.2.3. (Final rule, clause S5.3.13(l)-(m).)

In addition, the final rule requires all Schedule 5.3 connection applicants to provide information on their ride-through capability to the NSP and AEMO, at the NSP's request. See section 5.2.4. (Final rule, clause S5.3.1(a1)(2A)).

Source: AEMC.

Electrical plant, including but not limited to IBLs, sometimes disconnects in response to a fault or disturbance on the power system. This can be an appropriate response to a disturbance as protection systems act to clear a fault or prevent damage to equipment. Loads with uninterruptible power supplies (UPS), such as data centres, may be more likely to disconnect from the power system in a disturbance as they can switch to back-up supply without interrupting services to their end users. However, in order to maintain the security and stability of the power system as a whole, it is preferable to minimise the amount of power system equipment that disconnects following a disturbance. Plant tripping unnecessarily can affect the balance of supply and demand, leading to frequency deviations, voltage decline (or over-voltage), and power system instability.

'Ride-through capability' refers to the ability of plant to stay connected and continue operating during and after a disturbance. The NER sets out comprehensive ride-through requirements for generators and integrated resource systems.[197] However, until now, there have been no disturbance ride-through requirements for loads.

197 NER clauses S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.5A, S5.2.5.6, S5.2.5.7.

The impact of load disconnections is increasing with the influx of large IBL

As more IBLs connect to the NEM (see section 1.1), the behaviour of these IBLs during a disturbance will begin to have a larger impact on the grid. Data centres have emerged as by far the dominant type of large IBL and they continue to grow in size and number. There is also potential for growth in other types of large IBL, such as electrolysers.[198] The NEM is seeing some potential data centre connections of around one gigawatt in size, which may be large enough for the disconnection of a single load to impact power system stability. Even where individual IBLs are not so large, the aggregate effect of multiple IBLs can be significant (see section 3.2.3).

Data centres, collectively, have a number of characteristics which make their ride-through capability particularly significant for power system security.

- They are likely to be equipped with UPS, meaning they are able to disconnect from the grid very quickly without interrupting computational load.
- Many data centres are likely to have similar design features, including protection settings (in part because they use equipment supplied by relatively few original equipment manufacturers (OEMs)).
- They are likely to be clustered in specific locations, such as major cities or industrial zones within those cities.

As noted in submissions to the draft determination, this means that a number of data centres might see the same power system disturbance and respond in the same way, which may include disconnecting.[199]

Specifically, a risk of cascading outages may emerge as more large IBLs connect.[200] A cascading outage is an uncontrollable succession of plant disconnections, each of which is initiated by conditions arising or made worse by the events preceding it.[201] For example:

- A transmission fault occurs and causes a voltage disturbance
- One or more data centres disconnect as a result of the initial disturbance
- Those disconnections exacerbate the voltage disturbance because of the sudden reduction in power consumption
- The larger voltage disturbance causes other plant to disconnect.
  - Since voltage is a local quantity, nearby plant would be most severely affected, but the impacts could be geographically widespread (see Box 13).
  - Other types of plant including generators and non-IBLs could also be impacted.

The clustering of data centres with similar disturbance response settings contributed to the July 2024 Virginia large load loss incident, where 60 data centres with a similar protection setting tripped after a lightning arrestor failure, resulting in 1500 MW of load being disconnected.[202]

An aggregate loss of load, including as a result of cascading outages, could have the following negative impacts for consumers:

- loss of supply for the loads directly affected (especially any non-UPS loads)
- reduced power quality, where voltage and frequency may stray outside the normal range

198 See section 2.1 of the draft determination for more information.

199 Submissions to the draft determination: AusNet, p 13; Transgrid, p 9; ElectraNet, pp 1-2.

200 As noted in AEMO's rule change request overview, pp 69-70.

201 NER Chapter 10, Glossary definition of *cascading outage*.

202 NERC, Incident Review Considering Simultaneous Voltage-Sensitive Load Reductions, 8 January 2025, website, pp 1-2; AEMO rule change request overview, 4 April 2024, pp 69-70.

- in a severe case, widespread supply disruptions impacting residential and small business customers as well as large loads
- in an extreme case, a system black, which would impact supply to a large number of consumers for an extended period. Restart costs would also be passed on to consumers.

The existing arrangements cannot manage the risk of IBL disconnections efficiently

While there are existing arrangements to manage the risk of credible contingency events in the NEM, these arrangements do not necessarily scale to accommodate the increase in large IBL connections, without significant cost. AEMO is responsible for ensuring that the power system returns to a secure operating state after a contingency event, such as the loss of a generator or large loss of load, while maintaining supply to consumers.[203] AEMO has several tools at its disposal to manage these risks in operational timeframes, such as dispatch constraints, contingency frequency control ancillary services (FCAS), and market notices for forecast minimum system load. There are also mechanisms that would operate immediately in the event of large load loss including primary frequency response and special protection schemes (e.g. over frequency generation shedding). However, many of these risk management tools have direct or indirect costs, and/or limitations on the size of load contingency that they can manage.

If a large amount of IBL continues to connect under the existing arrangements, AEMO and NSPs may face increased costs to manage the risk of large load disconnections, and these costs would likely be passed on to consumers.

The final rule goes beyond AEMO's rule change request in creating explicit ride-through requirements

The final rule differs from AEMO's initial rule change request with respect to disturbance ride-through requirements. The Commission has decided to introduce explicit ride-through access standards instead of the light-handed approach in the rule change request. Under AEMO's proposed rule, the NSP and Schedule 5.3 Participant would have been required to cooperate to design protection systems and settings that maximise ride-through capability, subject to engineering and safety requirements.[204] We consider that disturbance ride-through access standards, along with information provision, will address the issues raised in the rule change request more effectively than AEMO's initial proposal. The Commission's decision builds on AEMO's earlier work and consultation on disturbance ride-through for IBLs in its Access Standards Review, and we have undertaken further analysis and extensive stakeholder engagement over the course of this rule change process.[205]

We are now able to draw on recent developments to better understand the issues and develop effective solutions. Similar risks associated with the disturbance ride-through behaviour of large loads are emerging in many international jurisdictions, influenced by the global growth of data centres. Many jurisdictions, such as the Electric Reliability Council of Texas (ERCOT) (USA) and Fingrid (Finland) have introduced or are developing disturbance ride-through and other technical requirements for large loads to address these risks.[206] Taking a proactive approach for the NEM will help avoid or mitigate the challenges that many overseas electricity systems are facing in relation to the growth of data centres.

203 NER clauses 4.2.3, 4.2.4, 4.2.6.

204 AEMO, rule change request overview, pp 70-71.

205 AEMO, Review of technical requirements for connection (Access Standards Review), final report, 22 December 2023, website, chapter 4.

206 ERCOT, Nodal Operating Guide Revision Request 282 - Board Priority - Large Computational Load Ride-Through Requirements, 9 July 2026, website; Fingrid, Draft for comments: KJV2026 Grid code specifications for demand connections, 12 June 2026, website.
See appendix A of our draft determination for more information.

Having said this, a substantial number of large IBLs are already connecting to the NEM as indicated by Figure 3.1 in section 3.1.2. As a result, AEMO and NSPs have recently gained further experience in connecting and managing large loads, including working with large load operators to decide modelling and technical requirements. Technical Working Group (TWG) feedback suggests that data centres and other large load connections are already facing ad hoc technical requirements and complex connection processes as NSPs seek to manage the impact of large IBL on their networks.[207]

In submissions to the consultation paper, several stakeholders expressed support for explicit ride-through access standards.[208] This feedback was reinforced during the TWG process, with most stakeholders including NSPs, load operators, OEMs and AEMO agreeing that disturbance ride-through access standards would be a better solution than AEMO's proposal for protection systems and settings to maximise ride-through capability. We consider that explicit access standards will provide greater certainty and predictability for connection applicants, NSPs and AEMO, which will better support system security as well as a clear, efficient connections process.

Submissions to the draft determination strongly supported the proposed direction to introduce disturbance ride-through access standards for IBLs, as they agreed this would enhance system security.[209] Some stakeholders also noted that ride-through requirements would help "reduce the reliance on operational interventions", such as FCAS, and avoid cost increases.[210] Stakeholders were generally comfortable with the overall approach to setting quantitative requirements that are aligned with credible contingency events and only apply to IBLs. Submissions supported the inclusion of voltage ride-through, frequency ride-through, post-fault active power recovery requirements, and limits on IBL protection systems.[211]

5.1.2 How we have designed the ride-through access standards

The main purpose of the NEM access standards is to ensure that the technical requirements for new connections are consistent with maintaining power system security, as well as safety and quality of supply. Therefore, the disturbance ride-through access standards for IBL must be set at a level that meets the NEM's system security needs. However, the industry is still learning how large IBLs interact with the power system, particularly given the rapid growth of data centres and ongoing development in the technologies used for these IBLs. We must consider the cumulative impact of IBLs as well as their individual impacts. Our understanding of system security in a high-renewables power system is also still evolving. New risks are emerging, but new tools may become available to manage them. AEMO's Statements of Need for Type I and II Transitional Services are an example of work in this area.[212] Finally, system security needs can be location dependent and can be different in transmission and distribution networks.

Another complicating factor is that existing IBL capabilities do not always align with system security needs. Some stakeholders considered that the access standards should be more onerous than the draft rule proposed, in order to capture technical capabilities exceeding current system security needs.[213] This could reduce the cost of managing the system or help insure against

207 See section 3.2.1 for a more detailed discussion of this issue.

208 Submissions to the consultation paper: EPEC, p 6; Gridmo, p 2; Transgrid, p 17; Hydro Tasmania, p 4; TE H2, p 2.

209 Submissions to the draft determination: Ergon Energy and Energex, pp 1-2; CPU, p 2; Celero and GPE, p 1; VicGrid, pp 1-2; Snowy Hydro, pp 2-3; SA Power Networks, p 1; VeriConneX, p 2; Canus, p 3; Antora, p 1-2; ElectraNet, pp 1-2; Transgrid, pp 9-12; Origin, p 1; Syncline, p 4; Powerlink, pp 1-2; Tesla, p 1, 3; AusNet, pp 1-2; VisIRGrid, p 2; Sungrow, pp 1-3; AEMO, p 1; AWS, pp 1-2; Endeavour, p 1; City of Melbourne, p 1.

210 Submissions to the draft determination: Snowy Hydro, pp 2-3; CPU, p 2.

211 Submissions to the draft determination: Antora, pp 1-3; EUAA, p 2; Celero and GPE, p 7; VisIRGrid, p 4; Origin (supplementary), pp 1-2; AusNet, pp 10-14; Sungrow, pp 2-3; Tesla, p 3; AEMO, pp 4-5; Syncline, pp 4-5; ElectraNet, pp 6-7, 9-13; Transgrid, pp 9-12; VicGrid, pp 1-2.

212 AEMO, Transitional Services - Type 1 Services, website; AEMO, Transitional Services - Type 2 Services, website.

213 Submissions to the draft determination: ElectraNet, pp 3, 6-7, 9-15; Transgrid, pp 9-11; Powerlink, p 2; VicGrid, pp 1-2.

potential future risks. Others considered that the access standards should primarily confirm the existing capability of IBLs, with any system security gaps to be managed by AEMO and NSPs.[214]

Some submissions also discussed how system security needs, or the impact of an IBL on system security, can differ depending on the connection location due to factors such as local network strength. AusNet, for example, noted that compliance with the minimum access standard may be sufficient from a system security perspective in some parts of the network.[215] ElectraNet considered that NSPs should be able to ask for a higher level of performance (beyond the automatic access standard) for individual connections when there is a system security need, for example in relation to the connection location.[216]

The Commission has designed the access standards for disturbance ride-through to prioritise system security, while keeping the above factors in mind.

The access standards enable IBLs to ride through credible contingency events

We have sought to align the automatic access standards with the impacts of credible contingency events on voltage and frequency, where possible. This means that IBLs meeting the automatic access standard should generally be able to ride through credible contingency events, which will make it easier for AEMO and NSPs to meet their obligations in managing credible contingencies when they occur. Where applicable the automatic access standard are aligned with the NEM system standards (Schedule 5.1a of the NER). The system standards represent the quality of service that load connections can generally expect, as NSPs operate the network and manage connections in such a way as to keep power system conditions within the system standards during system normal and credible contingency events.[217] Additionally, the new access standards are no more onerous than the access standards that apply to generators (Schedule 5.2 of the NER).

We have created flexible access standards to accommodate different types of IBLs

We have designed the minimum access standards to provide flexibility for loads that may have different technical capabilities. This approach acknowledges the variety of technical characteristics amongst IBLs, including but not limited to data centres, so that loads do not face unreasonable barriers to connection. To this end, the final rule includes a non-onerous minimum access standard for some key aspects of ride-through capability (voltage ride-through envelope, behaviour during disturbances).[218] For other aspects of ride-through capability there will be no minimum access standard (frequency ride-through, active power recovery).[219] For voltage disturbance ride-through, connection applicants, NSPs and AEMO may also agree to a lower level of performance than the minimum access standard after considering factors including the technical characteristics of the IBL and its impact on the power system.[220]

The negotiation framework enables NSPs and AEMO to consider the impacts of a given IBL, depending on its size, nature, and connection point, and to weigh up system needs with any technical limitations and costs, when deciding whether to accept a proposed negotiated access

214 Submissions to the draft determination: Tesla (supplementary), pp 1-5; Celero and GPE, pp 2-8; VisIRGrid, pp 4-6, 8-9; Origin (supplementary), p 1.
215 AusNet submission to the draft determination, p 13.
216 ElectraNet submission to the draft determination, pp 14-15.
217 NER clause 5.2.3(b).
218 Final rule, clause S5.3.13(f)-(h).
219 Final rule, clauses S5.3.12, S5.3.13.
220 Final rule, clause S5.3.13(f).

standard. Negotiated access standards must be as close as practicable to the automatic access standard and must not adversely impact system security or quality of supply to other users.[221]

The access standards are clear and objective

We have sought to create clear and objective ride-through access standards, including by using a quantitative form wherever possible. During the TWG process, stakeholders expressed a strong preference for a clear, numerical formulation such as a ride-through curve, rather than a direct requirement to ride through contingency events, for example.[222] This approach provides simplicity and certainty for connection applicants and help limit modelling requirements.

The access standards are aligned with international requirements

The Commission has sought to align the new access standards in the final rule with those in comparable international jurisdictions, such as ERCOT and Fingrid.[223] If Australia's access standards align with practices in other mature markets, connecting parties may be able to use feasibility studies, grid-integration assumptions, and risk models developed for other jurisdictions, thereby reducing technical and regulatory incompatibilities that may deter investment in large loads for the NEM. Further, this approach will benefit connecting loads, such as large data centres, because OEMs that supply standardised load equipment may be better able to do so in Australia. This would potentially widen the pool of available OEMs, shorten procurement timeframes, reduce engineering hours, and lower equipment integration risk for the NEM. Those savings would flow directly into lower capex and faster commissioning for data centre developers, whilst ensuring system security is maintained.

Feedback on the draft rule supported this alignment with comparable requirements in other jurisdictions.[224] Powerlink considered that this international alignment could go further, recommending that the "automatic access standard be aligned with internationally proven, in-service capabilities", noting that NEM access standards less onerous than international practice could discourage developers "from configuring plant to utilise its full technical capability" in Australia.[225] Conversely, AusNet noted that NEM access standards should be based on NEM-specific evidence.[226] International alignment is only one of the factors we have considered. The new access standards set out in the final rule are also shaped by the needs of the NEM and consultation with local stakeholders.

Figure 5.3 in section 5.2.1 provides a comparison of the final rule voltage disturbance ride-through access standard with corresponding international requirements. Appendix A of our draft determination provides more information about proposed or existing large load ride-through requirements in other jurisdictions.

The new access standards have been shaped by stakeholder feedback

Stakeholders provided a range of feedback on the detailed design of the access standards, which is discussed in section 5.2. Key areas for feedback were the ride-through of longer or deeper

221 NER clause S5.3.4A.

222 See our 4 December 2025 TWG slides, available on our website, for the discussion questions posed to the TWG on this topic.

223 ERCOT, Nodal Operating Guide Revision Request 282 - Board Priority - Large Computational Load Ride-Through Requirements, 9 July 2026, website; Fingrid, Draft for comments: KJV2026 Grid code specifications for demand connections, 12 June 2026, website.
See appendix A of our draft determination for more information.

224 Submissions to the draft determination: AEMO, p 4; Syncline, pp 1-2; Canus, p 3; Endeavour, p 1.

225 Powerlink submission to the draft determination, p 2.

226 AusNet submission to the draft determination, p 1.

voltage disturbances, the selection of active power recovery times, and a minimum access standard for frequency ride-through.[227] We have made changes in the final rule responding to this feedback as outlined in Box 12 and we have sought to balance system security needs with what is practical and achievable for IBL connections.

Box 12: Changes between the draft and final rule

The conditions for application of the disturbance ride-through access standards to IBLs have changed because we have made changes to the classification framework, as discussed in chapter 3. The ride-through access standards always apply to large IBLs and the NSP may apply them to small IBLs, having regard to their impact on the system including their aggregate impact.

We have made a number of design changes to the **voltage ride-through access standard** for the final rule, including:

- **Lowering the temporary disconnection threshold** in the automatic access standard to 0.5 per unit (p.u.) (previously 0.7 p.u.).
- **Extending the ride-through duration for the 0.5-0.7 p.u. voltage range** in the automatic access standard to one second (previously 240 ms).
- **Simplifying the active power limits for the 1.1-1.3 p.u. voltage range** in the automatic access standard to permit a 10per cent change from the pre-disturbance active power (previously, a change proportional to the size of the voltage swell).
- **Relaxing the current limit in the minimum access standard** to a less onerous fixed limit, which is that IBL current must not exceed 120per cent of the rated current (in the draft rule, IBL could not increase its current from the pre-disturbance level by more than 20per cent of the rated current).
- **Removing the minimum access standard for active power recovery,** while providing more detailed requirements for negotiated access standards and the information that is to be recorded in the plant performance standards.

We have made minor changes to the **frequency ride-through access standard** to clarify that:

- An IBL's frequency ride-through capability must be recorded in the plant's performance standard, whether or not it is a negotiated access standard.
- Any load shedding obligations are to take precedence over frequency ride-through requirements.

We have moved the **limits on how IBL protection systems can operate** for phase shifts or multiple successive disturbances from clause S5.3.3 in the draft rule to S5.3.13 in the final rule. This means that these protection systems apply according to the classification framework and are an AEMO advisory matter.

There are no changes to the information provision requirement for the final rule.

Source: AEMC.

We consulted a broad group of industry stakeholders on our approach to disturbance ride-through for IBLs through the TWG meetings held in 2025, prior to the draft determination. This TWG process informed our decision to introduce explicit disturbance ride-through access standards for IBL. A further TWG meeting in July 2026 was used to test a number of potential changes to the ride-through access standards, including changes suggested in submissions to the draft

227 Submissions: Ergon Energy and Energex, p 2; CPU, p 2; Celero and GPE, pp 5, 7-8; VicGrid, p 2; ElectraNet, pp 5-6, 10-12; Transgrid, pp 9-12; AusNet, p 14; VisIRGrid, pp 4-5; Sungrow, pp 3-4.

determination.[228] This further TWG feedback has helped the Commission refine our approach to disturbance ride-through access standards for the final rule.

5.2 How the ride-through access standards will work

This section provides a detailed explanation of the ride-through access standards in the final rule and the Commission's considerations in designing the ride-through access standards, as well as our responses to detailed stakeholder feedback.

In this section:

- Section 5.2.1 explains the voltage disturbance ride-through access standard, including the voltage ride-through envelopes, requirements for IBL behaviour during disturbances, and active power recovery.
- Section 5.2.2 explains the frequency disturbance ride-through access standard.
- Section 5.2.3 explains the final rule's limits on how IBL protection systems can operate.
- Section 5.2.4 explains the information provision requirement in the final rule.

5.2.1 Voltage disturbance ride-through

Voltage disturbances can occur on the power system for a number of reasons including a fault, loss of generation, or loss of load. These power system disturbances can cause the voltage to vary outside its normal operating range, which can affect how plant operates and trigger protection systems. While it is sometimes necessary for plant to trip off in a voltage disturbance to protect sensitive equipment, it is also important for plant to ride through disturbances where possible in order to maintain system stability and avoid undesirable outcomes such as cascading outages.

We have designed the voltage disturbance ride-through requirements to address both shallow and deep voltage sags (below the nominal voltage), as well as voltage swells (above the nominal voltage). Shallow voltage sags, which are relatively small in magnitude and may last for seconds or minutes, may be caused by distant faults, high impedance faults, or to a lesser extent, operational activities such as start-up of large transformers or motors. Deep disturbances are typically caused by faults, involve a larger voltage sag (even to zero or near-zero voltage), and are shorter (measured in milliseconds). We have also considered voltage swells of up to 1.3 p.u. Voltage swells may be caused by large loads turning off, or capacitor switching.

The new access standard in the final rule consists of:[229]

- **voltage ride-through envelopes** indicating the depth and duration of disturbances that IBL must be able to withstand, for the automatic and minimum access standards
- requirements for **IBL behaviour during disturbances,** which are limits on increasing or decreasing active power or current during a disturbance, with different limits applying to different parts of the ride-through envelope
- requirements for timely **active power recovery** after a voltage disturbance.

The final rule voltage disturbance ride-through standard is illustrated in Figure 5.1 below. There are different requirements in each of the marked regions in Figure 5.1 as follows:

228 TWG meeting materials are available on our website.

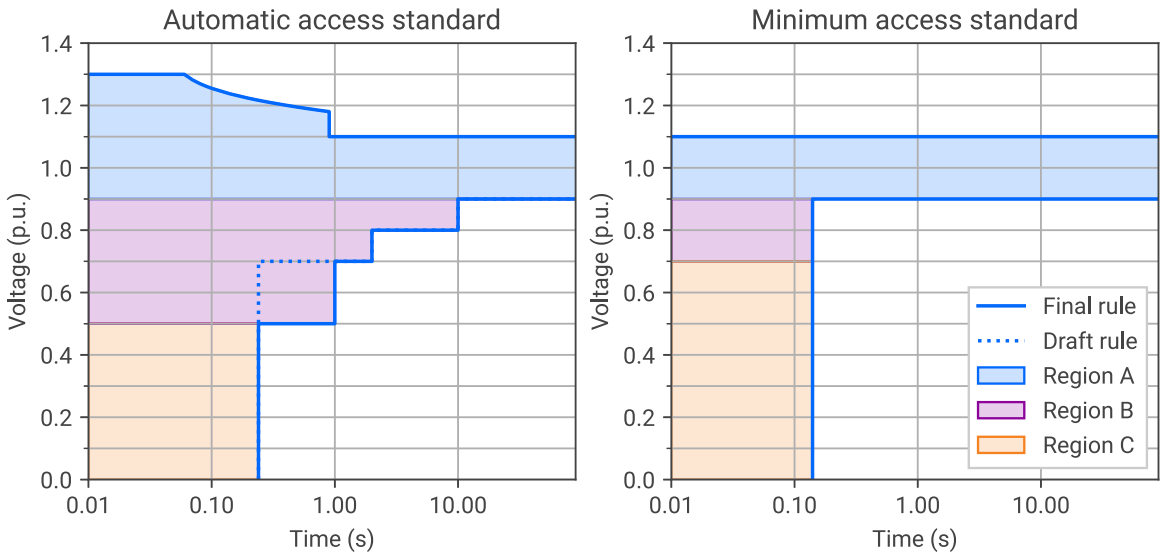
229 Final rule, clause S5.3.13(c)-(h), (k), (n).

- **Region A:** Plant must not disconnect during a disturbance, and must maintain its active power and current consumption within the allowed limits (discussed below), for the duration of the disturbance.
- **Region B:** Plant must not disconnect during a disturbance, and must maintain its active power and current consumption within the allowed limits, depending on the size of the disturbance, for the duration of the disturbance.
- **Region C:** Plant is permitted to disconnect or reduce active power by any amount, but its active power and current consumption must not exceed the allowed maximum levels, depending on the variation in voltage, for the duration of the disturbance. Active power recovery is also required after the disturbance.

We discuss the design of the voltage ride-through envelopes first, followed by the requirements for IBL behaviour during disturbances and finally active power recovery.

The voltage disturbance ride-through access standard will be deemed to be an AEMO advisory matter.[230] This is consistent with voltage disturbance ride-through for Schedule 5.2 plant, which is also an AEMO advisory matter.[231]

Figure 5.1: Voltage ride-through envelopes



Source: AEMC.

Voltage ride-through envelopes

Both the automatic and minimum access standard will require IBLs to withstand voltage variations at the connection point within the range 0.9-1.1 p.u., regardless of duration.[232] That is, an IBL should generally be capable of operating continuously in this voltage range. The Commission expects that IBLs would generally already have this capability because voltage variations in the range 0.9-1.1 p.u. are common. The active power limits, discussed later in this

230 Final rule, Chapter 10, Glossary definition of *AEMO advisory matter*.

231 NER clause S5.2.5.4 is included in the definition of *AEMO advisory matter*.

232 Per unit (p.u.) quantities are relative to the nominal voltage at the connection point. Final rule, clause S5.3.13(c)(2).

section, will permit an IBL's active power consumption to vary by 10per cent during a disturbance of this type.

Over-voltage ride-through envelope

The automatic access standard over-voltage ride-through curve shown in Figure 5.1 is aligned with the NEM system standards.[233] This reflects the maximum size of a voltage swell that would be expected as a result of a credible contingency event, because NSPs are required to maintain the voltage within the system standards following a credible contingency event.[234]

For this final determination, we have reassigned the over-voltage section of the ride-through curve between 1.1-1.3 p.u. to Region A, instead of Region B as proposed in the draft determination. This is because we have simplified the active power limits that apply during over-voltage disturbances, as discussed in the relevant section below.

Following feedback on the draft rule, the Commission considered raising the over-voltage ride-through envelope to align with the corresponding requirements for generators, instead of the system standards.[235] Part of the over-voltage envelope (for example, the section above 1.3 p.u.) could be assigned to Region C, meaning that IBL would not need to stay connected during the disturbance but would need to recover after the disturbance.[236] This would capture over-voltage conditions associated with some non-credible events. We tested this option with industry stakeholders at the July 2026 TWG meeting.[237]

We also considered, and tested with stakeholders, whether the automatic access standard should capture transient over-voltages. Transients are brief increases in the instantaneous voltage (shorter than one cycle) which may be caused by lightning strikes or reactive plant switching. Transgrid's submission suggested a light-touch requirement, similar to the final rule requirements for phase shift and multiple faults, that would prevent IBL protection systems from operating within 20 ms of commencement of a transient over-voltage, but would not require the plant to guarantee ride-through.[238]

The Commission has decided to maintain the over-voltage ride-through envelope set out in the draft rule, with no specific provisions for transients, for two reasons.

- First, we consider that stronger over-voltage ride-through requirements are not justified with respect to the system security risk. Generally, voltage swells are less common and less severe than voltage sags, so they are a lesser system security concern. The Commission understands that this may be a localised issue arising from multiple large IBLs connecting electrically close together (and potentially close to reactive plant) on Transgrid's network. Disconnection in response to transients and voltage disturbances outside the system standards could be a system security concern in this scenario. However, it would not be appropriate to set a NEM-wide access standard based on this localised risk. The Commission notes that NSPs and connection applicants may agree to performance standards outside the NER access standards where there is a need, on a case-by-case basis.
- Secondly, most stakeholder feedback supported the draft rule approach. Feedback from the TWG generally did not support more onerous over-voltage ride-through requirements for either

233 Final rule, clause S5.3.13(c)(1)-(2), (d).
For the corresponding system standards, see NER clause S5.1a.4.

234 NER clause 5.2.3(b).

235 Final rule, clause S5.2.5.4(a)(1)-(5).

236 Transgrid submission to the draft determination, pp 9-11.

237 TWG meeting materials are available on our website.

238 Transgrid submission to the draft determination, p 12.

transients or longer disturbances, because it would be unnecessary and/or technically challenging. In a supplementary submission made following the July 2026 TWG meeting, Origin supported retaining the draft rule over voltage ride-through requirements.[239]

The Commission understands that some UPS models, and other IBLs, cannot withstand the 1.3 p.u. voltage required by the automatic access standard. Voltage of 1.15-1.2 p.u. may be more achievable. However, we are confident that any such technical limitations could be accommodated in a negotiated access standard, noting the minimum access standard only goes up to 1.1 p.u.[240]

Under-voltage ride-through envelopes

The automatic access standard undervoltage ride-through envelope is designed to correspond approximately to voltage sags caused by credible contingency events. Since there is no quantitative system standard for undervoltage conditions, we have used the existing voltage ride-through requirements for generators, combined with the relevant fault clearance times, as a basis for the design.

The final rule strengthens the automatic access standard under-voltage ride-through envelope compared to the draft rule. We have lowered the temporary disconnection threshold (lower limit of Region B) from 0.7 p.u. to 0.5 p.u., and IBLs are now required to ride through voltage sags in this range for one second, instead of 240 ms.[241] The dotted line in Figure 5.1 indicates the draft rule for comparison. This change to the automatic access standard will support system security by requiring IBLs to have better capability to ride through slowly cleared, but distant, faults.

For the voltage range 0.7-0.9 p.u, the automatic access standard remains aligned with the corresponding requirements for generators in Schedule 5.2.[242] We understand that most data centres are likely to be able to stay connected and continue operating at voltages between 0.7-0.9 p.u., for the durations indicated for the automatic access standard in Figure 5.1. (Box 16 discusses a possible exception and how this could potentially be accommodated.)

Consistent with the draft rule, the minimum access standard envelope only requires IBLs to ride through voltage disturbances as low as 0.7 p.u. for 140 ms (Region B in Figure 5.1).[243]

The final rule deep disturbance durations are the same as the draft rule, that is, 240 ms for the automatic access standard and 140 ms for the minimum access standard (Region C in Figure 5.1).[244] IBLs will not strictly be required to stay connected during these disturbances, but will need to avoid exceeding active power and current limits and meet relevant active power recovery requirements, provided that the disturbance is not longer than the deep disturbance duration.[245] These requirements are discussed under the relevant headings below.

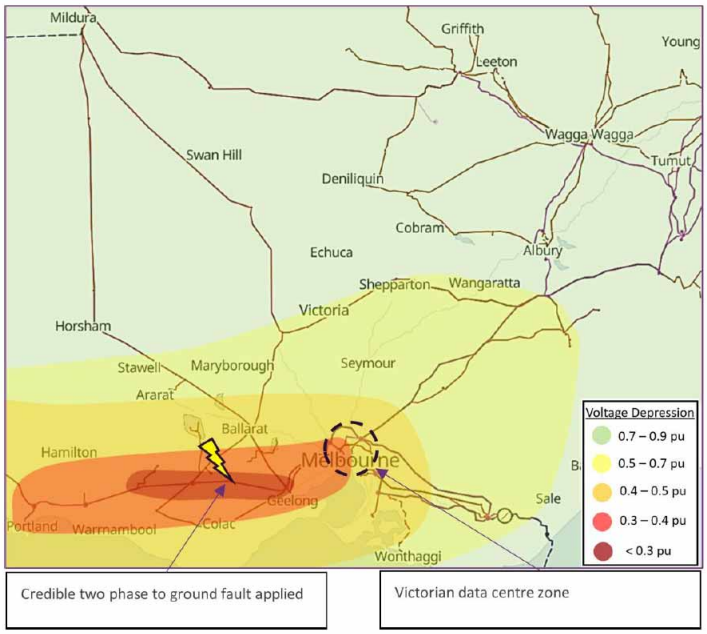
239 Origin supplementary submission to the draft determination, p 2.
240 Final rule, clause S5.3.13(g).
241 Final rule, clause S5.3.13(c)(3), (d). Compare draft rule, clause S5.3.13(c)(3), (d).
242 NER clause S5.2.5.4(a)(7)-(8).
243 Final rule, clause S5.3.13(g)(2).
244 Final rule, clause S5.3.13(d), (g)(3).
245 Final rule, clause S5.3.13(c)(4) and (g)(3).

Box 13: Propagation of voltage disturbances

Voltage in electrical networks is location-dependent. A short-circuit fault causes a severe voltage sag close to the fault location, where the voltage can be reduced to near zero. The voltage sag will be smaller in areas that are electrically further away from the faults, although there may still be a significant disturbance over a large area. As outlined in AEMO's 2026 General Power System Risk Review (GPSRR), and illustrated in Figure 5.2:

> *Voltage disturbances can propagate widely through the transmission network, affecting data centres even for remote faults. Voltage disturbances applied to the high voltage transmission network can be experienced across wide geographic areas due to the low impedance transmission lines. The same properties that allow for the transmission of power over long distances also mean that when a voltage disturbance occurs, this may propagate to locations that are distant from where the fault occurred. This may mean that even faults occurring in remote locations may impact the operation of IBLs located close to major cities. [*Figure 5.2*] illustrates this, demonstrating the modelled propagation of a two phase to ground fault in South West Victoria. It can be seen that the network surrounding the Melbourne central business district (CBD) would experience a voltage drop below 0.5 p.u. This would result in the disconnection of all data centres that experienced this disturbance if only complying with the ITIC [Information Technology Industry Council] curve.*

Figure 5.2: Voltage disturbance propagation for a two phase to ground fault in the Victorian transmission network



This example shows why it is important for the IBL disturbance ride-through access standard to capture some deeper voltage disturbances. However, we note that faults in the distribution network do not usually cause a significant disturbance in the upstream transmission network because it is shielded by the larger distribution network impedances, including transformer impedance. This means that higher voltage transmission faults are more likely to affect a large number of IBLs, compared to distribution faults.

Source: AEMO, 2026 GPSRR, final report, 31 July 2026, website, pp 22-23.

Box 14: Fault clearance times in the NEM

Clause S5.1a.8 and Table S5.1a.2 in the NER specify the maximum fault clearance times for short circuit faults. Faults at higher voltages are cleared more quickly than those at lower voltages. For example, a fault on the remote portion of a 330 kV line needs to be cleared within 120 ms, while for a 220 kV line this is 220 ms. The NER does not provide a specific maximum clearance time for faults at 100 kV and below. Citipower, Powercor and United Energy's (CPU) submission noted that faults in the distribution network may take around 500-600 ms to clear.

Back-up and breaker fail protection also operates more slowly than primary protection. For example, Table S5.1a.2 in the NER gives a maximum back-up or breaker fail clearance time of 430 ms for faults on a 220 kV transmission line.

Source: NER clause S5.1a.8, Table S5.1a.2.
Source: CPU submission to the draft determination, p 2.

The deep disturbance durations are based on the worst-case primary protection fault clearance times in the system standards, given by Table S5.1a.2 in the NER.[246] The automatic access standard of 240 ms will ensure that IBLs have active power recovery capability for a fault anywhere on the transmission or sub-transmission network that is cleared by primary protection.[247] This is the longest primary protection clearing time for any voltage over 100 kV in Table S5.1a.2 in the NER, plus 20 ms (one cycle) of buffer time for the voltage to stabilise. Consistent with feedback from the 2025 TWG meetings, load will not be required to recover quickly from disturbances that are cleared more slowly by back-up or breaker fail protection.

We selected a shorter duration of 140 ms for the minimum access standard to provide a range for negotiation, noting that many international standards have similar requirements for approximately 150 ms (see Figure 5.3).[248] Most faults on the transmission network would be cleared within 120 ms.[249]

The changes to the under-voltage ride-through envelope respond to stakeholder feedback on the draft rule. Stakeholder feedback also asked us to consider extending the deep disturbance duration, but we have decided against this for the final rule. We consider that lowering the temporary disconnection threshold to 0.5 p.u. for one second will also address the concerns raised about the deep disturbance duration.

A number of submissions to the draft determination suggested that we consider setting the temporary disconnection threshold lower than 0.7 p.u.[250] VicGrid and Sungrow considered there was not enough evidence to demonstrate that IBL disconnection below 0.7 p.u. would be acceptable from a power system perspective.[251] Transgrid suggested lowering the temporary disconnection threshold to 0.5 p.u. and extending the ride-through time to one second "based on analysis of the likely voltage disturbances caused by remote faults in the 132 kV system, which may not be cleared in 250 ms."[252]

246 NER clause S5.1a.8.

247 Final rule, clause S5.3.13(d).

248 Final rule, clause S5.3.13(g)(3); Alberta Electric System Operator (AESO), Guide to AESO Connection Requirements for Transmission-Connected Data Centres, 12 June 2026, website, p 25; EirGrid, Grid Code Modification Recommendation Form - MPID 345 Fault Ride Through, Rate of Change of Frequency and Post Fault Active Power Recovery for Demand Facilities, 1 April 2026, website, p 17; Energinet, Technical Regulation 3.4.3 Requirements for Transmission-Connected Demand Facilities, Revision 1, 23 September 2024, website, p 7; ERCOT, Nodal Operating Guide Revision Request 282 - Board Priority - Large Computational Load Ride-Through Requirements, Public Utility Commission of Texas (PUCT) Report 070926, 9 July 2026, website, p 11; Réseau de Transport d'Électricité (RTE), Article 8.3.5 - Cahierdes Charges descapacités constructives d'une Installation de consommation, version 1.0, 15 February 2024, website, p 26.
See appendix A of our draft determination for more information.

249 NER Table S5.1a.2.

250 Submissions to the draft determination: VicGrid, p 1; Sungrow, p 3; Transgrid, pp 10-11.

251 Submissions to the draft determination: VicGrid, p 1; Sungrow, p 3.

We also considered extending the deep disturbance duration to account for slower fault clearance times in the distribution network. This would also capture faults cleared by back-up or breaker fail protection, which necessarily takes longer than primary protection to operate. CPU suggested a deep disturbance duration of around 430 ms in the automatic access standard to allow for breaker fail protection on lines between 100-250 kV.[253]

We tested a number of potential changes to the under-voltage ride-through envelope with industry stakeholders in the July 2026 TWG meeting. While stakeholders had a range of views on the potential changes, the feedback confirmed that strengthening ride-through requirements for the 0.5-0.7 p.u. range is sufficient to address the concerns raised about slowly cleared faults. This is because IBLs that are further away from a fault will see a smaller voltage sag. From a system perspective, it is acceptable for some IBLs close to the fault to trip off provided that others on the broader network stay connected. This will help prevent adverse consequences such as cascading outages. Further, we note that slowly cleared faults are generally either:

- in the low-voltage network, meaning the upstream voltage sag will be less severe; or
- cleared by breaker fail protection, which may be considered a non-credible contingency event and therefore unreasonable for IBLs to ride through.

Extending the deep disturbance duration to (for example) 430 ms would mean IBLs must recover within 500 ms after a disturbance that lasts up to 430 ms. That is, the plant could take up to 930 ms in total to recover. However, after load has been disconnected for more than 500 ms, we consider there is limited benefit in rapid, automatic active power recovery. By this time, other mechanisms including very fast contingency FCAS and special protection schemes may have already acted to correct the loss of load. The recovery of IBL after that point may have adverse impacts on the power system, particularly if coordinated across many IBLs.

While the final rule automatic access standard is more onerous than the draft rule, we consider this is justified by the benefits it provides for system security, noting that we have retained the draft rule minimum access standard to provide flexibility. Origin's supplementary submission noted a preference to retain the draft rule under-voltage ride-through envelope as the changes contemplated in the TWG meeting materials would place a "greater technical burden" on IBL connections.[254] We also note that ride-through of 0.5 p.u. voltage for one second is slightly more onerous than many comparable international standards (see Figure 5.3 below). However, TWG feedback indicates that at least some UPS models can operate down to 0.5 p.u. before disconnecting. The ride-through duration for a UPS that can operate at 0.5 p.u. voltage is likely to be limited only by the battery energy storage, which is in the order of five to ten minutes. Capturing this low-voltage ride-through capability where it exists will support system security by improving IBL's capability to withstand distant or slowly cleared faults. The final rule sets a clear technical standard that will incentivise technology advancements over time, while also providing a reasonable range for negotiation.

The voltage ride-through envelope is aligned with international requirements

In designing the voltage disturbance ride-through requirements for the final rule, we have considered alignment with technical standards that are being consulted on or have been introduced internationally. Figure 5.3 shows the final rule undervoltage ride-through envelopes plotted against several analogous ride-through curves from other jurisdictions. Our final rule is

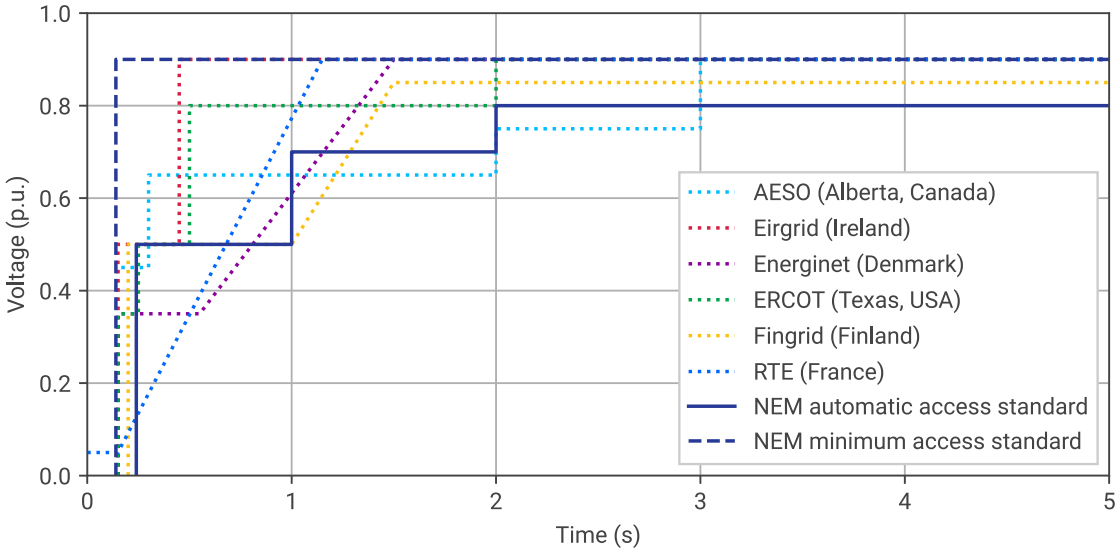
252 Transgrid submission to the draft determination, pp 10-11.

253 Submissions to the draft determination: CPU, p 2; Transgrid, pp 9-10; NER Table S5.1a.2.

254 Origin supplementary submission to the draft determination, p 2.
TWG meeting materials are available on our website.

generally well aligned with requirements large IBLs are facing overseas, for example in Alberta, Canada (Alberta Electric System Operator or AESO) and Finland (Fingrid).[255] Appropriately, the automatic access standard is relatively onerous and the minimum access standard is less onerous compared with most international standards. Appendix A of our draft determination provides more information about proposed or existing large load ride-through requirements in other jurisdictions.

Figure 5.3: Comparison of NEM and international low-voltage ride-through standards



Source: AESO, Guide to AESO Connection Requirements for Transmission-Connected Data Centres, 12 June 2026, website, p 25; Eirgrid, Grid Modification Recommendation Form - MPID 345 Fault Ride Through, Rate of Change of Frequency and Post Fault Active Power Recovery for Demand Facilities, 1 April 2026, website, p 17; Energinet, Technical Regulation 3.4.3 Requirements for Transmission-Connected Demand Facilities, Revision 1, 23 September 2024, website, p 7; ERCOT, Nodal Operating Guide Revision Request 282 - Board priority - Large Computational Load Ride-Through Requirements, PUCT Report 070926, 9 July 2026, website, p 11; Fingrid, KJV2026 Grid code specifications for Demand Connections, 12 June 2026, website, p 21; RTE, Article 8.3.5 - Cahierdes Charges descapacités constructives d'une Installation de consommation, version 1.0, 15 February 2024, website, p 26; final rule, clause S5.3.13(d), (g).

Note: Chart truncated at five seconds.

Requirements for IBL behaviour during disturbances (active power and current limits)

The final rule includes requirements for how IBLs behave during voltage disturbances, discussed here, as well as active power recovery requirements, discussed further below. These requirements are necessary because, while generators usually need to remain in *continuous uninterrupted operation* (CUO) as defined in the NER during voltage disturbances, the full definition of CUO would not work well for loads.[256] At a minimum, the load must stay connected to the network, unless required to disconnect under its performance standards. However, staying connected is not sufficient to solve the problem we have identified with ride-through of large IBLs – particularly for large UPS loads – because the load could reduce its active power without disconnecting. For this reason, the final rule access standard includes limits on the active power and current that an IBL may consume during a voltage disturbance.

255 AESO, Guide to AESO Connection Requirements for Transmission-Connected Data Centres, 12 June 2026, website, p 25;Fingrid, KJV2026 Grid code specifications for Demand Connections, June 2026, website, p 21.

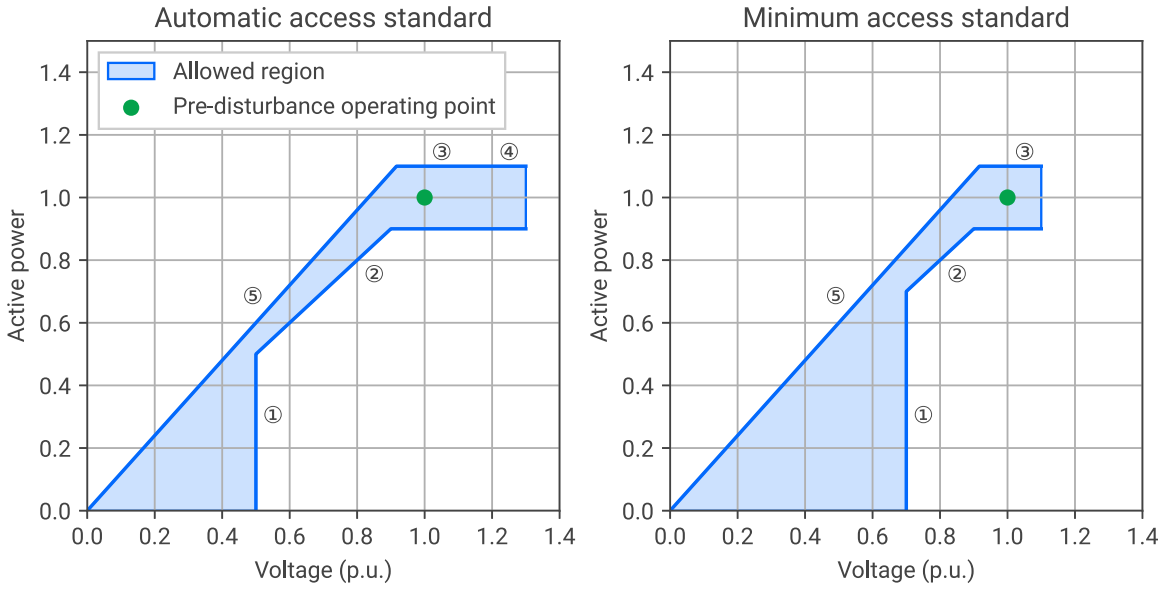
256 NER clause S5.2.5.4(a), (b); NER Chapter 10, Glossary definition of *continuous uninterrupted operation*.

Figure 5.4 illustrates the final rule active power and current limits for the minimum access standard and automatic access standard.[257] The blue shaded region indicates the allowed operating range, that is, between the upper and lower limits. Each of the limits is explained further below, along with any changes from the draft rule.

The Commission considered requiring a form of CUO for IBLs during voltage disturbances, as an alternative to some or all of these active power and current limits.[258] However, our analysis and TWG feedback indicates this approach would be overly complex and likely difficult to comply with.[259]

In response to the draft determination, Sungrow suggested considering requirements for IBL reactive power capability, including steady-state power factor as well as reactive power behaviour during disturbances.[260] Clause S5.3.5 of the NER sets out power factor requirements for Schedule 5.3 plant (IBL and otherwise). For IBL behaviour during disturbances, the Commission has only considered active power and total current. Based on our technical analysis and stakeholder engagement, we do not consider there is a case for detailed reactive power requirements for IBL at this stage. However, such requirements could be considered in future work such as AEMO's next access standards review.

Figure 5.4: Active power and current limits for IBL during disturbances



Source: AEMC.

Note: Voltage is measured at the connection point, relative to the nominal voltage for that connection point. The voltage is assumed to be 1.0 p.u. before the disturbance. Active power is measured relative to the rated power of the IBL and the IBL is assumed to be operating at 100 per cent load before the disturbance. (See Figure 5.5 for an example of operation at partial load.) The current limit (5) is plotted in terms of active power, assuming for illustrative purposes that the IBL is only drawing active current.

In the automatic access standard, there are no requirements for voltages above 1.3 p.u. In the minimum access standard, there are no requirements for voltages above 1.1 p.u.

257 Final rule, clause S5.3.13(c), (g).

258 TWG slides.

259 Origin supplementary submission to the draft determination, pp 1-2.

260 Sungrow submission to the draft determination, p 3.

1. Temporary disconnection threshold

The temporary disconnection threshold, which appears as a vertical line in Figure 5.4, corresponds to the bottom of Region B in Figure 5.1. When the voltage at the connection point falls below this level, which is 0.5 p.u. for the automatic access standard and 0.7 p.u. for the minimum access standard, IBL is permitted (but not required) to stop consuming active power, provided it recovers after the disturbance.[261] (The change to the temporary disconnection threshold in the automatic access standard is discussed above.)

2. Proportional reduction in active power for under-voltages

During a voltage sag where the voltage does not fall below the temporary disconnection threshold, an IBL is permitted to reduce its active power consumption by an amount proportional to the voltage disturbance.[262] For example, in a voltage sag to 0.8 p.u., the IBL must continue consuming at least 80 per cent of its pre-disturbance active power (but may consume more than this).

This requirement acknowledges that IBLs may need to reduce active power during a voltage sag, while ensuring that some level of active power is maintained to support power system stability. Allowing an active power reduction proportional to the voltage sag is similar to some requirements in other jurisdictions, such as ERCOT.[263] We understand this proportional reduction is consistent with how many double conversion UPS models, commonly used by data centres, operate in undervoltage conditions. Double conversion UPS convert incoming power to direct current (DC) and then back to alternating current (AC) as part of normal operation and so they are often able to switch part of the data centre load to the battery in proportion to the voltage change, known as 'load sharing'. This is because drawing the same power at a lower voltage would require more current, but UPS hardware typically has a rectifier current limit that prevents this.

The proportional reduction in active power applies for 0.5-0.9 p.u. in the automatic access standard and 0.7-0.9 p.u. in the minimum access standard.[264] This is a lower limit, so the access standard also accommodates IBLs that do not significantly reduce their active power consumption, subject to the current limit discussed below. For IBLs that behave differently and cannot comply with the proportional reduction lower limit, connection applicants may be able to use the flexibility in the minimum access standard to agree on alternative arrangements with the NSP.[265] See Box 16 for an example of where this flexibility may be considered.

3. Active power limits for the 0.9-1.1 p.u. voltage range

Both the automatic and minimum access standard require that an IBL must not change its active power consumption by more than 10% for voltage variations in the range 0.9-1.1 p.u.[266] This gives effect to Region A in Figure 5.1 and targets power system disturbances that cause a variation in connection point voltage, but not outside the 0.9-1.1 p.u. range. The Commission understands that IBLs generally operate in constant power mode for this voltage range, so the requirements are consistent with typical plant behaviour. The final rule permits a 10% increase or decrease in active power, compared to the pre-disturbance active power, because requiring no change would be unnecessarily restrictive and impractical.[267]

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261 Final rule, S5.3.13(c)(4), (g)(3).

262 Final rule, clause S5.3.13(c)(3)(ii)(A), (g)(2)(ii)(A).

263 ERCOT, Nodal Operating Guide Revision Request 282 - Board priority - Large Computational Load Ride-Through Requirements, PUCT Report 070926, 9 July 2026, website, p 11.

264 Final rule, clause S5.3.13(c)(3)(ii)(A), (g)(2)(ii)(A).

265 Final rule, clause S5.3.13(f).

266 Final rule, clause S5.3.13(c)(2)(ii)(A), (g)(1)(ii)(A).

267 The *Operational integration and visibility of large inverter based loads* rule change is considering requirements for the rate of change of active power

4. Active power limits for the 1.1-1.3 p.u. voltage range

The automatic access standard requires that an IBL must not change its active power consumption by more than 10 per cent during voltage swells captured by the over-voltage ride-through envelope in Figure 5.1. That is, during a voltage disturbance where the voltage reaches between 1.1-1.3 p.u, an IBL must not increase or decrease its active by more than 10 per cent from the pre-disturbance level for at least the duration specified in Figure 5.1.[268]

We have simplified the active power limits for this voltage range following feedback on the draft rule. The draft rule would have permitted a proportional increase or decrease in active power during an overvoltage disturbance (see Figure 4.2 and Table 4.3 in section 4.1.4 of our draft determination).[269] However, stakeholders provided feedback that these limits may be unnecessarily complex. The Commission understands that IBLs would typically maintain constant active power during voltage swells, to the extent they can withstand the over-voltage.

Using the same 'flat' active power limits for all voltages between 0.9-1.3 p.u. is simpler than what was proposed in the draft rule and provides more certainty of IBL behaviour. Because they align with how IBLs typically operate, we do not expect these active power limits to be onerous. Where IBLs are already compliant, the new access standard will improve visibility of their behaviour to assist AEMO and NSPs in managing system security.

Due to this simplification, we have reassigned the over-voltage part of the ride-through envelope in Figure 5.1 to Region A instead of Region B. The automatic access standard requirements are now the same for all disturbances where voltage is in the range 0.9-1.3 p.u.

The Commission also considered using qualitative IBL behaviour requirements for the 0.9-1.3 p.u. voltage range. For example, IBLs could have been required to "continue operating normally and not substantially vary active power" during these disturbances. Some feedback from stakeholders suggested that quantitative limits were not necessary and could require additional modelling work to demonstrate compliance with the access standards, noting the complexity of the draft rule active power and current limits. However, the Commission's further consultation indicates that the quantitative limits in the final rule are feasible to comply with, while qualitative limits may be unclear.

5. Current limit

The access standard includes a current limit which will require IBLs to keep their (total) current below a certain limit during an under-voltage disturbance, as follows.

- The automatic access standard is a **load-dependent limit**, which is the same as what was proposed in the draft rule: An IBL must not increase its current consumption by more than 20 per cent of its rated current.[270]
- The minimum access standard is a **fixed limit**, which is less onerous than what was proposed in the draft rule: An IBL's current consumption must not exceed 120 per cent of its rated current.[271]

during normal operation. The consultation paper is available on our website.

268 Final rule, S5.3.13(c)(1)(ii).

269 Draft rule, clause S5.3.13(c)(1)(ii).

270 Final rule, clause S5.3.13(c)(2)(ii)(B), (3)(ii)(B), (4)(i)(B).
An IBL's rated current means the largest continuous current that the schedule 5.3 plant is designed to consume at the connection point, as may be specified in the Power System Design Data Sheet. (Final rule, clause S5.3.13(b)(1).)

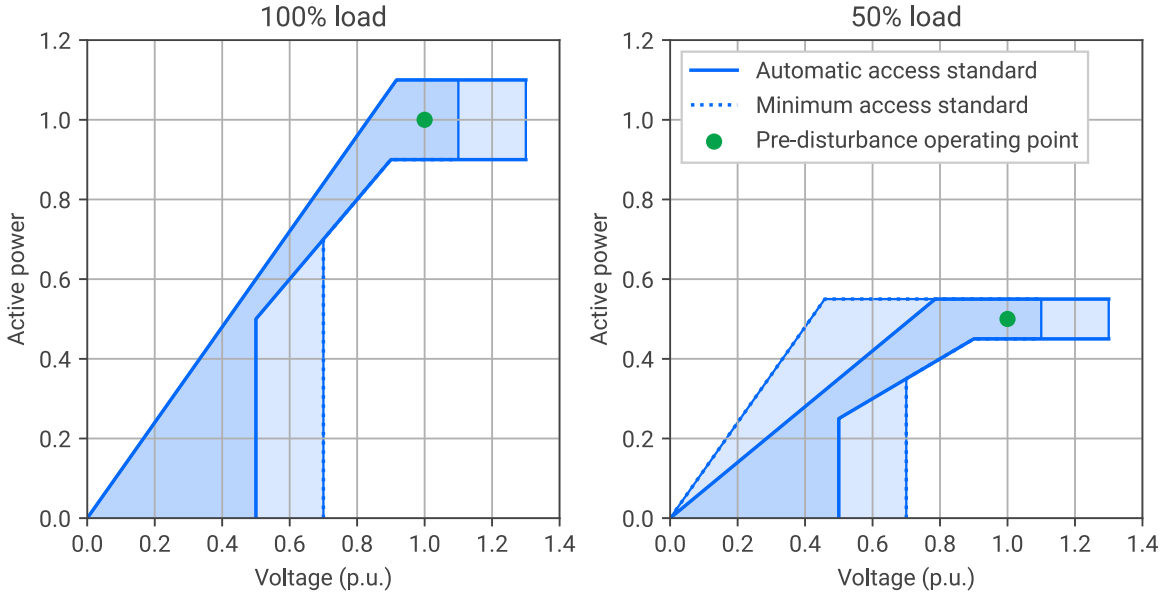
271 Final rule, clause S5.3.13(g)(1)(ii)(B), (2)(ii)(B), (3)(ii).

An IBL operating as a constant power load would need to draw increased current during a voltage sag, due to the P=VI relationship.[272] This could exacerbate the under-voltage condition because it would increase the voltage drop over the network impedance between the source and the load. Increasing the size of the voltage could increase the risk of adverse consequences such as cascading outages.

We have relaxed the minimum access standard to a less onerous fixed limit. In the draft rule, both the automatic and minimum access standard were the load-dependent limit.[273] This change provides a range for negotiation where plant is not able to comply with the automatic access standard.

The load-dependent current limit and fixed current limit are the same for an IBL operating at full load, but differ significantly at partial load as shown in Figure 5.5. At partial load, the load-dependent limit is lower and therefore more restrictive. For example, at 50 per cent load, the load-dependent limit is 70 per cent of the rated current while the fixed limit is still 120 per cent of the rated current. In Figure 5.5 as well as Figure 5.4, the current limit is plotted in terms of active power (assuming for illustrative purposes that the IBL is not injecting or absorbing reactive power).

Figure 5.5: Current limits for IBL at partial load during disturbances



Source: AEMC.

Note: Voltage is measured at the connection point, relative to the nominal voltage for that connection point. The voltage is assumed to be 1.0 p.u. before the disturbance. Active power is measured relative to the rated power of the IBL.
In the automatic access standard, there are no requirements for voltages above 1.3 p.u. In the minimum access standard, there are no requirements for voltages above 1.1 p.u.

Following further consultation, the Commission understands it is likely to be challenging for UPS devices to comply with the load-dependent limit because they do not currently have control algorithms that apply a different maximum current depending on the loading. However, most UPS and other IBLs could easily comply with the fixed limit because they typically have a rectifier current limit (hardware limit) of around 120 per cent of the rated current. Origin noted a preference for a fixed current limit in its supplementary submission, as it considered this would "achieve a

272 Power (P) is given by the product of voltage (V) and current (I).
273 Draft rule, clause S5.3.13(c)(2)(ii)(B), (c)(3)(ii)(B), (c)(4)(i)(B), (g)(1)(ii)(B), (g)(2)(ii)(B), (g)(3)(i)(B).

sufficiently similar outcome with reduced technical and compliance complexity" compared to the draft rule.[274] Celero and GPE did not support the current limit as they considered the underlying concern had not been quantified, noting IBL equipment is often "inherently current-limited".[275]

The final rule seeks to balance system security needs and existing IBL capabilities. The current limit is a key part of the voltage ride-through requirements because increased current draw by a large IBL, or an aggregation of small to medium IBLs, could significantly impact the voltage on the local network. If the ride-through access standards require IBLs to stay connected down to 0.7 p.u. or 0.5 p.u. voltage, they must also consider the current drawn by IBLs at those voltage levels.

While the fixed current limit is simpler and less onerous, it would not be effective in addressing the system security risk if it was the only requirement. This is because a fixed current limit would not prevent an IBL from materially increasing its current when operating at partial load. We have therefore retained the load-dependent limit for the automatic access standard and relaxed the minimum access standard to provide flexibility. IBLs which cannot meet the load-dependent limit may still be able to connect to the NEM. The minimum access standard provides a ceiling to avoid an unbounded current response.

However, as part of the connection process, NSPs and AEMO need to consider system security and impact on supply to other network users in considering any proposed negotiated access standard.[276] The fixed limit, for example, may be appropriate for smaller IBLs or IBLs connecting in a strong area of the network. The Commission considers that retaining the relatively onerous automatic access standard will set an expectation for better performance and help drive technology improvements over time.

The current limit applies to all under-voltage disturbances, including for voltage below 0.5 p.u. It is an upper limit, and IBL is permitted to temporarily disconnect below 0.5 p.u. (or 0.7 p.u. for the minimum access standard).

As shown in Figure 5.5, the current limit and upper active power limit (maximum increase of 10 per cent) both apply simultaneously for under-voltage conditions for voltage variations in the range 0.9-1.1 p.u.[277] Plant would need to comply with whichever limit is lower, which depends on its loading.

Active power recovery following disturbances

As discussed above, the Commission understands many data centres use a double conversion UPS which will respond to low voltage by drawing less power from the grid and making up the difference from its battery. The reduced active power consumption is unavoidable (due to the UPS rectifier current limit), but can be managed through existing frequency control mechanisms for a short period. However, after the disturbance ends, if the active power consumption does not return to the pre-disturbance level, the grid still sees a significant drop in demand as if a large amount of load had disconnected – with a corresponding power system security impact. Therefore, it is important that IBL is able to recover quickly after the disturbance in order to maintain the balance of supply and demand and maintain voltage stability.

The final rule includes requirements for timely active power recovery after a voltage disturbance. The automatic access standard is that an IBL's active power consumption must return to at least 90 per cent of the pre-disturbance level within 500 ms after the end of the disturbance. Active

274 Origin supplementary submission to the draft determination, p 1.
275 Celero and GPE submission to the draft determination, p 7.
276 NER clause 5.3.4A(b)(2)-(3).
277 Final rule, clause S5.3.13(c)(2)(ii), (g)(1)(ii).

power recovery requirements apply for voltage sags (that is, where the voltage falls below 0.9 p.u.), provided that the duration of disturbance is within the relevant ride-through envelope in Figure 5.6, or such other envelope as agreed in a negotiated access standard.[278] Stakeholder feedback on the draft rule generally supported the inclusion of active power recovery requirements.[279]

Box 15 provides an example of what active power recovery may look like.

We have removed the minimum access standard

For the final rule, we have removed the minimum access standard for active power recovery to provide more flexibility to accommodate a range of different IBL technologies. The draft rule set a minimum access standard of one second for active power recovery.[280] In lieu of a minimum access standard, we have included more specific requirements for negotiated access standards and the information that must be recorded in the plant's performance standard.[281] This approach maximises flexibility for active power recovery while ensuring that NSPs and AEMO have sufficient information about IBL disturbance responses to operate the system securely.

We have made these changes to address stakeholder feedback on the efficacy and feasibility of the draft rule minimum access standard. VisIRGrid suggested a longer recovery time of two seconds, while Celero and GPE suggested no minimum access standard, because they considered that some plant would not be able to recover its active power within one second.[282]

The Commission considers that a specific minimum access standard for active power recovery would have limited, if any, benefits. Forcing IBLs to recover within one or two seconds, if they cannot meet the automatic access standard, may have adverse power system impacts. After a large amount of load has been disconnected for more than half a second, other mechanisms such as FCAS begin to be used to correct the power balance. The automatic recovery of IBL after this point could require further corrective action and lead to an unstable system response.

Removing the minimum access standard reflects our view that the impact of some (not all) loads recovering more slowly is manageable. However, the slower recovery of these loads should be managed in a responsible, flexible and transparent way. To achieve this, the final rule leverages the existing negotiation framework and includes additional provisions as set out below.

The absence of a minimum access standard provides a wide range for negotiation of plant performance standards, but does not change how the broader negotiation framework operates. IBL connections must still have a negotiated access standard agreed with the NSP and AEMO, and a negotiated access standard can only be accepted if it does not adversely impact system security or quality of supply to other users. Negotiated access standards for active power recovery should also take into account the plant's technical characteristics and the potential impact of the plant on the system.[283] Larger IBLs, for example, may have a greater system impact through their active power recovery.

278 Final rule, clause S5.3.13(c)(3)(iii), (4)(ii).
In the draft rule, active power recovery would also have applied to voltage swells (above 1.1 p.u.) for the automatic access standard. (Draft rule, clause S5.3.13(c)(1)(iii).) This is no longer the case because we have changed the active power limits for over-voltage disturbances so that the IBL's active power must remain within 10 per cent of its pre-disturbance value during the disturbance, so there is no need for a recovery requirement.

279 Submissions to the draft determination: VisIRGrid, p 4; Celero and GPE, p 7; ElectraNet, p 10; Transgrid, p 11; Syncline, pp 4-5; AEMO, pp 4-5; Tesla, p 3; Sungrow, p 3; AusNet, p 11.

280 Draft rule, clause S5.3.13(g)(2)(iii), (3)(ii).

281 Final rule, clause S5.3.13(k), (n).

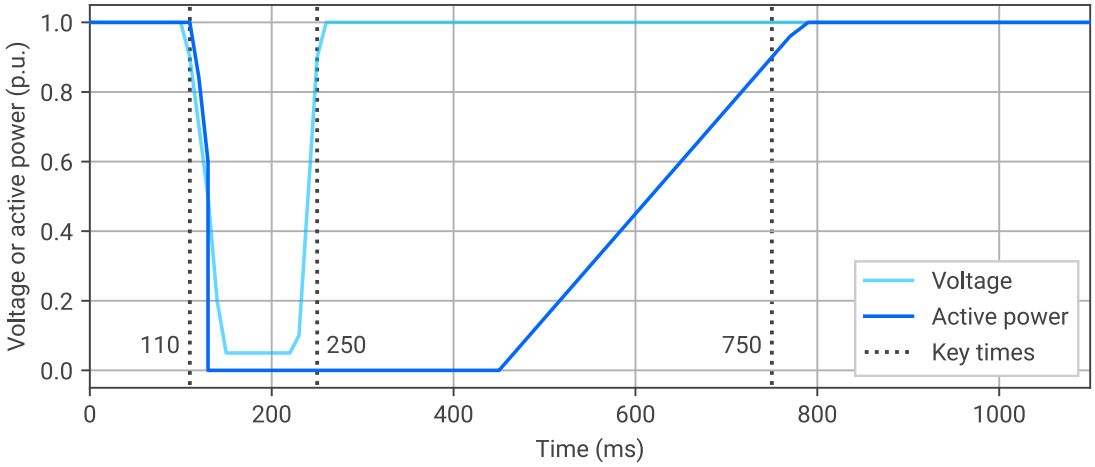
282 Submissions to the draft determination: VisIRGrid, p 4; Celero and GPE, pp 7-8.

283 NER clause 5.3.4A.

Box 15: Example of active power recovery for the automatic access standard

Figure 5.6 illustrates an example of active power recovery meeting the automatic access standard for a deep voltage sag lasting 240 ms. The 500 ms recovery time begins at the end of a voltage disturbance. A voltage disturbance is taken to begin when the voltage at the connection point falls below 0.9 p.u. and end when the voltage returns to the range 0.9-1.1 p.u. and remains in that range for 20 ms. (Final rule, clause S5.3.13(b)(2), (3)(i)-(ii)).

Figure 5.6: Active power recovery example



Source: AEMC.

In Figure 5.6:

- The voltage disturbance begins at 110 ms, when the voltage first falls below 0.9 p.u. The lowest voltage during the disturbance is 0.05 p.u.
- The IBL disconnects (stops consuming active power) when the voltage drops below 0.5 p.u, as permitted by the automatic access standard.
- The voltage disturbance ends at 250 ms, as the voltage returns to 0.9 p.u. and stays above this level. The disturbance duration was 240ms, which is the longest time for which active power recovery is expected in the automatic access standard. The required recovery time of 500ms is measured from this point.
- After the disturbance ends, the IBL waits for around 200ms, then begins a linear ramp-up of active power.
- The IBL reaches 90 per cent of its pre-disturbance active power at 750 ms, which is 500ms after the end of the disturbance, as required.

In this example, the IBL uses the whole 500ms time for recovery, but a faster recovery is also acceptable (and should be recorded in the performance standards). The wait time, ramping time, and recovery profile are not prescribed in the access standard, but should be recorded in the plant's performance standard.

Source: AEMC.

The final rule allows flexibility by providing that a negotiated access standard for active power recovery may include:

- a recovery time which is longer than 500 ms, for some or all of the voltage ranges considered in Figure 5.1; and/or
- such other recovery behaviour as may be agreed with the NSP and AEMO, which may include a recovery that is manually triggered, staged, or occurs when certain conditions are met.[284]

For example, the Commission understands that large facilities sometimes need to recover in a staged manner which will take more time.[285] This is one type of disturbance response that could be accommodated in a negotiated access standard, but the NSP and AEMO will need to consider any trade-offs for system security and quality of supply to other users.

The final rule enhances transparency by requiring the plant's performance standards to set out how the plant will behave after a voltage disturbance, regardless of whether the plant is connecting at the automatic access standard or a negotiated access standard. The performance standards should include, where relevant:

- the recovery time and the active power level to which the plant recovers (which may be different from 500 ms and 90 per cent)
- the active power recovery trajectory (for example, any wait time and ramping time)
- the size and duration of voltage disturbances for which the plant can achieve this recovery
- any operational arrangement for the plant behaviour after a voltage disturbance; and
- any conditions under which the plant cannot meet the usual requirements of its performance standard.[286]

These requirements aim to be as flexible as possible while ensuring that all relevant information is recorded. Different recovery behaviour may be agreed on for disturbances with different characteristics and recovery behaviour may depend on other conditions, such as loading at the time of the disturbance. The intent is that the plant should have an agreed recovery behaviour for (at least) all disturbances captured by its agreed voltage ride-through envelope. The agreed voltage ride-through envelope is either the automatic access standard in Figure 5.1, or an alternative negotiated envelope.

The final rule retains the automatic access standard of 500 ms

We consider that a recovery time of 500 ms for the automatic access standard balances what is achievable for IBL technology with a manageable impact on the power system. Several submissions noted support for the 500 ms automatic access standard.[287] However, others considered that more analysis was required to demonstrate that a 500 ms recovery time would be sufficient from a power system security perspective.[288] Transgrid noted that NSPs would be responsible for implementing mitigation schemes, such as voltage control, if IBLs are not able to recover quickly enough from a disturbance.[289] Celero and GPE also considered that the access standard should balance system security risks with technical feasibility.[290]

284 Final rule, clause S5.3.13(k).
285 See for example Sungrow submission to the draft determination, p 3.
286 Final rule, clause S5.3.13(n).
287 Submissions to the draft determination: VisIRGrid, p 4; Syncline, pp 4-5; AEMO, pp 4-5.
288 Submissions to the draft determination: Celero and GPE, p 7; Transgrid, p 11; AusNet, p 14; Sungrow, p 3.
289 Transgrid submission to the draft determination, p 11.
290 Celero and GPE submission to the draft determination, p 7.

The Commission selected 500 ms for the automatic access standard because we understand AEMO would be able to manage the impacts of a voltage disturbance and resulting loss of load on the power system for that amount of time. A 500 ms recovery time also aligns with certain international requirements such as those recently adopted by EirGrid (Ireland).[291] However, we acknowledge that the disconnection of a large quantity of IBL for 500 ms is not without impacts, for example a reduction in inter-regional transfer limits. In the July 2026 TWG meeting we presented an AEMO case study illustrating how IBL disconnection and recovery could affect inter-regional transfer limits for an example fault scenario.[292]

The Commission's consultation indicates that 500 ms aligns with the fastest achievable recovery time for many UPS models used with data centres.[293] Faster recovery is technically challenging because typically the control system needs to first confirm that the connection point voltage is stable, then ramp up the power drawn from the grid from zero to the desired value. While a faster recovery may further reduce the impact on the grid, we understand that few IBLs are currently capable of this, although there are exceptions including some co-located data centre and battery energy storage system (BESS) configurations (see Box 16).[294] Because of this, we consider that setting a more onerous automatic access standard may increase the cost of and time taken for connection negotiations without materially improving system security outcomes.

We have considered location dependence and potential unintended consequences

A number of submissions also raised concerns that the simultaneous active power recovery of multiple IBL could have unintended consequences such as an unstable system response or secondary frequency and voltage swings.[295] For example, AusNet noted that the recovery of a large amount of load after a voltage sag has ended could cause the voltage to drop again (in contrast, the ride-through or recovery of generation injects power and helps to support the voltage.) AusNet suggested considering staged reconnection of IBL and/or fast acting reactive power support where needed to avoid these unintended consequences.[296]

The impact of IBL disconnection and recovery on the power system is also somewhat location dependent.[297] For example, ElectraNet's submission noted that the 500 ms recovery time may not be well suited to the South Australian region.[298]This is due to potential adverse interactions of very large IBL disconnection and reconnection with emergency control schemes.

There are a number of very large proposed data centre connections in South Australia, including the 800 MW IREN data centre campus near Bundey which received connection approval in June 2026.[299] IBLs of this size will be large relative to the interconnector capacity into South Australia (as well as South Australia's total demand). The disconnection of a very large data centre(s) could significantly upset the supply-demand balance and potentially lead to transient instability on the interconnector(s). Emergency control schemes (such as the South Australian Interconnector Trip Remedial Action Scheme (SAIT RAS) or over-frequency generation shedding) may then trip

291 EirGrid, Grid Code Modification Recommendation Form - MPID 345 Fault Ride Through, Rate of Change of Frequency and Post Fault Active Power Recovery for Demand Facilities, 1 April 2026, website, pp 16-17.

292 TWG meeting materials are available on our website.

293 See for example Syncline submission to the draft determination, p 4.

294 Tesla supplementary submission to the draft determination, p 2.

295 Submissions to the draft determination: ElectraNet, pp 10-11; AusNet, p 14; Sungrow, p 3; Celero and GPE, p 7.

296 AusNet submission to the draft determination, p 14.

297 Submissions to the draft determination: ElectraNet, pp 10-11, 14-15; Sungrow, p 3.

298 ElectraNet submission to the draft determination, pp 14-15.

299 IREN,IREN Announces First Australian Data Center Campus - 800MW in South Australia, 3 June 2026, website This example is included to illustrate the potential scale of data centre connections, but we note that the new access standards will not apply to existing connection agreements. See chapter 9.

generation within a few hundred milliseconds. Recovery of data centre load after emergency control schemes have operated would create an active power imbalance in the opposite direction, which the emergency control schemes are not designed to manage. This sequence of events could increase the risk of instability, cascading outages, islanding or a black system event in South Australia.[300]

The Commission notes these risks are location-specific and connection-specific, so a more onerous access standard for the whole NEM is not justified. As noted in ElectraNet's submission, NSPs and connection applicants (with AEMO) may agree to higher performance (i.e. faster recovery) than the automatic access standard on a case-by-case basis.[301] We note that ElectraNet has made arrangements for the involvement of transmission-connected loads in special protection schemes such as SAIT RAS.[302] Alternatively, where there potential undesirable consequence of recovery within 500 ms, parties may wish to agree on a negotiated access standard that involves staged or manual recovery, either always or depending on the circumstances.

Negotiated access standards should consider the combined effect of voltage ride-through envelopes, behaviour during disturbances, and active power recovery

The minimum access standard for voltage disturbance ride-through in the final rule is not intended to be onerous. By setting this minimum access standard, we aim to provide flexibility to accommodate a range of IBL technologies including non-standard data centre configurations.

As discussed above, the minimum access standard will only require:[303]

- capability to operate in the 0.9-1.1 p.u. voltage range, without changing active power by more than 10 per cent
- capability to withstand disturbances down to 0.7 p.u. for 140ms, without increasing active power by more than 10 per cent or decreasing active power more than in proportion to the disturbance
- complying with the fixed current limit which is 120 per cent of the rated current
- an agreed active power recovery behaviour for voltage sags of any depth lasting up to 140 ms.

When negotiating voltage ride-through performance standards, the various aspects of the access standards (ride-through envelope, behaviour during disturbances, and recovery) should be considered together. An IBL that connects at the minimum access standard in all three respects may pose a higher risk to power system security than an IBL which uses only parts of the minimum access standard.

The final rule also includes some flexibility to agree to a lower minimum access standard on a case-by-case basis. If agreed by the NSP and AEMO, a connection applicant may be able to negotiate a performance standard that is lower than the usual minimum access standard. The NSP and AEMO will need to consider the impact of credible faults at the connection point, the plant's technical capability, and the potential system security impact of plant disconnection.[304]

We have included this option in the final rule primarily to provide flexibility for IBL other than data centres, as we have less information on the capabilities of other IBL and future developments are

300 ElectraNet, SAIT RAS and Transmission Connections in South Australia, June 2025, website, pp 2-6; Norris et al, Enhancing South Australia's Grid Resilience Through Synchrophasor Measurements, March 2025, website.

301 ElectraNet submission to the draft determination, pp 10-11.

302 ElectraNet, SAIT RAS and Transmission Connections in South Australia, June 2025, website, pp 3-6.

303 Final rule, clause S5.3.13(g), (k).

304 Final rule, clause S5.3.13(f).

uncertain. As discussed in Box 16, it may also provide a negotiation pathway for non-standard data centre configurations, such as a data centre co-located with a BESS which helps moderate the active power consumption.

When negotiating performance standards below (or different to) the usual minimum access standard, NSPs and AEMO should take into account the factors specified in clause 5.3.4A as well as the following additional factors:

- the technical characteristics of the schedule 5.3 plant
- the expected impact of a credible contingency events on the voltage at the connection point
- the expected impact of the disconnection of the schedule 5.3 plant on the power system
- the expected impact on the power system of the behaviour of the schedule 5.3 plant following a voltage disturbance; and
- any other relevant matters.[305]

The intent is that the NSP and AEMO should take into account both the schedule 5.3 plant's capabilities and the potential impact on system security and quality of supply to other network users. They should also consider the plant's performance holistically, noting there may be trade-offs between different parts of the access standards for a particular plant's performance.

The minimum access standard for voltage disturbance ride-through will also include a caveat that Schedule 5.3 plant does not need to continue operating if the ratio of voltage to frequency (relative to nominal values) exceeds a value of:

- 1.15 for more than two minutes; or
- 1.10 for more than 10 minutes.[306]

This is to ensure consistency with the access standards for Schedule 5.2 plant, so that loads are not subject to more onerous requirements than generators.[307]

Box 16: Flexibility in the minimum access standard may help enable innovative data centre architectures

While data centres are the dominant type of IBL currently being connected to the NEM, there is also a wide variation amongst data centres in design and technical characteristics. Providing flexibility in the minimum access standard may allow NSPs and AEMO to better accommodate innovative IBL architectures, such as data centres co-located with BESS.

Many data centres use a centralised double-conversion UPS system. However, others may use rack-level UPS, and UPS may be of the standby (offline) or line-interactive type rather than double-conversion. Some data centres provide flexible or non-critical load which is able to be disconnected following a disturbance, or in response to market conditions, and may not require a UPS. Data centres can also be co-located with other plant such as a BESS which provides some of the functions of a standard UPS, and potentially other functions.

Stakeholder feedback raised examples of data centre and BESS co-location where a BESS connected in parallel with the data centre can be used to provide 'load mimicking'. That is, the BESS can consume or supply active power to the grid to help meet the data centre's ride-through requirements. The final rule can allow this because the active power and voltage are defined at the connection point (final rule, clause S5.3.13(b)(2)). A BESS could also provide load smoothing that

305 Final rule, clause S5.3.13(f).
306 Final rule, clause S5.3.13(g)(1).
307 NER clause S5.2.5.4(b)(3).

corrects for a rapid rate of change of active power or cyclic variations in active power, although the NER does not currently require this.

Tesla's supplementary submission presents a case study of data centre and BESS co-location. The proposed architecture uses a low-voltage UPS, which is not a double-conversion type, in parallel with a behind-the-meter BESS. Tesla provided modelling results for an example of a relatively shallow voltage disturbance (around 0.7 p.u.), showing that the facility responds by:

- immediately transferring the data centre load completely to the UPS, so that critical IT load is not interrupted ('load transfer')
- ramping up BESS active power consumption to replace the active power that was being drawn by the load.

This is different to the typical data centre behaviour contemplated in the final rule. The modelled response does not comply with the final rule minimum access standard because the active power consumption drops below 70 per cent of the pre-disturbance value (to a lowest level of 33 per cent) while the connection point voltage does not fall below 0.7 p.u. However, the BESS can bring the active power consumption back to the level required by the minimum access standard within a few hundred milliseconds, in fact before the disturbance has ended. The BESS may also be able to provide further beneficial responses for the grid, such as grid-forming behaviour (inertial response). Connecting this plant may be acceptable from a system security perspective, noting the active power reduction outside the access standard is brief, and there may be other grid benefits associated with this architecture.

Tesla noted that this parallel architecture is in use in the US and has been included in NVIDIA's Enterprise Design Architecture for high-performance AI facilities. It was also accounted for in ERCOT's recently finalised ride-through requirements following consultation with Tesla.

The flexibility in the minimum access standard could enable NSPs and AEMO to accommodate innovative IBL architectures such as data centres with parallel BESS. When considering this approach, NSPs and AEMO would need to have regard to all matters in the existing negotiation framework, as well as the matters we have specified for using the flexibility in the minimum access standard (final rule, clause S5.3.13(f)). Other relevant factors to be considered may include any trade-offs between the plant's ride-through performance and its other technical capabilities, and the aggregate impact of co-located BESS facilities together with other plant. Performance standards are to be agreed on a case-by-case basis.

Parties seeking to connect a co-located data centre and BESS should confirm with the NSP and AEMO whether the combined facility can be considered Schedule 5.3 plant. One condition to qualify as schedule 5.3 plant is that the facility must not be designed to export active power to the grid (see section 3.2.4). An alternative approach may be to connect the BESS as Schedule 5.2 plant.

The Minister for Climate Change and Energy has recently submitted a rule change request for *Improving the NEM connections framework for integrated facilities, co-located plant and flexible loads*, which seeks to clarify the arrangements for this type of co-located connection (amongst others).

Source: Submissions to the draft determination: Tesla (supplementary), pp 1-5; Celero and GPE, p 5, 8; VisIRGrid, p 6; Syncline, pp 4-5; NVIDIA, NVIDIA Reference Architectures for Enterprise AI Factories, 18 September 2026, website;ERCOT, Nodal Operating Guide Revision Request 282 - Board Priority - Large Computational Load Ride-Through Requirements, PUCT Report 070926, 9 July 2026, website, pp 12-13.

The Commission has considered stakeholder feedback on other matters

In response to the draft determination, some stakeholder also questioned how voltage disturbance ride-through and recovery would work for IBLs that are capable of operating in island

mode, which may include some co-located data centre and BESS facilities described in Box 16.[308] Islanding capability does not affect the access standard requirement for an IBL to stay connected during a disturbance and comply with the relevant active power and current limits. If the plant is designed to behave in a way that is inconsistent with the automatic or minimum access standards, this could be considered as part of the negotiation process. In particular, the additional flexibility for active power recovery in the final rule allows for a longer recovery time and this may be appropriate for plant operating in island mode and later re-synchronising with the grid.[309]

Amazon Web Services (AWS) sought clarification on the draft rule's provision that "A schedule 5.3 plant is not required to meet the requirements [of the automatic or minimum access standard, as relevant] to the extent that it is prevented from doing so by changed power system conditions beyond the Schedule 5.3 Participant's reasonable control."[310] This provision, which we have retained for the final rule, is included for consistency with S5.2.5.5A.[311] AWS noted that an exception should be available for "equipment protection requirements consistent with manufacturer specifications and good electricity industry practice".[312] Such protection requirements can be considered under the existing negotiation framework because they relate to protecting plant from damage and may affect the commercial and technical feasibility of complying with the automatic access standard.[313] The flexibility in the minimum access standard could also be used for this purpose if related to the technical characteristics of the plant.[314]

Some stakeholders sought clarity on what modelling would be required in relation to the disturbance ride-through access standards.[315] For example, VisIRGrid suggested that AEMO should provide load-specific control-interaction guidelines to set expectations for Schedule 5.3 plant's control systems.[316] Any modelling required for negotiating or demonstrating compliance with the voltage ride-through access standards should be in accordance with the Schedule 5.3 Participant Modelling Guidelines, which AEMO is required to develop within 12 months of commencement of the final rule.[317] AEMO may also provide relevant guidance as part of the Power System Model Guidelines (PSMG) or the Power System Stability Guidelines (PSSG). AEMO's draft interim guideline for connection of IBL will provide some guidance on modelling requirements for IBLs while the Schedule 5.3 Participant Modelling Guidelines and updates to other guidelines are being developed.

308 Submissions to the draft determination: VisIRGrid, p 6; VicGrid, p 2.

309 Final rule, clause S5.3.13(k).

310 AWS submission to the draft determination, p 7.
Final rule, clause S5.3.13(e) and (h).

311 NER clause S5.2.5.5A(e), (h)(1), (l), (o)(1).

312 AWS submission to the draft determination, p 3.

313 NER clause 5.3.4A(b1)(1), (3).

314 Final rule, clause S5.3.13(f).

315 Submissions to the draft determination: Ergon Energy and Energex, p 1; Ausgrid, p 2; ElectraNet, p 9; AusNet, p 5; VisIRGrid, pp 3-4, 5-6; Sungrow, p 2; AEMO, p 5; Jemena, pp 2-3; AWS, pp 6-7; Endeavour, pp 2-3; Celero and GPE, p 7.

316 VisIRGrid submission to the draft determination, pp 5-6.

317 Final rule, clauses S5.3.1aa, 11.197.7.

5.2.2 Frequency disturbance ride-through

The power system frequency needs to be maintained within an acceptable range, as set out in the FOS, to support the stable operation of the system.[318] Frequency disturbances can occur in the power system when there is a significant loss of generation or load, because this upsets the balance of supply and demand. It is important for large IBL to ride through frequency disturbances for a number of reasons. In particular:

- Unlike voltage disturbances, frequency disturbances are global and can affect a whole region or all of the mainland NEM. Therefore, it is very likely that multiple large loads would be affected, and multiple disconnections would lead to a significant aggregate loss of load.
- Voltage and frequency disturbances may co-occur if they have the same root cause, such as a fault or plant tripping. Therefore, voltage disturbance ride-through capability may not be effective unless it is combined with frequency disturbance ride-through capability.

The access standard in the final rule has been designed with these considerations in mind.

How the frequency disturbance ride-through access standard will work

The automatic access standard for frequency disturbance ride-through will be aligned with the FOS determined by the Reliability Panel, which forms part of the system standards.[319] IBL will be required to stay connected and continue operating as long as the frequency stays within the FOS, as shown in Figure 5.7, unless the magnitude of the rate of change of frequency (RoCoF) exceeds:[320]

- 4 Hertz per second (Hz/s) for more than 0.25 seconds
- 3 Hertz per second for more than one second; or
- other limits as determined by the Reliability Panel from time to time. (Currently there are no such other limits in force).

Since the access standard would be linked to the FOS, the frequency bands, stabilisation time and recovery time may change with future Reliability Panel decisions. A different FOS applies in Tasmania. Figure 5.7 shows the automatic access standard according to the current FOS for the mainland and for Tasmania.[321]

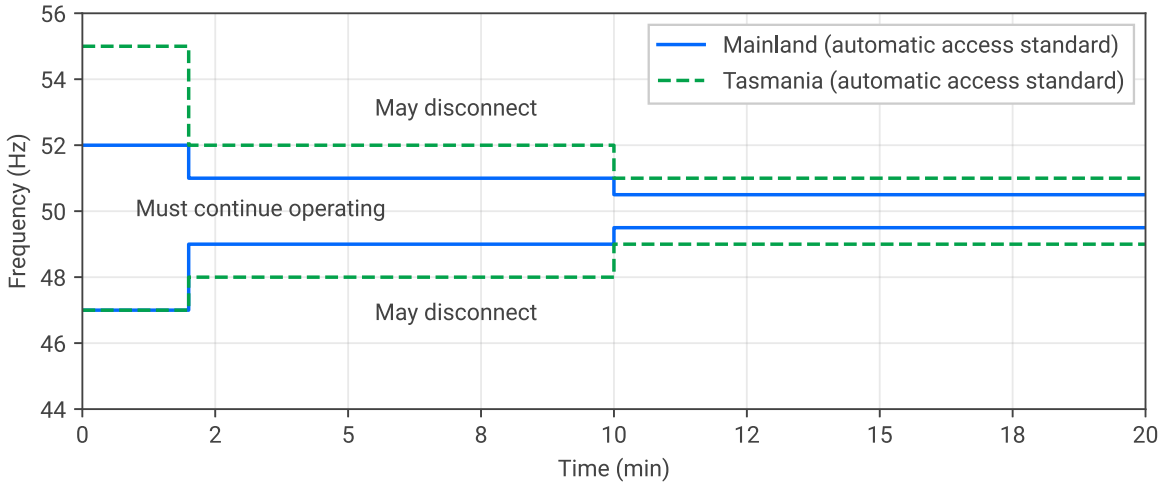
The final rule does not have a minimum access standard for frequency ride-through. This means that negotiated access standards may be anywhere below the automatic access standard, with no minimum requirement. This approach is discussed further below.

The frequency ride-through access standard will only apply to IBL and will apply according to the final rule classification framework.

The frequency ride-through access standard will be an AEMO advisory matter.[322] This is consistent with frequency disturbance ride-through for Schedule 5.2 plant, which is also an AEMO advisory matter.[323]

318 Reliability Panel, AEMC, Frequency operating standard (FOS), 6 April 2023, website.
319 NER clause S5.1a.2.
320 Final rule, clause S5.3.12.
321 Reliability Panel, AEMC, FOS, 6 April 2023, website, p 2.
322 Final rule, Chapter 10, Glossary definition of *AEMO advisory matter*.
323 NER clause S5.2.5.3 is included in the definition of *AEMO advisory matter*.

Figure 5.7: Frequency ride-through



Source: AEMC.

The frequency ride-through access standard will promote system security

Submissions to the draft determination generally supported the proposed frequency ride-through access standard.[324] AEMO noted that frequency ride-through for IBLs was important as "[f]requency deviations are a system-wide phenomenon that require a co-ordinated response from all connections."[325]

Riding through frequency disturbances is feasible for most IBLs, because AC-DC conversion can provide good frequency withstand. Stakeholder feedback, including TWG feedback, confirms that IBLs can operate over a wide frequency range, sometimes much wider than required by the automatic access standard.[326] Many data centres have an inherent incentive to ride through frequency disturbances to continue operating without using back-up supply. One of the functions of a double conversion UPS is to correct power quality parameters including frequency in the supply to the load.

Therefore, introducing a frequency ride-through access standard will have low costs while providing significant benefits in assuring NSPs and AEMO that plant is able to ride through frequency disturbances. Even where this ride-through capability is inherent, creating an access standard will mean that the capability is recorded in the plant's performance standard and known by the NSP and AEMO.

We have not included a minimum access standard to provide flexibility

There is no minimum access standard for frequency ride-through in the final rule. If a Schedule 5.3 participant wishes to connect plant that does not meet the automatic access standard, it would need to agree on a negotiated access standard with the NSP, in consultation with AEMO. The plant's frequency ride-through performance must be recorded in its performance standard.[327]

324 Submissions to the draft determination: AusNet, p 13; AEMO, p 5; Transgrid, p 11; Tesla, p 3; Ergon Energy and Energex, p 2; CPU, p 2; Celero and GPE, p 5, 8; SA Power Networks, p 1; ElectraNet, pp 11-13; Syncline, p 4, Syncline (supplementary), p 1.

325 AEMO submission to the draft determination, p 5.

326 AusNet submission to the draft determination, p 13.

327 Final rule, clause S5.3.12(f).

We have taken this approach to avoid creating unreasonable barriers to connection for any plant that has limited frequency withstand capability for a technical reason. We expect that the new access standard will be effective in enhancing system security, even with no minimum access standard, because:

- most IBLs are likely to connect at the automatic access standard because they usually inherently have good frequency withstand capability
- any negotiated access standards must be set at a level that will not adversely impact system security;[328] and
- recording frequency ride-through performance in the plant's performance standard will improve visibility of the frequency response.

Some submissions to the draft determination explicitly supported the absence of a minimum access standard.[329] However, others suggested that the Commission should consider setting a minimum access standard for frequency ride-through, for a variety of reasons.

- Ergon Energy and Energex considered that either a minimum access standard or guidance on negotiated access standards would assist Distribution Network Service Providers (DNSPs) in deciding whether to accept negotiated access standards.[330] The Commission prefers not to prescribe this in the rules to maximise flexibility. AEMO may provide guidance on negotiating frequency ride-through in its interim guideline for the connection of IBLs, or via its AEMO advisory role.
- CPU considered that the absence of a minimum access standard may permit large loads to trip off during an over frequency event (within the FOS envelope) and exacerbate the disturbance.[331] The Commission is satisfied that an automatic access standard, combined with the broader negotiated access standards framework, is sufficient to address the risk of IBL disconnecting due to frequency disturbances. This is because NSPs and AEMO need to consider system security and the quality of supply to other users in accepting any negotiated access standards.[332]
- Celero and GPE suggested creating a minimum access standard with a carve-out to allow a BESS to compensate for active power at the connection point where the computational load disconnects.[333] This could be permitted under the final rule, since there is no minimum access standard, provided that the NSP and AEMO agree that there is no adverse system security impact.

The Commission has taken stakeholder feedback into account

Some submissions, while supportive, noted that the new requirement for IBLs to stay connected during frequency disturbances may contradict the under-frequency load shedding (UFLS) requirements under NER clauses 4.3.5(a) and S5.3.10.[334] SA Power Networks noted that it may be preferable for loads to disconnect automatically (per UFLS) when frequency falls below the normal operating frequency band, rather than stay connected according to the new access standard.[335] Our intent is that UFLS obligations take priority over the frequency ride-through access standard.

328 NER clause 5.3.4A.
329 Submissions to the draft determination: Transgrid, p 11; Tesla, p 3.
330 Ergon Energy and Energex submission to the draft determination, p 2.
331 CPU submission to the draft determination, p 2.
332 NER clause 5.3.4A.
333 Celero and GPE submission to the draft determination, p 5, 8.
334 Submissions to the draft determination: SA Power Networks, p 1; ElectraNet, p 13.
335 SA Power Networks submission to the draft determination, p 1.

The final rule clarifies that a Schedule 5.3 participant is not required to comply with a frequency ride-through performance standard to the extent it would conflict with the participant's load shedding obligations.[336]

ElectraNet questioned whether the frequency ride-through requirements, including the RoCoF exemption in the automatic access standard, were "consistent with secure operation of low inertia, inverter dominated parts of the power system."[337] It considered that NSPs and AEMO should be able to specify more onerous frequency ride-through requirements (above the automatic access standard) where there is a system security need, depending on where the connection is located.[338]

The Commission notes that the frequency ride-through envelope (Figure 5.7) is aligned with the FOS for all NEM regions, and that the RoCoF requirements are more onerous than the FOS as they are aligned with the corresponding access standard for Schedule 5.2 plant. That is, RoCoF conditions would exceed the FOS (1 Hz/s on the mainland for a single contingency) before IBL is permitted to trip off under the automatic access standard (3 Hz/s).[339] Therefore, we consider the frequency ride-through access standard is appropriate across the NEM including in low inertia regions. However, plant performance standards may also include performance beyond the automatic access standard, by agreement between the connection applicant and NSP.

ElectraNet also noted that standard connection assessments may not pick up RoCoF protection that is embedded in IBL control systems, resulting in potential non-compliance with the automatic access standard (or agreed plant performance standard).[340] The final rule clarifies that anything affecting the plant performance at the connection point, including such internal protection settings, should be considered in the connection assessment and recorded in the performance standard.[341] NSPs may also use the new information provision requirement to request information about protection embedded in control systems (see section 5.2.4).[342]

Syncline suggested that the frequency ride-through access standard should also require controlled ramp down of load in high RoCoF conditions, rather than permitting load to disconnect immediately when the conditions in the automatic access standard are exceeded.[343] However, Syncline updated its view in a supplementary submission stating that UFLS by fast ramp down (see section 8.1) and/or FCAS could serve that purpose.[344] The Commission agrees that introducing compulsory frequency response for loads, beyond existing UFLS requirements, would create unnecessary complexity.

336 Final rule, clause S5.3.12(c).

337 ElectraNet submission to the draft determination, p 11.

338 ElectraNet submission to the draft determination, p 13.

339 TheRoCoF limits for Tasmania in the FOS are similar to the automatic access standard, but less onerous considering the measurement window. The FOS states that RoCoF in Tasmania must not exceed 3 Hz/s, measured over 250ms, for a single contingency event. (Reliability Panel, AEMC, FOS, 6 April 2023, website, p 4.) The automatic access standard permits IBL to trip if RoCoF exceeds 3 Hz/s for more than one second.

340 ElectraNet submission to the draft determination, p 12.

341 Final rule, clause S5.3.12(f).

342 Final rule, clause S5.3.1(a1)(2A).

343 Syncline submission to the draft determination, p 4.

344 Syncline supplementary submission to the draft determination, p 1.

5.2.3 Limits on how protection systems can operate

The final rule will introduce two new protection system requirements for IBL, to supplement the disturbance ride-through access standards.[345] Since the new access standards will not require IBL to withstand any phase shifts or multiple successive faults, we have taken a light-touch alternative approach to these characteristics. The final rule will prevent IBL from using protection systems that operate for phase shifts less than 20 degrees or for multiple faults in a certain time period as set out below.

The final rule will stipulate that, for Schedule 5.3 plant that is an IBL:

- Vector shift protection or similar protective functions must not operate for phase shifts less than 20 degrees.[346]
- Protection systems must not operate based solely on the number of faults or disturbances that occur during a period of time.[347]

A number of stakeholders supported the limits on how protection systems operate in the draft rule, or provided feedback to refine these requirements.[348] Tesla noted that compliance with the protection system requirements would depend on whole-of-site protection design and not only the IBL devices, UPS, or BESS.[349]

Both new protection system requirements will appear as part of the general requirements in clause S5.3.13 of the final rule, which is the clause that sets out the voltage disturbance ride-through requirements. We have moved them from clause S5.3.3 in the draft rule to clause S5.3.13 in the final rule to clarify that they apply to IBLs per the final rule classification framework, in the same way as the voltage and frequency disturbance ride-through access standards. This drafting change is appropriate because phase angle jumps and multiple successive disturbances are also related to voltage disturbances, as noted in Transgrid's submission.[350]

Placing the protection system requirements in clause S5.3.13 also means they are an AEMO advisory matter.[351]Transgrid supported this approach while Tesla noted that protection coordination is the responsibility of the NSP rather than AEMO.[352]The Commission agrees that NSPs have the main role in assessing protection system design, but AEMO will be consulted and may provide advice if necessary. AEMO's interim guideline for connection of IBLs may provide some guidance as to how it will use its advisory role.

We consider it is appropriate for the limits on how protection systems operate to be general requirements, which are not open for negotiation, because they are important for power system security and we understand they are not likely to be onerous. Transgrid's submission supported this approach, while Tesla was concerned it may reduce flexibility.[353] While the protection system requirements are general requirements, NSPs have discretion under the final rule in whether they apply this access standard to small IBL.[354]

345 Final rule, clause S5.3.13(l)-(m).
346 Final rule, clause S5.3.13(l).
347 Final rule, clause S5.3.13(m).
348 Submissions to the draft determination: VicGrid, p 2; ElectraNet, p 7, 12; Transgrid, p 12; AusNet, p 12; AEMO, p 5.
349 Tesla submission to the draft determination, p 3.
350 Transgrid submission to the draft determination, p 12.
351 Final rule, Chapter 10 glossary definition of *AEMO advisory matter*.
352 Submissions to the draft determination: Transgrid, p 12; Tesla, p 3.
353 Submissions to the draft determination: Transgrid, p 12; Tesla, p 3.
354 Final rule, clause S5.3.1a(a1)(2)(i)(B).

Vector shift protection

The final rule will stipulate that IBL must not have vector shift protection or similar protective functions that operate for phase shifts less than 20 degrees.[355] Avoiding protection systems that respond specifically to phase shifts less than 20 degrees will help prevent unnecessary tripping of IBL that would impact system security. There is an equivalent light-touch requirement for Schedule 5.2 plant.[356]

Vector shift protection may be used to detect islanding. For example, a data centre may apply vector shift protection to determine if it has been separated from the rest of the network (e.g. by an upstream network fault or black system event). It could then disconnect, use battery to support the load while it starts up a diesel back-up supply, and operate as an island. Avoiding protection functions that operate for small phase shifts will prevent IBL from switching into island mode unnecessarily due to minor disturbances.

For the avoidance of doubt, Schedule 5.3 plant will still be permitted (but not required) to have vector shift protection that operates for phase shifts greater than or equal to 20 degrees. Plant will not be strictly required to ride through any phase shifts, but must not have protection functions that are explicitly triggered by phase shifts less than 20 degrees. VicGrid suggested that the Commission consider explicitly requiring IBLs to tolerate phase angle jumps, noting that IBL control systems may not be able to track the grid angle through a phase shift.[357] However, we have retained the light-touch approach from the draft rule to provide flexibility for IBLs with different characteristics. The Commission also notes that an explicit requirement for IBLs to tolerate phase angle jumps would be more onerous than the corresponding requirements for Schedule 5.2 plant.[358]

Protection for multiple successive faults

The final rule will require that IBL must not have protection systems that operate based solely on the number of faults that occur during a period of time.[359] This will preclude protection functions that operate by 'counting' faults or disturbances, to address the risk of cascading outages where multiple loads with similar protection settings trip after a specific number of disturbances. This risk has been shown to be significant in the past, as this type of protection settings contributed to the 2016 South Australia system black and the 2024 large load loss incident in Virginia.[360]

Under the final rule, Schedule 5.3 plant will not be strictly required to ride through multiple successive disturbances. The final rule will only prevent protection that is triggered by a specific number of faults.[361] By comparison, the Schedule 5.2 access standards include extensive multiple fault ride-through requirements, many of which were introduced in 2018, partly because of the South Australia system black.[362]

Some stakeholders supported more explicit multiple fault ride-through requirements. VicGrid noted that "Multiple fault events are increasingly common in low SCR areas, and without such requirements, IBLs may sequentially trip after each disturbance, creating cascading outages."[363]

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355 Final rule, clause S5.3.13(l).

356 NER clause S5.2.5.8(b6).

357 VicGrid submission to the draft determination, p 2.

358 NER clause S5.2.5.8(b6).

359 Final rule, clause S5.3.13(m).

360 AEMO, *Generator technical performance standards*, rule change request, 11 August 2017, website, p 27; NERC, Incident Review Considering Simultaneous Voltage-Sensitive Load Reductions, 8 January 2025, website, pp 1-2.

361 Final rule, clause S5.3.13(m).

362 NER clauses S5.2.5.5, S5.2.5.5A; AEMC, *Generator technical performance standards*, final determination, 27 September 2018, website, pp 207-216.

363 VicGrid submission to the draft determination, p 2.

Similarly, ElectraNet considered the final rule should include multiple fault ride-through requirements equivalent to those for Schedule 5.2 plant,[364] explicitly addressing automatic reclosure operations, and also including repeated frequency disturbances.[365]

The Commission has retained the light-touch approach used in the draft rule. Detailed multiple fault ride-through requirements for loads are likely to be onerous and costly because they would require modelling and analysis of a range of multiple-disturbance scenarios. We understand that negotiating multiple disturbance ride-through (S5.2.5.5) performance standards is resource-intensive even for generators. For example, AusNet noted that its experience connecting wind farms had shown the difficulty of clearly defining the multiple-disturbance scenarios that a plant must ride through.[366]

Further, there is no evidence at this stage that detailed or onerous multiple fault ride-through requirements for IBL would have material benefits compared to our light-touch approach. AEMO considers that the draft rule approach would address risks associated with disconnection of IBLs due to common disturbance counter settings, without being overly onerous.[367] Detailed multiple fault ride-through for IBL could be considered in future work, such as AEMO's next access standards review, if the need arises. This would allow for consultation and drawing on operational experience of the Package 2 access standards.

5.2.4 Information provision

The final rule will enable NSPs to request information about connecting loads' ride-through capability (including both IBL and non-IBL).[368] The Commission considers this will support system security by closing a gap in the existing information requirements in Schedule 5.3.

Currently, connection applicants must provide a range of information to AEMO and the NSP, including information on protection and control systems, and models as specified by the PSMG.[369] However, this information does not necessarily provide a full picture of loads' ride-through behaviour.

Under the final rule, Schedule 5.3 connection applicants (for IBL and non-IBL) will be required to provide information about the Schedule 5.3 plant's ride-through capability, as requested by the NSP in consultation with AEMO. This includes information about the capability of the equipment to remain connected to the power system and continue operating during and after one or more frequency or voltage disturbances.[370] Connection applicants will need to provide this information to both the NSP and AEMO.[371] Additional information will assist NSPs and AEMO in managing system security risks by allowing them to understand, predict and plan for large loads' responses to power system disturbances.

364 NER clause S5.2.5.5.

365 ElectraNet submission to the draft determination, p 7, 12.

366 AusNet submission to the draft determination, p 12.

367 AEMO submission to the draft determination, p 5.

368 Final rule, clause S5.3.1(a1)(2A).

369 NER clause S5.3.1.

370 This ride-through information will generally not be included in the load's performance standards. However, the final rule will not prevent the information from being used in performance standards if it is relevant to any access standards that apply to the load connection.

371 Final rule, clause S5.3.1(a1)(2A).

In submissions to the consultation paper and draft determination, stakeholders generally agreed that there was a lack of visibility of large loads' ride-through capability and supported AEMO's proposal for information sharing.[372] Detailed stakeholder feedback is discussed below.

Information provision will apply to both IBL and non-IBL, subject to NSP discretion

The information provision requirement in the final rule will apply to all Schedule 5.3 plant, including IBL and non-IBL of all sizes, whenever the NSP chooses to request information. This is because, although IBL may have a larger impact, the ride-through behaviour of large non-IBL can also contribute to system security impacts. The loss of any significant load during a disturbance would affect local voltage stability and the balance of supply and demand.

In its submission to the consultation paper, the Energy Users Association of Australia (EUAA) did not support applying AEMO's proposal to non-IBLs as it considered disturbance ride-through was only a risk for IBLs.[373] SA Power Networks noted that information provision may only be appropriate for large loads.[374] The Commission agrees that most of the system security impacts associated with large loads arise from IBL and for this reason the ride-through access standards will only apply to IBL. However, we consider it is appropriate to apply the light-touch information provision requirement to non-IBL, without explicit access standards. NSPs (and AEMO) will be able to exercise their discretion and only request information where there is a need.

The final rule will provide flexibility to request appropriate, relevant information from different loads

The Commission has designed the information provision in the final rule to be flexible and adaptable to loads of different types and sizes. This flexibility is important to minimise the costs and regulatory burden of the final rule. NSPs may choose what, if any, information to request from each load on a case-by-case basis, subject to consultation with AEMO. Ergon Energy and Energex supported the use of NSP discretion for this purpose.[375]

Information provision may not be necessary for IBLs where disturbance ride-through access standards apply, as NSPs and AEMO will likely be able to obtain all relevant information through the connection negotiation process. However, information provision may be a suitable alternative for any small IBL for which the NSP elects not to apply the disturbance ride-through access standards (or only applies some of them). This will enable NSPs to use a flexible approach for IBLs whose ride-through capability may have a lesser impact on system security. An NSP may determine that no additional information is required for a relatively small or straightforward load connection, or a connection to which disturbance ride-through access standards apply.

Some stakeholders, although generally supportive, raised questions about the amount of detailed information that could be requested. A number of submissions suggested making the requested information more transparent and consistent across NSPs, for example by creating minimum information requirements.[376] AWS noted that loads and generators have fundamentally different ride-through capabilities, that capabilities vary among load technologies, and that detailed ride-through information may not be available early in the connection process.[377]EPEC and NEXTDC

372 Submissions to the consultation paper: Ergon Energy and Energex, p 6; Transgrid, p 16; Ausgrid, p 3; TE H2, p 2; Hydro Tasmania, pp 3-4; SA Power Networks, p 5; ENA, p 5; EPEC, p 5; AirTrunk, p 9; CPU, p 3; NEXTDC, p 8; AWS, p 7.
Submissions to the draft determination: Ergon Energy and Energex, p 2; Canus, p 3; HydroTas, p 1; Transgrid, p 12; AWS, p 7.

373 EUAA submission to the consultation paper, pp 7-8.

374 SA Power Networks submission to the consultation paper, p 5.

375 Ergon Energy and Energex submission to the draft determination, p 2.

376 Submissions to the consultation paper: TE H2 p 2; AirTrunk, p 9; AWS, p 7.

377 AWS submission to the consultation paper, p 7.

questioned whether information requests could include a level of modelling that may not be feasible for loads.[378]

The Commission considers it is important to maintain flexibility in the final rule, rather than prescribing specific information. However, we note that NSPs may request (but are not limited to requesting):

- Details of protection and control systems and settings
- Voltage and frequency ride-through envelopes for the load
- Relevant manufacturer datasheets
- Information about the load's reactive power behaviour during a disturbance
- Information about how different parts of a load facility may respond to a disturbance
- RMS (rootmeansquare) and/or EMT (electromagnetic transient) models of the load, where appropriate.

When making information requests, the Commission expects NSPs and AEMO to take into account what data or modelling the load would reasonably be able to provide at that stage of the connection process. This is accounted for in the modelling principles introduced for IBLs, discussed in section 4.1.[379] The Schedule 5.3 Participant Modelling Guidelines to be developed by AEMO may provide more details on the modelling to be requested for Schedule 5.3 plant.[380]

AWS also noted the need to protect sensitive information.[381] Commercially sensitive information provided under this final rule must be treated by Registered Participants(including NSPs) as confidential according to rule 8.6 of the NER. In addition, AEMO is subject to confidentiality obligations under section 54 of the NEL. AWS considered that "AEMO should develop standard confidentiality templates for load protection information sharing", based on similar frameworks for generator connections. AEMO may consider providing guidance on the treatment of confidential information as part of the interim guideline for connection of IBLs or other relevant guidelines.

We have made minor changes from AEMO's proposal for the final rule

Our final rule differs from AEMO's proposal in that there is no direct link to the performance standards, but any information provided to the NSP will also be automatically provided to AEMO.[382] We consider that linking information provision to the performance standards would, in effect, allow non-IBL to be held to a certain standard of ride-through capability, because performance standards form part of the Schedule 5.3 Participant's contractual obligations in its connection agreement.[383] This would not be consistent with the Commission's final determination to apply ride-through access standards to IBL only.

The final rule will stipulate that the connection applicant must provide any ride-through information requested by the NSP directly to both the NSP and AEMO.[384] This will give AEMO visibility of large loads' ride-through capability in a simpler way than the rule change request.[385]

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378 Submissions to the consultation paper: EPEC, pp 2, 5; NEXTDC, pp 3-4.

379 Final rule, clause S5.3.1aa(b)-(c).

380 Final rule, clause S5.3.1aa(a).

381 AWS submission to the consultation paper, p 7.
AWS submission to the draft determination, p 7.

382 Final rule, clause S5.3.1(a1)(2A).

383 NER clause 5.3.4A(i).

384 Final rule, clause S5.3.1(a1)(2A).

385 The rule change request proposed that the NSP would be required to provide a copy of the Schedule 5.3 plant's performance standards to AEMO whenever the NSP elected to include the provided ride-through information in those performance standards. See AEMO rule change request proposed

This approach will streamline the implementation of the information provision requirement and allow the system security benefits to be realised more efficiently. It will also complement the expansion of AEMO's register of performance standards to non-Registered Participants (see section 4.2.1) as AEMO will have access to both the performance standards and any additional ride-through information provided.[386]

5.3 The final rule will clarify the disturbance ride-through access standard for generators

The final rule clarifies and restricts the scope of credible contingency events for generator ride-through to events used for network planning only.[387] This is a change from the draft rule, which also included non-credible contingency events likely to be reclassified by AEMO as credible.[388] The final rule is simpler and easier to implement than the draft rule, while still supporting system security.

In this section:

- Section 5.3.1 explains how the final rule will work, including the changes from the draft rule.
- Section 5.3.2 explains the Commission's rationale for the final rule and how we have taken stakeholder feedback into account.

5.3.1 The final rule will clarify and restrict the scope of credible contingency events for disturbance ride-through

The final rule will clarify the disturbance ride-through access standard that applies to Schedule 5.2 plant, which includes generators and integrated resource systems. We have restricted the scope of credible contingency events for the purposes of this ride-through access standard to include only those events used by the NSP for its network planning.[389]

The existing disturbance ride-through access standard requires Schedule 5.2 plant to be capable of riding through disturbances caused by credible contingency events, as well as disturbances caused by specific types of faults, and multiple disturbances subject to certain conditions.[390]The final rule clarifies which credible contingency events are to be considered for the purposes of this access standard. For both the automatic and minimum access standard, this will include only the credible contingency events used by the NSP for its network planning under NER clause S5.1.2.1.[391]

The intent of clause S5.1.2.1 is that NSPs must plan and operate their networks to allow the transfer of power from production units to loads, including when credible contingency events occur.[392]It specifies that the credible contingency events to be used by NSPs for this purpose include the disconnection of any single production unit or transmission line, with or without the application of certain fault types. The fault types to be considered depend on the transmission or distribution line voltage, for example, a single circuit two-phase-to-ground solid fault on lines at 220kV or above.[393] Under the final rule, the set of credible contingency events used for clause

drafting, 4 April 2024, website, p 189 (proposed new clause S5.3.4A).

386 Final rule, clause 4.14(n).

387 Final rule, clause S5.2.5.5(c)(1), (k)(1), (u).

388 Draft rule, clause S5.2.5.5(c)(1), (k)(1), (u).

389 Final rule, clause S5.2.5.5(c)(1), (k)(1), (u).

390 NER clause S5.2.5.5.

391 Final rule, clause S5.2.5.5(c)(1), (k)(1), (u).

392 Production units include generating units and bidirectional units. (NER Chapter 10, Glossary definition of *production unit*.)

393 NER clause S5.1.2.1.

S5.1.2.1 will also be used for the disturbance ride-through access standard for Schedule 5.2 plant.[394]

The final rule preserves a range for negotiation between the minimum and automatic access standards, as the minimum and automatic access standards include different sets of specific fault types in addition to credible contingency events. The minimum and automatic access standards also have different conditions for ride-through of multiple disturbances.[395]

Box 17: Changes between the draft and final rule

We have reduced the scope of credible contingency events for the automatic access standard compared to the draft rule.

The draft rule automatic access standard for disturbance ride-through by Schedule 5.2 plant included:

- Credible contingency events used by the NSP for its network planning under NER clause S5.1.2.1
- Non-credible contingency events that are likely to be reclassified by AEMO as credible under NER clause 4.2.3A.

The final rule excludes the second of these two categories from the automatic access standard.

The draft rule also stipulated that the relevant NSP was to prepare a list of events likely to reclassified as credible, in consultation with AEMO. NSPs will not need to prepare this list under the final rule.

The final rule minimum access standard is the same as the draft rule minimum access standard.

Source: Draft rule, clauses S5.2.4(e1)(1BA), S5.2.5.5(u); final rule, clause S5.2.5.5(u).

5.3.2 The Commission's rationale for the final rule

The final rule clarifies the disturbance ride-through access standard for generators and allows for easier implementation, while still supporting system security. Restricting the scope of credible contingency events will support an efficient connections process by making the requirements simpler, more transparent and less onerous.

The final rule makes this access standard simpler, more transparent and more predictable, which will support a more efficient connections process. The final rule is clearer than the existing arrangements because it removes the ambiguity identified in the initial rule change request. AEMO's view put forward in the rule change request was that the access standard included any event that may become credible via reclassification, which would have been an unbounded and potentially ambiguous obligation.[396] AEMO can reclassify a non-credible contingency event as a credible contingency event if the event becomes reasonably possible due to abnormal conditions, such as storms or bush fires.[397]

The final rule is more transparent and predictable than either the rule change proposal or the draft rule, because it does not include any reclassified events.[398] Although the list of events developed by the NSP under the draft rule would have helped to improve transparency, there was potential for

394 Final rule, clause S5.2.5.5(u).
395 NER clause S5.2.5.5.
396 AEMO rule change request overview, 4 April 2024, p 45.
397 NER clauses 4.2.3A(a), (g).
398 Final rule, clause S5.2.5.5(c)(1), (k)(1), (u).

unpredictable requirements as this list could change relatively quickly, as noted in stakeholder feedback (discussed further below).[399]

Although the final rule sets a less onerous access standard than the draft rule, we consider this will not adversely impact system security. Submissions to the draft determination noted that NSPs already manage the risk of non-credible contingency events through operational arrangements and emergency control schemes, for example under clause S5.1.8 of the NER.[400] Therefore, while there is a need to clarify the disturbance ride-through access standard, there is no need to include events likely to be reclassified. Excluding these events in the final rule would achieve similar system security outcomes to the rule change proposal or the draft rule, while supporting a more efficient connection process.

The final rule will have a lower implementation cost than the rule change proposal or the draft rule, because:

- NSPs and AEMO will not be required to create and maintain a list of events likely to be reclassified
- Connection applicants will not need to model plant response to reclassified events in order to demonstrate compliance with the access standard (a key concern raised in submissions, discussed below).

This will keep resources available to process connection applications more quickly, lowering costs to industry participants and ultimately consumers.

The final rule takes stakeholder feedback into account

Stakeholders provided mixed views on the draft rule as discussed throughout this section 5.3. Some submissions supported the draft rule as they considered it would improve clarity,[401] while others considered that changes were not necessary and raised implementation concerns.[402]

Snowy Hydro and APA agreed with AEMO that the existing requirement to ride through credible contingency events was unbounded, and supported the draft rule.[403] APA also noted its support for the draft rule minimum access standard which included only events used for network planning.[404] Although we have changed our position for the final rule, we consider the final still addresses these stakeholders' concerns because it provides more clarity and certainty in the access standard.

Several stakeholders also did not support the draft rule as they considered that the existing access standard was sufficiently well-defined and bounded.[405] Ergon Energy and Energex noted "there is value in AEMO, NSPs and proponents each considering different contingencies to ensure comprehensive system coverage."[406] Transgrid and Origin noted that NSPs manage the risk of potential reclassified events through operational arrangements and emergency control schemes. Therefore, including these events in the ride-through access standard may be duplicative and would not materially improve system security.[407]

399 Draft rule, clause S5.2.4(e1)(1BA).

400 Submissions to the draft determination: Origin, pp 1-2; Transgrid, p 12.

401 Submissions to the draft determination: Snowy Hydro, pp 1-2; APA, p 3.

402 Submissions to the draft determination: Origin, pp 1-3; Transgrid, pp 12-13; Ergon Energy and Energex, p 2; Akaysha, pp 2-3; Tesla, p 3.

403 Submissions to the draft determination: Snowy Hydro, pp 1-2; APA, p 3.
AEMO rule change request overview, 4 April 2024, p 45.

404 APA submission to the draft determination, p 3.

405 Submissions to the draft determination: Transgrid, p 12; Origin, pp 1-2; Ergon Energy and Energex, p 2.

406 Ergon Energy and Energex submission to the draft determination, p 2.

407 Submissions to the draft determination: Origin, pp 1-2; Transgrid, p 12.

Submissions also raised concerns about the implementation of the draft rule, which the final rule addresses by excluding events likely to be reclassified. First, there may be a large number of non-credible events that are likely to be reclassified as credible, and these events may change relatively quickly. Thus, it may be challenging for NSPs to keep the list up to date and provide a definitive set of requirements to connection applicants.[408] Origin considered the draft rule access standard may be overly onerous, despite the exclusion of reclassified events from the minimum access standard.[409] Ergon Energy and Energex noted that DNSPs consider a larger set of contingency events than Transmission Network Service Providers (TNSPs), which may be impractical to use for the ride-through access standard.[410]

Secondly, many stakeholders considered that requiring Schedule 5.2 plant to ride through events likely to be reclassified would significantly increase the modelling required to demonstrate compliance with the access standard. This would increase costs for connection applicants, as well as NSPs and AEMO who may need to consider broader technical studies, and could prolong connection negotiations.[411] Tesla also noted that this additional modelling would need to use simplifying assumptions that could limit its value.[412]

Akaysha was similarly concerned that NSPs may require modelling of an unlimited number of scenarios, including very rare scenarios, in order to demonstrate compliance with the ride-through requirements under all circumstances. Akaysha previously provided this feedback on the Package 1 rule change and AEMO's access standards review, because in its view, the concern arises even when the access standard does not include reclassified events. Akaysha noted that the negotiated access standard provisions introduced by the Package 1 rule change (enabling disclosure of plant limitations that would prevent plant from riding through multiple credible contingency events) did not address its concerns.[413]In the Package 1 final determination, the Commission took into account all stakeholder feedback and disagreed with Akaysha's view.[414] However, this final rule for Package 2 may mitigate Akaysha's concerns to an extent by clearly defining and limiting the scope of credible contingency events for the disturbance ride-through access standard.

Finally, while stakeholders acknowledged that the draft rule requirement for NSPs to develop a list improved on the rule change proposal, some concerns remained.[415] Transgrid considered that AEMO, rather than NSPs, should develop the list. Given that events likely to be reclassified could be added to the list at any time, stakeholders sought clarity on whether existing Schedule 5.2 plant would be required to ride through these events, or if not, then how the risk of these events would be managed. These concerns are addressed by the final rule because it does not include reclassified events and there is no need to develop a list.

Transgrid also sought clarity on how the draft rule would manage the risk of reclassified events where they are excluded from a negotiated access standard.[416]Under the final rule, events likely to be reclassified as credible will be managed through operational arrangements and emergency control measures under the existing rules, including clause S5.1.8, as noted by Transgrid. This is

408 Submissions to the draft determination: Transgrid, p 13; Tesla, p 4; Origin, p 2; Akaysha, p 2.

409 Origin submission to the draft determination, p 2.

410 Ergon Energy and Energex submission to the draft determination, p 2.

411 Submissions to the draft determination: Ergon Energy and Energex, p 2; Origin, p 2; Akaysha, pp 2-3.

412 Tesla submission to the draft determination, p 4.

413 NER clause S5.2.5.5(r2).
Akaysha submission to the draft determination, pp 2-3.

414 AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, p 44.

415 Draft rule, clause S5.2.4(e1)(1BA).

416 Transgrid submission to the draft determination, p 13.

clearer in the final rule compared to the draft rule since there is no duplication between the disturbance ride-through access standard and those existing requirements.

5.3.3 The final rule will clarify that the access standard for responses to disturbances following contingency events is an AEMO advisory matter

Clause S5.2.5.5A of the NER sets out the access standard for the response of Schedule 5.2 plant (generating systems, integrated resource systems, and synchronous condensers) to disturbances following contingency events. The final rule will clarify that clause S5.2.5.5A is an AEMO advisory matter by adding it to the NER definition of AEMO advisory matter.

The Commission considers that clarifying this AEMO advisory matter status is consistent with the intent of clause S5.2.5.5A. Clause S5.2.5.5A was separated from clause S5.2.5.5 in the Package 1 rule change to improve the clarity of the rules drafting, but still covers aspects of technical performance that were included in the previous version of clause S5.2.5.5.[417] Clause S5.2.5.5 was an AEMO advisory matter prior to the Package 1 rule change.[418]

Clause S5.2.5.5A meets the definition of an AEMO advisory matter because it relates to AEMO's power system security functions under the NEL and because it gives AEMO (along with the NSP) discretion on several aspects of the performance standard.[419] Explicitly including clause S5.2.5.5A in the NER definition of *AEMO advisory matter* would provide more clarity and certainty for connection applicants, NSPs and AEMO.

417 AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, p 50.

418 AEMC, *Improving the NEM access standards - Package 1*, final rule - markup, 22 May 2025, website, p 299 (Chapter 10, Glossary definition of *AEMO advisory matter*). For more information on AEMO advisory matters, see section 4.1.4 of this final determination. See also Package 2 final rule, Chapter 10, Glossary definition of *AEMO advisory matter*.

419 Section 49 of the NEL; NER clause S5.2.5.5A, for example paragraphs (f)(1), (f)(2), (g)(1) and (i).

6 The final rule improves power system stability and protection requirements

Box 18: Key points in this chapter

The Commission has made a final rule to improve the power system stability and protection requirements in the National Electricity Rules (NER). The final rule introduces an instability detection and response access standard for large inverter based loads (IBLs). It also formally defines primary and back-up protection systems for all plant.

Power system stability is essential to maintaining a secure and reliable energy supply for consumers. Some IBLs can contribute to power system instability because of their electronic interfaces and potential for control system interactions. This is similar to the characteristics of some inverter-based generation. Accordingly, these IBLs have a role to play in managing and mitigating the risk of power system instability.

For this reason, the final rule creates a new access standard for large IBL to detect, respond to, communicate about, and avoid contributing to instability. This new access standard will support the stable, reliable and secure operation of the National Electricity Market (NEM) as large data centres continue to connect.

The final rule requirements of the instability access standard are largely the same as the draft rule. We have made changes to clarify how aggregation of IBL applies for this access standard, as well as how the access standard applies to mixed connections and facilities with multiple connection points.

This chapter also discusses the two Rod Hughes Consulting rule change requests consolidated with Package 2. These rule change proposals sought to clarify the protection requirements for connecting plant in order to enhance system security and streamline connection processes.

In relation to the *Definitions for protection system requirements* rule change request, we have introduced definitions for primary and back-up protection systems in the NER. We have made minor drafting changes from the draft rule.

Consistent with the draft rule, the Commission has decided not to make the changes proposed in the *Conditions for generator protection systems* rule change request. We consider the existing arrangements are sufficient to support system security and provide appropriate flexibility.

In this chapter:

- Section 6.1 explains the new access standard for instability detection and response by large IBL.
- Section 6.2 details the new NER definitions for primary and back-up protection systems and our consideration of the other definitions proposed by Rod Hughes Consulting.
- Section 6.3 discusses our decision not to implement the *Conditions for generator protection systems* proposal.

6.1 The final rule will introduce an instability access standard for large IBLs

The final rule will create a new access standard that requires large IBLs to monitor for power system instability and respond in a way that helps manage instability risks.[420] The access standard for instability detection and response (instability access standard) will support system security by mitigating power system stability risks that may be posed by the increasing number of large IBLs connecting to the NEM. Like inverter-based generators, some IBLs can contribute to power system instability because of their power electronic interfaces and potential for control system interactions. The new access standard will require these IBLs to watch for instability and take responsive action, in a similar way to the existing instability access standard for generators (Schedule 5.2 plant).[421]

The final rule access standard will require large IBLs that have the potential to contribute to instability to:

- detect instability at their connection point
- respond in a way that helps manage instability, which may include disconnection as a last resort
- exchange information with AEMO and Network Service Providers (NSPs) about instability in the power system
- avoid causing, exacerbating, or contributing to instability.

The final rule is very similar to the draft rule, with some minor wording changes based on stakeholder feedback and the Commission's analysis. These changes clarify how the access standard applies to different types of facilities and how aggregation should be considered in applying this access standard.

In this section:

- Section 6.1.1 sets out the Commission's rationale for the final rule.
- Section 6.1.2 explains the new instability access standard in detail and discusses stakeholder feedback on the draft rule.

6.1.1 Large IBLs have a role to play in power system stability

Maintaining power system stability is key to providing a secure and reliable energy supply for consumers. Stability can be thought of as the ability for the power system to settle back into a normal state and continue operating after a small or large disturbance. AEMO's Power System Stability Guidelines (PSSG) define power system stability as:[422]

> the ability of the electric power system, for a given initial operating condition, to regain a state of operating equilibrium after being subjected to a physical or electrical disturbance, with system variables bounded so that practically the entire power system remains intact.

While AEMO has the overarching responsibility for power system security, NSPs and connected plant also play a role in maintaining stability.[423] The performance standards for generators, loads and high voltage direct current networks (HVDC links) can help AEMO operate the system stably

420 Final rule, clause S5.3.14.
421 NER clause S5.2.5.10.
422 AEMO, Power System Stability Guidelines, v3.0, 12 January 2026, website, p 5.
423 NER clause 4.3.1(a).

by requiring appropriate plant responses to disturbances and providing visibility of those responses.[424]

Power system instability occurs when one or more power system quantities - such as voltage, frequency, or active or reactive power - become unstable. This could include:

- power system quantities straying outside the normal range and not recovering in a timely manner (e.g. voltage collapse or an uncontrolled decrease in frequency)
- oscillations in power system quantities that are not sufficiently damped (that is, they do not settle quickly enough)
- loss of synchronism between different items of plant or different parts of the power system.[425]

This rule change is particularly concerned with oscillatory or small-signal stability, where a small disturbance such as a change in generation or load could trigger oscillations (repeated variations) in power system quantities such as voltage or frequency.

Instability is an inherent risk in any power system that needs to be managed. The power system cannot operate stably with large undamped oscillations, loss of synchronism, or sustained variations in power system quantities. Therefore, instability must be dealt with promptly to avoid major supply disruptions and potential black system events.

Large IBLs may contribute to power system stability risks

Instability can be caused by a wide range of factors relating to various types of plant. However, inverter based resources (IBR) – including generation, storage and load – may be more likely to contribute to instability because of their power electronic control systems, as discussed in section 2.2 of the draft determination. These control systems can cause or contribute to instability because of:

- non-linear behaviour, where the control system has a large response to a small stimulus (although non-linearity is not unique to IBR)
- control system interactions, where IBR may interact with each other or the power system in a way that causes or contributes to oscillations
- more generally, any unintended or undesirable interactions with other plant or responses to network conditions.[426]

Because of these characteristics, IBL may contribute to power system instability in the same way that inverter-based generation can.[427] Conventional loads or non-IBL typically do not contribute to instability.

The current NEM access standards include requirements for Schedule 5.2 plant to detect and respond to instability, which were updated in the Package 1 rule change.[428] However, as noted in AEMO's rule change request, there are currently no requirements for loads to monitor instability in the power system or take any action if instability is detected.[429] There are also no requirements for loads to avoid causing instability. Instability may therefore pose an increasing risk to power system security as more large IBLs, including data centres, connect to the NEM.[430] Thus, it is

424 NER clauses S5.2.5.10, S5.3a.4.2.
Final rule, clause S5.3.14.

425 AEMO, Power System Stability Guidelines, v3.0, 12 January 2026, website, pp 14-16.

426 AEMO, Power System Stability Guidelines, v3.0, 12 January 2026, website, pp 14-16.

427 AEMO rule change request overview, 4 April 2024, website, p 72.

428 NER clause S5.2.5.10,AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, pp 68-71.

429 AEMO rule change request overview, 4 April 2024, p 72.

430 The increasing penetration of IBR on the supply side has had a similar effect, and this has been addressed through the *Improving the NEM access*

becoming more important for these large IBLs to monitor instability, communicate with NSPs and AEMO regarding instability, and respond effectively.

AEMO's Package 2 rule change request identified this issue and proposed to introduce a new access standard that would require large IBLs to detect and respond to instability and exchange information with AEMO and the NSP.[431]

The final rule will support the stable operation of the NEM with an increasing presence of large IBL

The new access standard will support system security by requiring large IBLs that may contribute to instability to play a role in managing and mitigating it. As outlined above, IBLs can contribute to power system instability, and instability that is not managed promptly can have serious consequences such as supply disruptions for consumers. The instability access standard set out in the final rule will support the stable, reliable and secure operation of the NEM as large data centres continue to connect.

The instability access standard will support system security by requiring relevant large IBLs to detect, respond to, communicate about, and avoid causing instability. This includes the following:

- Providing visibility of instability at large IBL connection points.[432] This will help provide a more complete picture of any instabilities across the NEM to NSPs and AEMO, supporting centralised management of power system stability.
- Ensuring that large IBL which is contributing to instability can be disconnected, either by its own systems (in the automatic access standard) or a remote tripping signal (if required by the NSP).[433] Although disconnection of plant is a last-resort measure, it can be an important tool to prevent unstable behaviour from impacting the rest of the system.[434]
- Having Schedule 5.3 Participants create clear processes for responding to instability, which are agreed by the NSP and AEMO, again supporting coordination on power system stability.[435]
- Enabling two-way sharing of instability data between the Schedule 5.3 Participant and the NSP and AEMO, which can be used to understand the causes of instability and coordinate how it is managed.[436]
- Minimising IBL behaviour that may contribute to instability, by requiring capabilities and control systems sufficient to ensure the operation of the plant does not cause instability.[437]

Stakeholders generally supported the draft rule instability access standard

Submissions to the draft determination were generally supportive of the new instability access standard.[438] Stakeholders agreed with our analysis that system stability risks may increase with the volume of large IBLs connecting to the NEM, and that the new access standard was appropriate to address these risks.[439]For example, AWS noted that the draft rule had improved on the rule change proposal by increasing the large IBL threshold to 30MW and prioritising measures other than disconnection in response to instability, and we are retaining those changes for the

standards - Package 1 rule change.

431 AEMO rule change request overview, 4 April 2024, pp 72-73.

432 Final rule, clause S5.3.14(c)(1), (c)(4), (d)(1)(i), (d)(2).

433 Final rule, clause S5.3.14(c)(2), (j).

434 Final rule, clause S5.3.14(f).

435 Final rule, clause S5.3.14(c)(3), (d)(1)(ii).

436 Final rule, clause S5.3.14(c)(4)(ii), (d)(2)(ii), (i).

437 Final rule, clause S5.3.14(e).

438 Submissions to the draft determination: Ergon Energy and Energex, p 3; CPU, p 2; Celero and GPE, p 8; VeriConneX, p 2; ElectraNet, p 16; Transgrid, p 14; Tesla, p 4; AusNet, p 11; AEMO, p 11; AWS, p 1, 7.

439 Submissions to the draft determination: Transgrid, p 14; Ergon Energy and Energex, p 3; CPU, p 2; ElectraNet, p 16; Sungrow, p 4.

final rule.[440] Ergon Energy and Energex have observed instability on their networks related to the behaviour of some large customers and noted that instability monitoring is particularly important under weak network conditions, for loads larger than 100 MW, and/or where potential unstable behaviour is not well understood.[441] A number of original equipment manufacturers (OEMs) and engineering providers also noted that the draft rule requirements for detection, response and communication were comfortably feasible using existing technologies, although Ergon Energy and Energex noted some relevant instability detection technologies are still maturing.[442]

Stakeholders also sought clarification and guidance on some aspects of the draft rule access standard, discussed further below.[443]

6.1.2 How the instability access standard will work

The final rule access standard will ensure that large IBLs have capabilities and processes in place to detect, respond to, communicate, and avoid or prevent instability. There are specific criteria for the application of the access standard and some of the requirements within it. First, the instability access standard only applies:

- in respect of any large IBL included in a schedule 5.3 plant; and
- if AEMO or the NSP considers the large IBL has the potential to contribute to instability.[444]

While this access standard generally applies to large IBL only, an NSP may elect to apply it to smaller IBLs if they are electrically proximate and reasonably likely to have an aggregated impact on the power system.[445] An NSP may also apply the phasor measurement unit (PMU) requirement, which normally applies to IBL of 100MW and above, to smaller IBL after similarly taking aggregation into account.[446]

The requirements of the instability access standard fall into four categories:

- **Detection:** Monitoring voltage and power at the connection point to check for instability.
- **Response:** Responding in a timely manner to help manage any instability detected, by taking steps agreed with the NSP and AEMO.
- **Communication:** Exchanging information about instability with the NSP and AEMO as needed, including PMU data when a PMU is required.
- **Prevention:** Capabilities and control systems for the plant to avoid causing, exacerbating or contributing to instability.

These requirements, and the application criteria for specific requirements, are summarised in Figure 6.1 below.

The Commission notes that the instability access standard is an AEMO advisory matter.[447]

440 AWS submission to the draft determination, p 1.

441 Ergon Energy and Energex submission to the draft determination, p 3.

442 Submissions to the draft determination: Tesla, p 4; Celero and GPE, p 6; VeriConneX, p 2; Ergon Energy and Energex, p 3.

443 Submissions to the draft determination: Ergon Energy and Energex, p 3; VeriConneX, p 2; ElectraNet, p 16; Transgrid, p 14; Tesla, p 4; VisIRGrid, pp 6-7; Sungrow, p 4; AWS, p 7.

444 Final rule, clause S5.3.14(a).

445 Final rule, clause S5.3.1a(b)(2). See section 3.2.3 for more information.

446 Final rule, clause S5.3.14(b), (c)(4), (d)(2).

447 Final rule, Chapter 10, Glossary definition of *AEMO advisory matter*.

Figure 6.1: Summary of the instability access standard requirements

Large IBL, where the NSP or AEMO considers that the operation of the IBL could reasonably contribute to instability in voltage, active power or reactive power, must have:		
Detection	• Facilities to detect instability in voltage, active power and reactive power at the connection point *MAS: Only required if the load can change the voltage at the connection point by more than 1%*	
	• **100 MW and above:** Access to a PMU with the capability to send data to AEMO and the NSP *MAS: Only if required by AEMO or the NSP*	
Response	**Automatic access standard** • Capability to disconnect the plant for unstable behaviour, with configurable conditions and settings • Prompt execution of a hierarchy of actions on detection of instability, based on configurable thresholds and only using disconnection as a last resort • Details to be agreed with the NSP and AEMO and recorded in the performance standards	**Minimum access standard** • Process to manage instability promptly upon detection • Details to be agreed with the NSP and AEMO and recorded in the performance standards *Only required if the load can change the voltage at the connection point by more than 1%*
Communications	• **100 MW and above:** Receive information from AEMO relating to the plant's contribution to instability, when available *MAS: Only if required by AEMO or the NSP*	
	• Communicate information from plant detection systems to AEMO/NSP control centres, if required by AEMO/NSP • Receive a remote tripping signal from the NSP, if required by NSP	
Prevention	• Capabilities and control systems to ensure its operation does not cause, exacerbate or contribute to instability	

Source: Final rule, clause S5.3.14.

Box 19: Changes between the draft and final rule

We have made minor changes between the draft rule and final rule to clarify how the aggregation principle applies to this access standard. Aggregation may be applied for the access standard as a whole, and for the PMU requirement.

We have also made minor drafting changes to clarify the treatment of IBL facilities with multiple connection points and facilities which comprise both IBL and non-IBL.

Source: AEMC.

Box 20: Differences between the final rule and rule change request

There were a number of changes between AEMO's rule change proposal and the draft rule, which we have retained for the final rule. The key differences between the final rule and AEMO's proposal are:

- Subject to aggregation, the access standards will only apply to large IBL as per our final rule definition, which is IBL with a nameplate rating of at least 30 MW, instead of the existing definition in the System Strength Impact Assessment Guideline (SSIAG), which is 5 MW and above.
- We have added a requirement for large IBL to have capabilities and control systems sufficient to ensure that its operation does not cause, exacerbate or contribute to instability, and linked this directly to the PSSG so that AEMO can provide further guidance.
- We have aligned the instability response requirements with the equivalent requirements for Schedule 5.2 plant, which were updated in the Package 1 rule change, by omitting AEMO's proposed requirement for disconnection to account for available automated information on the plant's contribution to instability.

Source: Final rule, clause S5.3.14(a)(1), (e), (h); AEMO, SSIAG, v2.2, 28 June 2024, website, p 8; AEMO rule change request proposed drafting, 4 April 2024, website, p 193, proposed new clause S5.3.12(a)(1), (b)(3)(i); NER clause S5.2.5.10; AEMC, Improving the NEM access standards - Package 1, final determination, 22 May 2025, website, pp 69-70.

The final rule access standard is flexible and proportionate to the risk

The final rule access standard requirements are commensurate to the risk posed by large IBL. To avoid placing overly onerous requirements on IBLs that are not likely to impact stability, we have included application criteria for the access standard as well as several of the specific requirements. There is also a range for negotiation between the minimum and automatic access standards.

The access standard generally applies to large IBL, depending on its potential to contribute to instability

The new access standard in the final rule will apply automatically in respect of any large IBL included in Schedule 5.3 plant, if AEMO or the NSP considers the large IBL may contribute to instability at its connection point.[448] This means that AEMO and NSPs will have discretion in whether to apply this access standard if the load is not likely to have an adverse stability impact. If AEMO and the NSP find that an IBL will not contribute to instability, neither the automatic nor the minimum access standard apply.

Applying the access standard to large IBL is appropriate because they are more likely to have a material impact on the system if they behave unstably, and therefore contribute more to instability risks.[449] Submissions to the draft determination supported using the updated large IBL threshold of 30 MW for the application of this access standard.[450]

The access standard also applies to smaller IBLs where it is reasonable to consider their aggregate impact

The final rule clarifies how the aggregation principle is to be applied to the instability monitoring access standard. The aggregation principle, discussed in section 3.2.3, states that an NSP may treat any IBL as a large IBL for the purposes of Schedule 5.3 where it is reasonable and

448 Final rule, clause S5.3.14(a).

449 See chapter 2 of the draft determination.

450 Submissions to the draft determination: AWS, p 1; DCA, p 4; SA Power Networks, p 1; AusNet, p 9; Jemena, p 1.

appropriate to consider the aggregate impact of that connection and other electrically proximate connections.[451] This means that an NSP can apply the instability access standard (including both the automatic and minimum access standard) to small IBL in those cases, even though this access standard generally only applies to large IBL. It is important to enable NSPs to consider the aggregation of IBLs for the instability access standard so that connection applicants cannot avoid the requirements by dividing up a Schedule 5.3 plant which includes more than 30 MW of IBL into two separate connections.

The threshold for applying the instability access standard to small IBL is higher than that for the disturbance ride-through access standards.[452] All access standards can be applied to small IBL where there is an aggregate impact, and the disturbance ride-through access standards can also apply to a small IBL which (in its own right) may adversely affect the quality or security of network services to other network users.[453]

The final rule also applies aggregation to the 100 MW threshold for the PMU requirement in the instability access standard, for similar reasons. This means that an NSP can require access to a PMU, in either the minimum or automatic access standard, for an IBL smaller than 100 MW, if it is reasonable and appropriate to consider the aggregate impact of that connection and other electrically proximate connections.[454] For example, if two or more IBLs are connected at the same connection point or very close together, with a combined size of 100 MW or over, the NSP may reasonably require one or both IBLs to have access to a PMU.

The design of the access standard promotes flexibility

The access standard requirements set out in Figure 6.1 provide flexibility in a number of ways. This flexibility will help keep costs down by enabling IBLs to install an efficient level of instability monitoring and response capability as appropriate to the specific connection.

First, the two general requirements for communications capability (communicating information to AEMO/NSP control centres and receiving a remote tripping signal) are on an as-required basis as shown in Figure 6.1.[455]

Second, we have set a less onerous minimum access standard to provide a wide range for negotiation. The minimum access standard:

- allows for a simple, straightforward process to promptly manage instability.[456] For example, it may be sufficient to raise an alarm if oscillations are detected, notify AEMO or the NSP, and stand by for further instructions.
- does not require the capability to disconnect the plant in response to instability.
- provides NSP and AEMO discretion in applying the requirement for IBLs of 100 MW and above to have access to a PMU.[457]

Finally, certain detection and response requirements in the minimum access standard only apply if the plant can change the voltage at its connection point by more than one per cent (see Figure 6.1).[458] This provides a wider negotiation range for large IBLs that do not significantly affect the

451 Final rule, clause S5.3.1a(b)(2).

452 The disturbance ride-through access standards are set out in clauses S5.3.12 and S5.3.13 of the final rule. See section 5.1 and section 5.2 of this final determination for more information.

453 Final rule, clause S5.3.1a(a1)(2)(i)(B).

454 Final rule, clause S5.3.14(b), (c)(4), (d)(2).

455 Final rule, clause S5.3.14(i), (j).

456 Final rule, clause S5.3.14(d)(1)(ii).

457 Final rule, clause S5.3.14(d)(2)(i)-(ii).

458 Final rule, clause S5.3.14(d)(1).

voltage at their connection point, which may occur if they are moderate in size and/or located in a strong area of the network. For IBL smaller than 100 MW which do not meet the voltage change threshold, the minimum access standard will effectively be zero because PMU access is also not required.

While Schedule 5.3 Participants will incur some costs in complying with the new access standard, we consider these costs are reasonable for large IBL that may contribute to instability.[459] The costs of meeting the new requirements, including implementing a real-time monitoring system, are not expected to be large compared to the total project cost for a large IBL. Providing some flexibility in the access standard, and setting criteria for when some requirements apply, will also help smaller IBL that contribute to an aggregate effect to meet the requirements at a reasonable cost. Overall, the new instability monitoring access standard will promote the National Electricity Objective (NEO) by enabling stability risks to be managed in a more efficient manner as more large IBLs connect to the NEM.

We considered making PMUs mandatory following ElectraNet's suggestion

The automatic access standard set out in the final rule requires access to a PMU for IBLs of 100 MW and above.[460] For these larger plant, access to a PMU will enable real-time measurement of voltage and current to help detect instability, which is key to managing IBL stability impacts. The 100 MW threshold will ensure that the cost of the PMU is commensurate with the potential stability impact of the load.

We considered whether PMU capability should be mandatory in the minimum access standard for IBLs of 100 MW and above, following feedback from ElectraNet.[461] In the draft and final rule, the minimum access standard only includes PMU access when required by the NSP or AEMO.[462]

We consider that removing the discretion around PMUs in the minimum access standard would have limited, if any, system security benefits. NSPs and AEMO are well placed to determine the need for a PMU for each connection (of 100 MW and above). We expect that PMUs are likely to be installed for most very large IBLs because they are part of the automatic access standard and are relatively low-cost for a plant larger than 100 MW.

While PMU capability is an appropriate requirement for most very large IBLs, we consider the minimum access standard should provide some flexibility because there are genuine grounds for exception. For example, if two 100 MW data centres (under separate connection agreements) are electrically very close together, they would see similar power system conditions and only one PMU may be needed.

The final rule approach to PMU access, including the 100 MW threshold and flexibility in the minimum access standard, is consistent with the Schedule 5.2 instability access standard introduced by the Package 1 rule change.[463]

Stakeholders sought guidance on the implementation of the requirements

Several stakeholders considered that AEMO should provide more guidance on the implementation of the instability access standard. For example, stakeholders sought guidance on:

459 Submissions to the consultation paper: EPEC, p 7; EUAA, pp 10-11; TE H2, p 2; AirTrunk, p 10; NEXTDC, pp 8-9; AWS, p 8.

460 Final rule, clause S5.3.14(c)(4).

461 ElectraNet submission to the draft determination, p 16.

462 Final rule, clause S5.3.14(d)(2)(i)-(ii).
Draft rule, clause S5.3.14(d)(2)(i)-(ii).

463 NER clause S5.2.5.10(a)(3), (b)(2); AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, pp 68-69.

- how instability detection should be implemented, including but not limited to:[464]
  - technical specifications for PMUs and other monitoring equipment
  - data quality and accessibility
- criteria for when the access standard applies based on the condition of being reasonably able to contribute to instability[465]
- compliance expectations after commissioning[466]
- the treatment of multiple connection points and whether large facilities need multiple measurement locations.[467]

Transgrid suggested that AEMO should develop a unified NEM-wide guideline for instability detection and response for Schedule 5.3 and Schedule 5.2 plant to promote consistency, and also define instability as it applies to IBRs and IBLs. It noted the draft rule requirement to update the PSSG was broad.[468]

The Commission expects that the technical guidance that stakeholders have requested will be provided by the PSSG. The new Schedule 5.3 Participant Modelling Guidelines may also provide guidance on modelling relevant to the instability access standard.[469] The final rule requires AEMO to update the PSSG and develop the Schedule 5.3 Participant Modelling Guidelines, in consultation with stakeholders, within 12 months from commencement of this rule.[470]

The final rule does not prescribe in detail the information that should be included in the PSSG, as we consider AEMO is best placed to determine what guidance is needed, in consultation with industry. AEMO's draft interim guideline for IBL will provide some guidance while the PSSG is being updated, and connection applicants may seek further guidance from the relevant NSP or AEMO if needed as part of the negotiation process. The Commission considers that clear guidance on the instability monitoring access standard, provided via the PSSG, will support the effective implementation of the final rule.

Some stakeholders also noted that the instability access standard and any new technical guidance provided should be consistent with AEMO's other existing documentation, such as the Power System Model Guidelines (PSMG).[471] We have sought to minimise any inconsistency amongst the relevant guidelines and rules through extensive consultation with AEMO. However, there may be temporary discrepancies which will be resolved after AEMO updates the guidelines.[472] The NER takes precedence over guidelines to the extent of any inconsistency.[473]

The final rule will require large IBLs to avoid causing instability

The final rule includes a general requirement for large IBLs to have capabilities and control systems that ensure the operation of the IBL does not cause, exacerbate or contribute to instability.[474] This is a high-level requirement that helps support system security by addressing a gap in the existing access standards: there were previously no requirements for Schedule 5.3

464 Submissions to the draft determination: Ergon Energy and Energex, p 3; ElectraNet, p 17; Transgrid, p 14.
465 AWS, submission to the draft determination, p 7.
466 VeriConneX submission to the draft determination, p 2.
467 Submissions to the draft determination: Transgrid, p 14; ElectraNet, p 17.
468 Transgrid submission to the draft determination, p 14.
469 Final rule, clause S5.3.1aa.
470 Final rule, clauses 11.197.6, 11.197.7.
471 Submissions to the draft determination: VisIRGrid, pp 6-7; ElectraNet, p 17.
472 For example, the definition of large IBL in the SSIAG is still 5 MW, but this is superseded by the 30 MW threshold in the final rule - AEMO, SSIAG, v2.2, 28 June 2024, website, p 8.
473 Final rule, clause 11.197.6(e).
474 Final rule, clause S5.3.14(e).

plant to avoid causing instability. As noted in some submissions to the consultation paper, AEMO's initial proposal only covered detection, response and communication, with no fundamental stability requirement.[475] The final rule requirement for not causing instability is modelled on existing NER clause S5.2.5.13(b)(1)(iii), which will provide some consistency between Schedule 5.2 and 5.3 requirements.[476]

Tesla's submission to the draft determination, although generally supportive of the new access standard, raised a concern with this requirement. Tesla considered it would be technically challenging to design control systems that "actively avoid causing or contributing to instability" because extensive analysis would be required to determine the effect of higher frequency data centre power variations on the power system.[477] The Commission does not intend for Schedule 5.3 Participants to model all interactions between their own plant and the power system, because this would require information about other equipment on the power system to which the Schedule 5.3 Participant would not have access. Rather, the connection applicant should provide sufficiently detailed models to the NSP for the NSP to test for potential interaction instability, as needed.

We also note the requirement to avoid contributing to instability does not necessarily capture cyclic or periodic variations in active power consumed by a large IBL. Such cyclic variations have been observed for some large computational loads, particularly artificial intelligence (AI) training loads, and could cause forced oscillations which may have undesirable interactions with other parts of the power system.[478] As these oscillations are not necessarily unstable, they may not be captured by the requirement for capabilities and control systems to avoid causing instability. The Commission is aware of this potential risk and we will be consulting on this issue as part of the *Operational integration and visibility of inverter based loads* rule change, initiated on 12 November 2026.[479]

The final rule links the high-level requirement for avoiding instability to the PSSG. That is, Schedule 5.3 plant will need to have operational arrangements and capabilities to prevent it from causing instability as required by AEMO pursuant to the PSSG.[480]

475 Submissions to the consultation paper: Transgrid, p 4, 18; AWS, p 8; EPEC, p 6; AEMO rule change request proposed drafting, 4 April 2024, pp 193-194, proposed new clause S5.3.12.

476 The rest of clause S5.2.5.13(b)(1)(iii) sets out extensive reactive power control requirements for Schedule 5.2 plant which are generally not appropriate or necessary for loads.

477 Tesla submission to the draft determination, p 4.

478 AusNet, Integrating Data Centres: Prioritising Power System Integrity Challenges in the NEM, White Paper, June 2026, website, pp 43-46; NERC, Characteristics and Risks of Emerging Large Loads, Large Loads Task Force White Paper, July 2025, website, pp 29-32.

479 AEMC, *Operational integration and visibility of inverter based loads*, consultation paper, 12 November 2026.

480 Final rule, clause S5.3.14(h).

The final rule will permit disconnection as a response action without accounting for the plant's contribution to instability

Like the draft rule, the final rule automatic access standard will require large IBL to be capable of disconnecting from the power system when instability is detected.[481] Disconnection should be the last option in the plant's instability response process as the final rule will require prioritising measures to eliminate the instability over disconnection.[482] Whether, when and how to trigger disconnection can be decided on a case-by-case basis, as part of the hierarchy of response actions to be agreed between the Schedule 5.3 Participant, NSP and AEMO.[483]

The final rule also does not require a large IBL to consider its own contribution to any instabilities when determining whether to disconnect, or take any other actions, in response to instability. Our decision not to add the proposed requirement for a large IBL to determine its own contribution to instability responds to feedback on the consultation paper.[484] Not adding this requirement also makes the Schedule 5.3 instability access standard consistent with its Schedule 5.2 equivalent.[485]

The Commission understands that determining the source of instability is technically challenging and it may not be feasible for plant to determine its own contribution.[486] Further, disconnecting automatically on detection of instability may make the power system less secure, because:[487]

- The plant may have been damping oscillations, in which case disconnecting it would make the oscillations worse.
- Otherwise, the unnecessary disconnection of large IBL could contribute to a significant loss of load which may have negative system security impacts including customer outages, as discussed in section 5.1.1.

AEMO noted there is potential to further develop the capability for all inverter-based plant to identify the source of instability and the plant's own contribution to the instability. AEMO's submission noted it is progressing this work in collaboration with industry.[488]

We have clarified how the instability access standard applies to different types of facilities

Submissions sought clarification on the treatment of campus style or integrated IBL developments, including facilities with multiple connection points, for the purposes of the instability access standard.[489] Where a data centre or other large IBL facility has multiple physical connection points but only one connection agreement, the access standard applies to the facility as a whole. For example, a critical IT load facility may have multiple physical connection points to provide redundancy. However, if there are multiple places where power can flow, the Schedule 5.3 Participant and NSP must agree on a single nominal connection point. This is required by the existing NER definition of *connection point*, as noted in Transgrid's submission.[490] We have

481 Final rule, clause S5.3.14(c)(2).

482 Final rule, clause S5.3.14(f).

483 Final rule, clause S5.3.14(c)(3).

484 Submissions to the consultation paper: CPU, p 3; AWS, pp 8-9; AirTrunk, p 11.
AEMO had proposed an automatic access standard that would require any disconnection of IBL in response to instability to account for available automated information on the plant's contribution to the instability. See AEMO rule change request proposed drafting, 4 April 2024, p 193, proposed new clause S5.3.12(b)(3)(i).

485 The Package 1 final rule also did not include AEMO's proposed requirements for Schedule 5.2 and Schedule 5.3a plant disconnections to account for the plant's contribution to instability, following similar stakeholder feedback on the draft rule about the difficulty of identifying the plant's contributions and the risk that automatic disconnections may exacerbate disturbances. See AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, pp 69-71, and NER clause S5.2.5.10.

486 Submissions to the consultation paper: CPU, p 3; AWS, pp 8-9; AEMO, p 8.

487 AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, pp 70-71.

488 AEMO submission to the draft determination, p 11.

489 Submissions to the draft determination: ElectraNet, p 5, 17; Transgrid, p 14.

490 NER Chapter 10, Glossary definition of *connection point*.Transgrid submission to the draft determination, p 14.

therefore removed the wording about multiple connection points from the draft rule instability access standard to avoid duplication and confusion.[491] Monitoring and measurement of power system quantities is only required at one location, which is the nominal connection point.

We have also considered the potential case where multiple facilities are located at the same site under different connection agreements. Connection agreements may be held by the same or different Schedule 5.3 Participants, and plant may be connected at the same or different physical (or nominal) connection points. Regardless, the instability access standard will apply to each connection agreement independently. However, in such cases there may be an opportunity to share the use of monitoring equipment including PMUs, and coordinate processes for responding to instability. Details of any such arrangements would need to be contractually arranged between Schedule 5.3 Participants, where relevant, and recorded in the connection agreement(s) with the consent of the NSP.

We have also clarified how the instability access standard applies to mixed connections. Where a Schedule 5.3 plant contains both IBL and non-IBL component, the instability access standard only applies in respect of the IBL component.[492] The non-IBL component does not strictly need to meet any of the requirements of this access standard. However, Schedule 5.3 Participants may choose to implement the requirements for the whole Schedule 5.3 plant for simplicity or coordination reasons. For example, it may be practical to install monitoring at the connection point which would capture the whole plant. We have updated the rule drafting to make this clear and consistent with the disturbance ride-through access standards set out in clauses S5.3.12 and S5.3.13.[493] We have also used *inverter based load* rather than *inverter based resource* throughout clause S5.3.14 to avoid confusion, following feedback on the rule drafting.[494]

One submission queried whether the instability access standard should also be applied to HVDC links (Schedule 5.3a plant).[495] We do not consider this modification is necessary as the Package 1 rule change already introduced a similar instability access standard for HVDC links which took effect in August 2025.[496]

6.2 The final rule will update the NER definitions for protection system types

The final rule introduces new definitions for the terms *primary protection system* and *back-up protection system*.[497] Clarifying these definitions will help streamline connection processes by reducing the potential for differing interpretations. An efficient connections process, in turn, helps to maintain system security at lowest cost. The final rule is similar to the draft rule, with minor changes to the definition of *back-up protection system*. This part of the final rule is in response to the Rod Hughes Consulting rule change request, *Definitions of protection system requirements*, which we consolidated with AEMO's Package 2 rule change request.[498]

491 ElectraNet (submission to the draft determination, p 5) noted that clause S5.3.14(b) of the draft rule appropriately recognised the case of a "single integrated facility where components are connected at separate connection points" and suggested this be extended across the broader access standards framework. While we have removed what was S5.3.14(b) in the draft rule, it is our intent that the IBL access standards be considered for all of the IBL in a Schedule 5.3 plant that is under one connection application or agreement. This is given effect by the existing NER definition of *connection point* and the final rule definitions of *inverter based load* and *large inverter based load* (NER Chapter 10, Glossary).

492 Final rule, clause S5.3.14(a)(1).

493 Final rule, clauses S5.3.1a(a1)(2)(i), S5.3.14(a)(1).

494 Transgrid submission to the draft determination, p 14.

495 Transgrid submission to the draft determination, p 14.

496 NER clause S5.3a.4.2; AEMC, *Improving the NEM access standards - Package 1*, final determination, 22 May 2025, website, pp 88-89.

497 Final rule, Chapter 10, Glossary.

498 Rod Hughes Consulting, *Definitions of protection system requirements*, rule change request, 21 December 2022, website.

In this section:

- Section 6.2.1 explains the Commission's rationale for the final rule.
- Section 6.2.2 sets out the new definitions and explains how we have addressed stakeholder feedback on the draft rule.

6.2.1 Defining primary and back-up protection systems will improve clarity

Creating clear definitions for primary and back-up protection systems will support system security and an efficient connections process. The final rule maintains the approach we took in the draft rule, which was supported by feedback on the consultation paper.

In submissions to the consultation paper, stakeholders generally supported the intent of the rule change proposal, and several called for further work to refine the proposed definitions.[499] Others acknowledged some of the clarity issues that the rule change sought to address, but did not support the proposed approach and recommended further work.[500]

We have modified the proposed definitions following stakeholder feedback and technical analysis

Consistent with the draft rule, the final rule simplifies and reduces the number of new definitions compared to Rod Hughes Consulting's rule change proposal. This addresses stakeholders' concerns, raised in response to the consultation paper, that the proposed definitions were too specific and may restrict the design of protection systems unnecessarily.[501] The final rule definitions include the minimum detail necessary to clarify the requirements for the types of protection systems. This approach will maintain flexibility and minimise complexity by avoiding overly detailed, prescriptive definitions.

Rod Hughes Consulting also proposed new or updated definitions for *breaker fail protection system*, 'protection element', 'control element', and 'protection function', as well as terminology changes to use 'main *protection system*' and 'independent alternative main *protection system*' in relation to duplicate primary protection systems.[502] Based on our technical analysis, the Commission considers that these other proposed changes would not promote the NEO because they would:

- provide little or no benefits for system security
- provide little or no benefits for the efficiency of the connections process
- reduce flexibility and increase complexity – potentially increasing the costs of compliance with the access standards.

Further information and analysis is provided in Table 5.1 in the draft determination.[503]

In the final rule, we have made a minor change to remove the words "a *facility*" from the definition of *breaker fail protection system*. Specifying that a *breaker fail protection system* protects a *facility* was inconsistent with the existing definition of *protection system* and the new definitions to be introduced in the final rule.[504] Further, we consider it was unclear whether a *facility* in this context included a load facility, although clause S5.3.3 clearly requires *breaker fail protection systems* for Schedule 5.3 plant.[505]The revised definition of *breaker fail protection system* is simply a *protection*

499 Submissions to the consultation paper: SA Power Networks, p 4; EUAA, p 8; EPEC, p 4; Vestas, p 2; AWS, p 6.
500 Submissions to the consultation paper: Transgrid, p 5; Ergon Energy and Energex, pp 4-5; ENA, p 4.
501 Submissions to the consultation paper: Transgrid, pp 12-13; ElectraNet, p 3; AWS, p 6.
502 Rod Hughes Consulting, *Definitions of protection system requirements*, rule change request, pp 8-10.
503 AEMC, Draft determination, 12 March 2026, pp 91-93.
504 NER Chapter 10, Glossary.
505 NER, clause S5.3.3; Chapter 10, Glossary definition of *facilities*.

system that protects against the non-operation of a circuit breaker that is required to operate to clear a fault.[506] The final rule also removes the definition of *breaker fail*, since this definition was not used anywhere in the NER except in the separately defined phrase *breaker fail protection system*.[507]

Some of the stakeholder feedback on the draft rule requested further consideration of the proposed definitions other than *primary protection system* and *breaker fail protection system*. APA supported the proposed new definitions but questioned why the draft rule did not also define some of the other terms raised in the request. APA also suggested linking the requirement for "sufficient redundancy" in primary protection systems to the concept of good electricity industry practice.[508] Ergon Energy and Energex agreed with the need to improve clarity, but were not confident that the draft rule would do so and suggested a more fundamental review, arguing "piecemeal" fixes are not effective. Ergon Energy and Energex also suggested the NER should define 'protection element', 'protection function', and 'control function' as they considered these terms were unclear in the NER.[509] However, after considering feedback on both the consultation paper and draft determination, the Commission maintains our view that defining these additional terms is not necessary and is likely to limit flexibility by being too prescriptive.

6.2.2 The final rule will formally define primary and back-up protection systems

The final rule will define *primary protection system* as:[510]

> A *protection system* that is designed to be the initial response to a fault.

The final rule will define *back-up protection system* as:[511]

> A *protection system* that is designed to operate after the relevant *primary protection system(s)* fail to clear a fault within the *fault clearance time* applicable to those *primary protection system(s)*.

The final rule will make a minor change to the definition of *breaker fail protection system* to remove the words 'a *facility*'. The new definition is:[512]

> A *protection system* that protects against the non-operation of a circuit breaker that is required to open to clear a fault.

The previous definition of *breaker fail protection system* was:

> A *protection system* that protects a *facility* against the non-operation of a circuit breaker that is required to open to clear a fault.

These new definitions will apply wherever the terms are used throughout the NER.

The final rule will delete the disused NER definition of *breaker fail*.[513]

506 Final rule, Chapter 10, Glossary definition of *breaker fail protection system*.
507 NER v256, Chapter 10, Glossary definition of *breaker fail*.
508 APA submission to the draft determination, pp 3-4.
509 Ergon Energy and Energex submission to the draft determination, pp 3-4.
510 Final rule, Chapter 10, Glossary.
511 Final rule, Chapter 10, Glossary.
512 Final rule, Chapter 10, Glossary.
513 NER v256, Chapter 10, Glossary.

Box 21: Changes between the draft rule and final rule

The final rule is very similar to the draft rule, with minor wording changes to improve clarity.

The definition of *primary protection system* is identical to the definition proposed in the draft rule.

We have slightly changed the wording of the *back-up protection system* definition to clarify that back-up protection is not expected to operate within the same clearance time as primary protection, in response to feedback from Transgrid. The definition proposed in the draft rule was:

> A *protection system* that is designed to operate when the relevant *primary protection system(s)* fail to clear a fault in the applicable *fault clearance time*.

The final rule also deletes the definition of *breaker fail* and makes a minor wording change to the definition of *breaker fail protection system*. These changes were not included in the draft rule.

Source: Transgrid submission to the draft determination, p 15.

We have considered stakeholder feedback on the draft rule

Transgrid's submission to the draft determination was generally supportive and suggested alternative, more detailed wording for the new definitions.[514] We have addressed this feedback by updating the definition of *back-up protection system* from the draft rule. We have retained the draft rule definition of *primary protection system* as we consider that the draft rule definition is sufficient to clarify the concept of primary protection and contains the minimum detail necessary to do so.[515]

AEMO supported the intent of the draft rule but noted that the new definition should not preclude it from requiring duplicate primary (or co-primary) protection systems where this could affect power system security.[516] The Commission notes that duplicate primary protection systems can be accommodated under the automatic access standards for Schedule 5.2, Schedule 5.3, and Schedule 5.3a plant.[517] In addition, AEMO and NSPs are empowered to require redundancy up to the level of the automatic access standard whenever required for system security.[518]

6.3 The final rule will not change the access standard for generator protection systems

The Commission's final rule does not implement the changes by Rod Hughes Consulting in the *Conditions for generator protection systems* rule change request, which we consolidated with AEMO's Package 2 rule change request. The rule change request sought to address a possible drafting inconsistency in the automatic access standard for generator protection systems and proposed a change to the minimum access standard.[519] We have not implemented the proposal because we consider the existing arrangements are fit for purpose, and we consider the proposed changes would reduce flexibility with limited system security benefits.

In this section:

- Section 6.3.1 explains the changes proposed in the rule change request.

514 Transgrid submission to the draft determination, pp 14-15.
515 Final rule, Chapter 10, Glossary definition of *primary protection system*.
516 AEMO submission to the draft determination, p 8.
517 NER clause S5.2.5.9(a), S5.3.3(a) and S5.3a.6(a).
518 NER clause 5.3.4A(b)(2).
519 Rod Hughes Consulting, *Conditions for generator protection systems*, rule change request, 10 January 2023, website.

- Section 6.3.2 sets out the Commission's rationale for making no changes to the rules, and our responses to stakeholder feedback.

6.3.1 Rod Hughes Consulting proposed changes to the protection systems access standard

The *Conditions for generator protection systems* rule change request sought to clarify how NSPs and AEMO can apply the access standard in clause S5.2.5.9 of the NER. This access standard sets out the access standards that apply to Schedule 5.2 plant for protection systems that impact on power system security. In the request, Rod Hughes Consulting proposed to:

- remove NER clause S5.2.5.9(b), part of the automatic access standard for protection systems that impact on power system security, which it considered to be redundant due to a drafting inconsistency
- amend the minimum access standard to clarify that AEMO or the NSP may require additional redundancy in protection systems for plant connecting at the minimum access standard, if necessary for system security.[520]

These changes were proposed to address two perceived issues.

First, Rod Hughes Consulting considered there was a drafting inconsistency in clause S5.2.5.9. Paragraph S5.2.5.9(a) sets out the automatic access standard. Paragraph S5.2.5.9(b) stipulates that some parts of paragraph (a) only part of the automatic access standard if AEMO or the NSP consider they are necessary to prevent certain adverse impacts on the power system or other Network Users. In the proponent's view, those requirements are always part of the automatic access standard by default, and so the intent and effect of paragraph (b) are not clear. Rod Hughes Consulting proposed to remove paragraph S5.2.5.9(b) to clarify the automatic access standard.[521]

The second issue raised relates to the minimum access standard, set out in clause S5.2.5.9(c). The minimum access standard includes less onerous requirements for breaker fail protection systems and redundancy in primary protection systems, without explicitly giving AEMO or the NSP discretion as to the level of redundancy needed.[522] Rod Hughes Consulting considered that this minimum access standard could result in risks to grid stability and system security because plant connecting under the minimum access standard may not have sufficient redundancy to ensure its protection systems clear faults as intended. To address this second issue, Rod Hughes Consulting proposed adding a provision for AEMO to require additional redundancy and/or breaker fail protection systems, as part of the minimum access standard, if it considers the absence of these systems may have adverse impacts.[523]

6.3.2 We have decided not to implement this proposal for the final rule

The final rule does not make any changes to the NER stemming from the *Conditions for generator protection systems* rule change request. The Commission considers that the proposed changes would not promote the NEO because they would have limited, if any, system security benefits, while reducing flexibility. We consider that retaining the existing arrangements, including the rule drafting, will continue to support system security and provide flexibility, while promoting regulatory certainty. Further, the proponent's concerns about the minimum access standard can be resolved through the existing negotiated access standard framework.

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520 Rod Hughes Consulting, *Conditions for generator protection systems*, rule change request, pp 1-2.

521 Rod Hughes Consulting, *Conditions for generator protection systems*, rule change request, pp 1-2.
Box 19 on page 95 of our draft determination provides more information about the existing S5.2.5.9 access standard.

522 NER, clause S5.2.5.9(c).

523 Rod Hughes Consulting, *Conditions for generator protection systems*, rule change request, pp 2-3.

We have retained the existing automatic access standard

The final rule retains clause S5.2.5.9(b) of the NER because the Commission considers it is not a drafting inconsistency. Rather, it provides important flexibility that allows NSPs to set appropriate performance standards more easily.

As noted in some submissions to the consultation paper, clause S5.2.5.9(b) enables NSPs to apply the automatic access standard flexibly where appropriate, without entering a formal negotiation process.[524] NSPs can set protection requirements commensurate with the risk depending on the characteristics of each connection. Removing S5.2.5.9(b) could lead to unreasonable costs of compliance with the automatic access standard and could prolong connection negotiations unnecessarily.

We have retained the existing minimum access standard

The Commission has also determined not to make the change to the minimum access standard proposed by Rod Hughes Consulting. We consider the concern that was raised can be resolved through the existing negotiated access standard framework. This is because, in general, a performance standard below the automatic access standard, down to and including the minimum access standard, is only permitted if it does not adversely affect power system security, or quality of supply to other network users.[525]Therefore, it is not necessary to explicitly specify that AEMO or NSP can require additional redundancy if a connection applicant proposes to connect at the minimum access standard. The existing negotiated access standard framework empowers NSPs and AEMO to require redundancy up to the level of the automatic access standard for any and all connections as necessary for system security.

The final rule takes stakeholder feedback into account

We have considered stakeholder feedback on both the consultation paper and draft rule in our decision not to implement the *Conditions for generator protection systems proposal*. Submissions to the consultation paper expressed mixed views on the rule change proposal, and this feedback is discussed further in section 5.3.2 of our draft determination.[526] We received limited feedback on this part of the draft determination, with Akaysha and AEMO supporting the Commission's decision to make no changes to the rules.[527]

Transgrid suggested an alternative approach to address the issue raised by Rod Hughes Consulting regarding the minimum access standard. Transgrid proposed changing the clause S5.2.5.9 minimum access standard to require back-up protection sufficient to ensure that all faults are cleared under a single-contingency condition, to better reflect industry practice. While negotiated access standards must include redundancy as needed for system security, Transgrid considered that there is "ambiguity regarding whether additional back-up protection is necessary when system security is not at risk." It also considered that the rules should provide guidance on "when protections should be duplicated; or alternatively, when back-up protection can be provided in place of duplicate protection."[528]

The Commission has not implemented Transgrid's suggestion for the reasons outlined below. We acknowledge that where there is a lack of adequate back-up protection, faults would be slow to

524 Submissions to the consultation paper: Transgrid, pp 5, 14-15; Akaysha, p 2.

525 NER clause 5.3.4A(b)(2)-(3).

526 Submissions to the consultation paper: Ergon Energy and Energex, p 5; SA Power Networks, pp 4-5; Vestas, pp 2-3; EPEC, pp 4-5; Transgrid, pp 5, 14-15; ElectraNet, p 3; Akaysha, pp 2-3; AEMO, pp 11-12; AWS, p 6; CPU, p 3.

527 Submissions to the draft determination: Akaysha, p 1; AEMO, p 8.

528 Transgrid submission to the draft determination, p 15.

clear after a failure of primary protection. This could lead to fire risk and risk of equipment damage, which, while obviously undesirable, may not strictly be a system security issue. However, we consider that these electrical safety considerations are adequately covered by existing obligations for good electricity industry practice and to protect equipment from damage, as follows:

- Registered Participants have an obligation to ensure their plant and equipment is provided, maintained and operated in accordance with "*good electricity industry practice*, all relevant *Australian Standards* and, to the extent specified in the *Rules*, relevant international instruments."[529] The NER definition of *good electricity industry practice* takes into account "safety and environmental protection".[530]
- When submitting a proposal for a negotiated access standard, a connection applicant must have regard to the need to protect the plant from damage.[531] The connection applicant must also provide reasons and evidence to the network service provider and AEMO as to why the proposed negotiated access standard is appropriate including how the connection applicant has taken into account the need to protect the plant from damage.[532]

Further, the Commission considers there is an appropriate role for engineering judgement in determining protection design for connection plant. Prescriptive requirements for when duplicate or back-up protection should be provided may not take into account the wide range of plant design characteristics that exist in practice, and may therefore be overly onerous.

Transgrid's submission also noted that where a generating system has non-duplicated primary protection only, upstream network protection may act as back-up protection for the generating system. This may mean additional load or generation is disconnected when upstream protection operates, and Transgrid considered the NER should provide guidance on the acceptable level of loss in this scenario.[533]We consider this risk is also covered under the existing arrangements, because a large loss of generation or load would affect at least one of the following:

- system security, which negotiated access standards must not adversely impact, noting that a large loss of generation or load would be a contingency event[534]
- quality of supply to other network users, which negotiated access standards must not adversely impact[535]
- power transfer capability between generation and load or between regions, which can be considered in the clause S5.2.5.9 access standard, as well as the Schedule 5.2 access standard for impact on network capability.[536]

529 NER clause 5.2.1(a)(3).
530 NER Chapter 10, Glossary definition of *good electricity industry practice*.
531 NER clause 5.3.4A(b1)(1).
532 NER clause 5.3.4A(b2)(1).
533 Transgrid submission to the draft determination, p 15.
534 NER clause 5.3.4A(b)(2).
535 NER clause 5.3.4A(b)(3).
536 NER clauses S5.2.5.9(b), S5.2.5.12.

7 The final rule makes improvements to the system strength framework for inverter based loads and HVDC links

Box 22: Key points in this chapter

The Commission has made a final rule to improve the system strength-related access standards that apply to large inverter based loads (IBLs) and high voltage direct current networks (HVDC links) in Schedules 5.3 and 5.3a of the National Electricity Rules (NER), respectively.

The final rule recognises the increasing connection of inverter-based technologies used by loads and HVDC link operators and the distinct ways in which their power electronics interact dynamically with the power system. It ensures that the system strength framework evolves to account for these technologies, including their potential impacts on system strength and how those impacts can be mitigated.

By ensuring connection requirements appropriately account for these impacts, the final rule supports the secure, reliable and efficient integration of inverter-based technologies used by loads and HVDC link operators into the power system. This promotes the National Electricity Objective (NEO) by supporting efficient investment and connection decisions and better outcomes for consumers over the long term.

In developing the final rule, the Commission considered stakeholder feedback on the draft rule and has retained the draft rule's approach to these reforms. Accordingly, clauses S5.3.11 and S5.3a.7 are unchanged between the draft and final rules, except for the insertion of the word 'large' in clause S5.3.11 to correct its unintended omission from the draft rule.

In this chapter:

- Section 7.1 details how the final rule limits the application of the short circuit ratio (SCR) withstand requirement under clause S5.3.11 of the NER to large IBLs with a nameplate rating of 30 MW or more.
- Section 7.1.2 explains the flexibility introduced by the final rule to lower the minimum access standard for the 'withstand short circuit ratio' requirement on a case-by-case basis, having regard to expected three-phase fault levels at the connection point.
- Section 7.2 explains the final rule's approach to allowing HVDC link owners and operators to procure system strength services from third parties to meet their system strength requirements.

7.1 The final rule improves how the system strength framework applies to IBLs

System strength describes the power system's ability to maintain stable voltage waveforms during normal operation and after disturbances. Assessing system strength capability helps determine how connected plant will interact with the power system and whether it can maintain stable operation following a disturbance, such as a fault.

As the power system evolves with increasing levels of inverter based resources (IBR), including IBLs such as data centres, the interaction between power electronic controls and the power system becomes increasingly important. Unlike synchronous machines, grid-following inverters

do not inherently establish the system voltage waveform and can be more sensitive to weak network conditions, particularly following a disturbance.

Clause 5.3.4B of the NER establishes a system strength mitigation requirement (SSMR) for IBR connections, which sets out an assessment process and allocates responsibility for addressing system strength impacts from specified connections. It gives certain applicants the choice to remediate their general system strength impacts, including by paying a system strength charge, self-remediating or paying the NSP to undertake applicable connection works, and also provides mechanisms to resolve disputes.

Clause S5.3.11 of the NER feeds into the SSMR, and currently requires schedule 5.3 plant that includes any iIBR to demonstrate that they can operate stably and remain connected under weak network conditions. This is assessed using a SCR withstand value, which divides the three phase fault level at the connection point by the plant's power transfer capability. IBLs tend to use various types of power electronics with bespoke control and protection settings that determine how they interact with the grid, which can affect their sensitivity to weak network conditions and their ability to maintain stable operation.

Accordingly, the Commission has made a final rule to improve the system strength access standard under clause S5.3.11 of the NER by ensuring that it is applied proportionately and appropriately reflects the characteristics and capabilities of different IBL technologies and the strength of the network at the connection point. The final rule will:

- **Limit the application of the withstand SCR requirement to large IBLs:** The final rule limits the application of the requirement to IBLs with a nameplate rating of 30 MW or more.[537] It provides a clear and transparent basis for applying the requirement, recognising that larger IBLs may pose greater system strength risks if they cannot operate stably and remain connected under relatively weak network conditions.
- **Allow flexibility in setting the minimum access standard:** The final rule allows the minimum access standard for the SCR withstand requirement to be lowered on a case-by-case basis, rather than requiring it to remain at 3.0 in all circumstances. This allows NSPs and AEMO to agree on an appropriate minimum, having regard to the expected three-phase fault levels at the connection point. This flexibility enables connection requirements to better reflect the demonstrated performance capabilities of different IBL technologies and local network conditions, reducing unnecessary compliance burdens where the network is stronger.

The final rule is consistent with the draft rule, owing to supportive stakeholder feedback (outlined below) and technical analysis. By clarifying and making the system strength access standards more flexible, the final rule supports the secure and reliable integration of large IBLs into the power system, promotes efficient connection decisions and contributes to better outcomes for consumers over the long term.

7.1.1 The final rule limits the application of the 'withstand short circuit ratio' access standard to large IBLs

Currently, all Schedule 5.3 plant that includes an IBR must demonstrate the capability to operate stably and remain connected when the SCR at its connection point is 3.0, regardless of the plant's size.[538]

537 Note: S5.3.11 may apply to small IBLs where they form part of a cluster or are expected to have an aggregate impact. See section 7.1.1 below for more details.

538 NER clause S5.3.11.

The Commission acknowledges that AEMO's System Strength Impact Assessment Guideline (SSIAG) limits the application of clause S5.3.11 to large IBL.[539] This is because under clause 4.6.6(a)(6) of the NER, AEMO is currently required to publish the SSIAG and prescribe the criteria for classifying inverter based resources (including IBL) as large.[540]

Despite this, the current drafting in clause S5.3.11 is causing confusion among connecting parties and may lead to the application of the system strength mitigation requirement in that clause to all IBLs, regardless of size.

To provide greater clarity and consistency, the Commission's final rule expressly limits the application of clause S5.3.11 to large IBLs.[541]

This targeted approach is important because demonstrating compliance with the withstand SCR standard can impose significant and disproportionate obligations on applicants seeking to connect a small IBL. For instance, compliance may require the applicant to:

- demonstrate plant performance against the prescribed withstand SCR test cases, where the simulated network conditions are purely theoretical and cannot be physically replicated at the connection point (i.e. circumstances where an SCR of 3.0 or lower would lead to voltage collapse in the local network)
- modify control systems, protection settings or other equipment where the plant cannot demonstrate the required capability, where it may be unreasonable to expect small IBL to bring significant reactive power capability.

As identified in AEMO's rule change request, this would impose significant modelling, testing and compliance costs relative to the incremental system strength benefits achieved.[542]

By expressly limiting the requirement's application to large IBLs, the final rule provides greater certainty for connection applicants and helps ensure that modelling, testing and compliance obligations are proportionate to the potential system strength impacts of connecting plant. This supports a more efficient application of the access standards framework while retaining the requirement for IBLs where system strength impacts are more likely to be material.

Stakeholders broadly supported the approach but sought clarification on hybrid and clustered load connections

Stakeholders broadly supported limiting the automatic application of the SCR withstand access standard to large IBLs as set out in the draft rule, rather than applying it to all plant incorporating an inverter-based resource regardless of size. Ergon Energy and Energex, Transgrid, Tesla and Ausgrid supported increasing the threshold, with Ergon Energy and Energex expressly supporting a 30 MW threshold on the basis that connections of this scale have greater potential to affect system strength.[543]

However, stakeholders also highlighted the need to address the cumulative impacts on system strength of smaller IBLs, including clustered connections, and sought greater clarity on how

539 AEMO, SSIAG, section 2.2(d).

540 This is for the purposes of the definition of IBL in Chapter 10 of the NER. As explained in chapter 3 of this final determination, AEMO will no longer be required to define large IBL in the SSIAG, as the term will be defined in the NER per the final rule for this rule change.

541 Final rule, clause S5.3.11(a).

542 AEMO rule change request overview, 4 April 2024, p 73.

543 Submissions to the draft determination: Ergon Energy and Energex, p 4; Transgrid, p 16; Ausgrid, p 1; Tesla, p 4.

system strength remediation costs and responsibilities would be managed when multiple loads connect within the same region.[544] For instance, Transgrid submitted:[545]

> *We believe that regardless of the threshold that is selected, it will inevitably incentivise sizing of projects to have a rating that is just under the threshold. This may lead to clustering of smaller IBL projects, that in aggregate may have an adverse impact on system strength.*

The Commission's final rule addresses this concern by requiring NSPs to consider the potential aggregate impact of electrically proximate IBL connections, where reasonable.[546] As described in chapter 3 of this determination, the final rule appropriately recognises the potential for collective impacts in a particular geographic area and provides scope for engineering judgement where the characteristics of the connections indicate that the Schedule 5.3 access standards should apply to the cluster as if it were a large IBL.

Accordingly, the access standard in clause S5.3.11 may be applied to small IBLs where they have an aggregate effect. This provides a mechanism to address stakeholder concerns that multiple smaller connections could collectively adversely affect system strength, without automatically imposing the requirement on every small IBL. It also supports a threshold-based framework that limits the automatic application of the standard while preserving the ability to address material system strength risks arising from smaller or aggregated connections.

With respect to system strength remediation costs and responsibilities, the Commission is considering these issues through the *Security framework enhancements* rule change.[547] This process, together with AEMO's pending review of the SSIAG, provides an opportunity to consider these issues further.

7.1.2 The final rule allows flexibility in setting the withstand SCR minimum access standard

The minimum access standard in clause S5.3.11(b) currently provides that:

> *Electrical plant must have plant capability sufficient to operate stably and remain connected at a short circuit ratio of 3.0, assessed in accordance with the methodology prescribed in the system strength impact assessment guidelines.*

Different IBL technologies and control configurations can have materially different capabilities under weak network conditions. Two facilities with the same MW demand can therefore have quite different electrical characteristics. As described in AEMO's rule change request,[548] a fixed minimum short-circuit ratio of 3.0 does not recognise that different IBL technologies, control architectures and protection arrangements can have different demonstrated capabilities under weak network conditions and may therefore impose a uniform requirement that is not proportionate to the characteristics of the individual plant.

In light of this, the final rule amends clause S5.3.11(b) as follows:

> *The minimum access standard is electrical plant must have plant capability sufficient to operate stably and remain connected at a short circuit ratio of 3.0, or a reasonable higher value agreed with the Network Service Provider and AEMO having regard to expected three*

544 Submissions to the draft determination: Transgrid, p 16; Sungrow, p 5; AusNet, p 13, DCA, pp 5-6.
545 Transgrid submission to the draft determination, p 16.
546 Final rule, clause S5.3.1a(b)(2).
547 AEMC, *Security framework enhancements*, rule change, initiated 12 March 2026.
548 AEMO rule change request overview, 4 April 2024, p 73.

phase fault levels at the connection point, assessed in accordance with the methodology prescribed in the system strength impact assessment guidelines.

The final rule, consistent with the draft rule determination, provides flexibility in applying the minimum access standard, recognising that different load technologies have differing technical capabilities and that system strength conditions vary across the network. In stronger parts of the network, where the minimum credible SCR may be higher than 3.0 (e.g. 5.0), requiring plant to withstand an SCR of 3.0 may impose unnecessary compliance costs. Conversely, some technologies, such as hydrogen production facilities using thyristor-based converters, may be unable to operate at an SCR of 3.0.[549]

As such, the final rule promotes the NEO by providing flexibility to accommodate differences in plant capability and local network conditions, rather than imposing a uniform minimum access standard that may be unnecessarily onerous or technically impracticable for some loads. This flexibility supports efficient connection outcomes and avoids unnecessary compliance costs, while enabling the requirements on connecting plant to be consistent with their technology type and commensurate with the needs of the power system at the connection point. In doing so, the final rule supports efficient investment and use of electricity services while maintaining power system security.

Stakeholders raised concerns about how the withstand capability should be assessed and how compliance with the requirement should be demonstrated

Consistent with AEMO's rule change request, stakeholders raised concerns about some IBLs' ability to meet the minimum access standard of SCR of 3.0 and are supportive of providing flexibility in the minimum access standard to accommodate differences in load technology and local network conditions.[550]

However, many stakeholders also raised concerns about how the SCR withstand capability should be assessed and how compliance with the requirement should be demonstrated.

Notably, AEMO's submission highlighted that the methodology for assessing a plant's withstand capability was developed primarily for inverter-based generation and evaluates plant stability in a simplified single machine infinite bus (SMIB) environment.[551] Though large IBLs rely on reactive support from the network to operate under low-system-strength conditions, this methodology cannot fully represent them.

Consequently, applying the existing standard to large IBLs may yield requirements or signals that do not accurately reflect their actual impacts on system strength, reducing the effectiveness of the system strength framework. AEMO therefore considered that clause S5.3.11 should be updated to address this issue, with further consideration of the broader application of the system strength framework to loads and consequential updates to the SSIAG.

Moreover:

- Celero and GPE considered that the SCR withstand access standard may impose modelling and system strength assessment requirements on large IBLs that are not within their control. It was of the view that system strength should be addressed through a system- or planning-

549 See AEMC, *Improving the NEM access standards - Package 2, Draft determination*, March 2026, section 6.1.1, for a detailed description of what different SCR values represent.

550 Submissions to the draft determination: Ergon Energy and Energex, p 4; Transgrid, p 16; AusNet, p 13; Tesla, p 4; and ElectraNet, p 8. See also AEMO's rule change request overview, p 73.

551 Clause 4.6.6(b)(1A) provides that, for the purposes of a preliminary assessment on the plant's system strength impact, this can be carried out using a SMIB.

standard, rather than a facility-level performance standard, given that loads pay network charges to maintain the system. Celero and GPE further suggested that the risks posed by large IBLs could be mitigated through appropriate connection locations, with less onerous modelling and assessment requirements for loads connecting in stronger parts of the network. Accordingly, it recommended that the final rule consider an SCR threshold below which loads would not be considered to pose system risks requiring SCR withstand assessment.[552]

- Ergon Energy and Energex sought further AEMO guidance on demonstrating SCR withstand capability for loads without voltage control capability.[553]
- Transgrid cautioned that simply relaxing the requirement without addressing the additional system strength needs of these facilities could transfer risks to the wider power system, potentially resulting in insufficient system strength procurement and delays to connections.[554]
- ElectraNet considered an SCR of 3.0 an appropriate starting point but sought clarification on how the requirement should operate where minimum credible system strength conditions may already fall below SCR 3.0, particularly in regions with high levels of inverter-based resources.[555]
- DCA and AWS recommended that the Commission expressly identify in-front-of-the-meter remediation as an option for meeting the SCR-withstand access standard, and requested clear and timely guidance for data centre developers. DCA proposed that system strength remediation could be procured or provided by the network and funded through network use-of-system charges. They considered that this approach would better reflect the shared benefits of system strength, enable a single, optimally sized and located remediation asset to serve multiple loads, and reduce overall system costs.[556]
- AusNet submitted that IBL plant is traditionally grid following, and encouraged the AEMC to consider who will bear the costs of remediating these IBL and if this is appropriate.[557]

The concerns expressed by stakeholders will be consulted on through the Commission's *Security framework enhancements* rule change

The Commission acknowledges the important issues raised by stakeholders, and agrees that their resolution requires detailed analysis and consultation.

The Commission is currently considering the broader system strength framework through the *Security framework enhancements* rule change.[558] The rule change is considering enhancements to the current security frameworks to promote timely and efficient delivery of system security, including exploring issues related to the system strength mitigation requirement such as:

- planning and coordination of system strength impacts arising from connecting plant
- the system strength charge
- potential flexibility for the implementation of remediation schemes and connection works
- procurement arrangements and the role of system-level remediation schemes.

The Commission has hosted a stakeholder workshop and other engagement activities to explore how and to what extent improvements for the above listed matters may be achieved. This is an

552 Celero and GPE submission to the draft determination, pp 8-9.
553 Ergon Energy and Energex submission to the draft determination, p 4.
554 Transgrid submission to the draft determination, p 16.
555 ElectraNet submission to the draft determination, p 8.
556 Submissions to the draft determination: DCA, pp 5-6; AWS, pp 2, 4.
557 AusNet submission to the draft determination, p 13.
558 Visit our website to see more information on this rule change.

ongoing process, and the next step will be a directions paper, which we intend to publish on 10 December 2026, to allow for further engagement on the broad range of issues raised.

The *Security framework enhancements* rule change provides an opportunity to examine and consult on the issues raised by stakeholders concerning the interaction between the system strength framework and the SCR withstand access standard under clause S5.3.11, as well as its interaction with the system strength charge. The *Security framework enhancements* rule change is considering these and other system strength issues collectively, recognising that the framework is interconnected and that a holistic approach will support more coherent and effective outcomes.

It also provides an opportunity to consider whether IBLs should be permitted to procure system strength services from third parties, as is currently permitted for Schedule 5.2 Participants and, under the final rule for this rule change, Schedule 5.3a Participants.[559]

Throughout the Commission's consultation on the *Security framework enhancements* rule change process, it will consider how and when AEMO should update its SSIAG in consultation with industry.

The approach outlined above promotes the NEO by addressing the broader system strength framework and the technical assessment of IBLs in a coordinated manner. Considering the interaction between SCR withstand requirements, system strength procurement and the system strength charge can support the efficient allocation of system strength costs and reduce the risk of imposing unnecessary compliance costs on connecting loads. Reviewing AEMO's SSIAG following the *Security framework enhancements* rule change, with industry consultation, would also allow the technical methodology to be informed by the broader framework outcomes and practical industry experience. This approach supports efficient investment and connection decisions while maintaining power system security and reliability.

7.2 The final rule enables HVDC link operators to procure system strength from third parties

Like IBLs, asynchronous generators and integrated resource systems, HVDC links are required to demonstrate that they can operate stably and remain connected under relatively weak network conditions, per clause S5.3a.7 of the NER. However, unlike asynchronous generators and integrated resource systems, HVDC links do not have the express ability to meet this requirement by procuring services from a system strength service provider or third party.

Accordingly, the Commission's final rule allows HVDC links to procure system strength services from third parties to meet their requirements. Including a corresponding right for HVDC link owners and operators may enable more efficient solutions and reduce both the cost and time to connect. The final rule is consistent with the draft rule, which received supportive stakeholder feedback.

7.2.1 The final rule addresses barriers to third-party procurement of system strength by HVDC links

Schedule 5.3a Participants, such as HVDC link operators, are required to meet the minimum access standard requirement in clause S5.3a.7 that stipulates:[560]

> *[E]lectrical plant must have plant capability sufficient to operate stably and remain connected at a short circuit ratio of 3.0, assessed in accordance with the methodology prescribed in the*

559 See section 7.2 below.
560 NER clause S5.3a.7.

system strength impact assessment guidelines.

HVDC link operators do not have the explicit ability to procure system strength services from third parties to meet this requirement if they are unable to do so. Conversely, generators and integrated resource providers (IRPs) (collectively, Schedule 5.2 Participants), whose plant is also required to operate stably and remain connected at a short circuit ratio of 3.0, can procure services required to meet this standard from an NSP, system strength provider, or another registered participant.[561]

This means that HVDC link operators must always self-remediate under the current framework, or pay an NSP for system strength connection works.[562] As identified in AEMO's rule change request, this may create inefficiencies. System strength is a shared network service that is often most efficiently provided through coordinated, network-level solutions.[563] Requiring HVDC links to internalise the solution may lead to asset duplication, higher capital costs, and longer connection timeframes, even where system strength could be procured more efficiently from existing providers. Moreover, paying an NSP for system strength connection works may not lead to the most cost-effective outcome.

Accordingly, the Commission's final rule allows HVDC links to procure system strength services from third parties to meet their requirements.[564] It provides that HVDC links can:

- reach an agreement with the NSP for the Schedule 5.3a Participant to undertake investment in its plant to achieve plant capability sufficient to operate stably and remain connected at a short circuit ratio of 3.0; or
- procure from the NSP, the System Strength Service Provider (SSSP) or another Registered Participant, services to enable the plant to operate stably and remain connected at a short circuit ratio of 3.0, calculated using a three-phase fault level at the connection point that excludes any contribution from the facilities providing the service.

Including a corresponding right for HVDC link owners and operators promotes the NEO as it will enable more efficient solutions and reduce both the cost and time to connect. Specifically:

- Allowing HVDC link operators to procure system strength services enables more efficient solutions that make use of existing system strength resources, rather than requiring duplication of assets.
- This may reduce overall system costs and facilitate the timely connection of HVDC infrastructure, including generator and load connections supported by HVDC technology.

7.2.2 Stakeholders support the option for third-party procurement of system strength by HVDC links

Hydro Tasmania, Transgrid and APA supported allowing HVDC market network service providers to meet their SCR minimum access standard obligations through third party procurement of system strength.[565] They considered that this could improve economic efficiency by making better use of existing system strength assets, avoiding unnecessary capital investment and facilitating coordinated network development, particularly where existing providers and planned HVDC developments are co-located.

The Commission also encourages AEMO to consider the feedback provided below when updating its SSIAG:

561 NER clause S5.2.5.15(e)(1)-(2).
562 AEMO, SSIAG, section 5.2.
563 AEMO rule change request, 4 April 2024, p 68.
564 Final rule clause S5.3a.7(e)-(f).
565 Submissions to the draft determination: Transgrid, p 17; Hydro Tasmania, pp 1-2; APA, pp 2, 4; EPEC, p 3.

- Transgrid cautioned that third party procurement should not be the default approach and should be considered where other options, such as additional investment by the Schedule 5.3a Participant or an arrangement with the network service provider or system strength service provider, are not viable.[566]
- Hydro Tasmania highlighted the importance of incentives for HVDC operators to consider third party contracting and other non-network solutions.[567]
- APA emphasised the need for a clear cost recovery mechanism for regulated HVDC operators purchasing system strength from third parties. [568]
- As noted in the draft determination, EPEC advised that a more mature assessment methodology should be considered in the SSIAG for HVDC links, especially with respect to the system strength charge.[569]

The Commission may also consider this feedback as part of the *Security framework enhancements* rule change process.

566 Transgrid submission to the draft determination, p 17.
567 Hydro Tasmania submission to the draft determination, pp 1-2.
568 APA submission to the draft determination, pp 2, 4.
569 EPEC submission to the consultation paper, p 3.

8 The final rule makes further changes for Schedule 5 participants and future AEMO reviews of the access standards

Box 23: Key points in this chapter

The Commission has made a final rule to improve flexibility and transparency in Chapter 5 of the National Electricity Rules (NER), strengthening regulatory clarity and supporting power system security and stability as the National Electricity Market (NEM) evolves. The final rule modernises key elements of the Chapter 5 framework to better align with the technical characteristics of contemporary plant and the increasing complexity of the power system. In doing so, it promotes regulatory consistency, enhances system resilience and supports efficient investment and operation.

Collectively, these reforms achieve the National Electricity Objective (NEO) by strengthening the security and reliability of the power system while maintaining proportionate and transparent regulatory settings. This promotes efficient operation of electricity services for the long-term interests of consumers with respect to the safety, security and reliability.

In this chapter:

- Section 8.1 explains that the final rule allows under frequency load shedding to be delivered through fast ramp down capability in addition to disconnection in blocks. This enables more precise and proportionate demand-side frequency response, reducing the risk of over-shedding and supporting system stability during disturbance events. No changes have been to the draft rule for the final rule.
- Section 8.2 outlines how the final rule ensures that Schedule 5 plant may be assessed or tested, regardless of registration status. By aligning compliance and testing powers with actual system impact rather than participant category, the draft rule closes regulatory gaps and strengthens assurance that material plant performs in accordance with agreed standards. No changes have been to the draft rule for the final rule.
- Section 8.3 outlines that the final rule permits AEMO to extend the timeframe for future access standards reviews for a period of up to six months, where there are matters of material complexity or material changes in circumstances. The Commission notes that this differs from the draft rule, which proposed a period of three months. A slightly longer timeframe supports more robust technical analysis and stakeholder engagement, improving the durability and integrity of access standards settings.

8.1 The final rule enables load shedding by way of fast ramp down

The Commission has made a final rule allowing Schedule 5.3 Participants to meet their automatic interruptible load obligations by fast reduction of active power consumption, where their plant has the technical capability.[570]

The load shedding framework under the NER is designed to help manage situations where the power system is under stress by enabling electricity demand to be reduced when necessary to maintain power system security and reliability. In the NEM, load shedding is important because

570 Final rule, clause S5.3.10. See also Box 6for details on what is a Schedule 5 Participant.

electricity supply and demand must be balanced continuously. When a major generator trips, a transmission line fails, or the system experiences a significant frequency or voltage disturbance, reducing demand can help prevent the disturbance from escalating and affecting a much larger part of the power system.[571]

Under clause S5.3.10 of the NER, automatic interruptible load obligations apply to Schedule 5.3 Participants, and are generally met through the disconnection of discrete blocks of load at specified frequency thresholds. This approach provides an established mechanism for rapidly reducing demand in response to a disturbance. However, it relies on disconnecting load rather than allowing consumption to be reduced progressively.

As the generation mix and demand profile of the NEM evolve, large inverter based loads (IBLs) may have technical capabilities that allow them to reduce consumption rapidly without disconnecting entirely. Relying solely on block disconnection may not fully accommodate these capabilities or allow their benefits to be realised.[572]

Consistent with the draft rule, the final rule amends clause S5.3.10 to allow technically capable loads to meet the relevant access standard through fast, proportional reductions in consumption, rather than relying solely on disconnection.[573] This provides greater flexibility in how loads respond to disturbances while maintaining the objective of reducing demand when required to support power system security and reliability.

Stakeholder feedback as well as our analysis informed the development of this approach, and responses to the draft determination were generally supportive. Stakeholders recognised that allowing fast, proportional demand reduction could reduce the risk of frequency overshoot, minimise unnecessary load shedding and limit secondary impacts on voltage and system stability.[574]

This section:

- explains how the final rule amends clause S5.3.10 of the NER to accommodate different technologies and enable fast ramp-down capability to satisfy automatic interruptible load obligations
- details how the final rule is shaped by stakeholder feedback and contributes to the achievement of the NEO.

8.1.1 The final rule introduces a new automatic and minimum standard for load shedding to promote flexibility

The Commission's final rule amends clause S5.3.10 to include an automatic and minimum access standard as follows:[575]

> Automatic access standard
>
> (b) The *automatic access standard* is a *schedule 5 plant* must provide automatic *interruptible load* in accordance with clause 4.3.5 of the *Rules* which must be capable of:
>
> (1) being *disconnected*; and
>
> (2) fast reduction of *active power* consumption.

571 See NER clauses 4.3.2, 4.3.5, S5.3.10, and S5.1.10.1.
572 AEMO rule change request overview, 4 April 2024, p 71.
573 Final rule, clause S5.3.10.
574 See AEMC, *Improving the NEM access standards - Package 2*, draft determination, 12 March 2026, chapter 7.
575 Final rule, clause S5.3.10(b)-(c).

Minimum access standard

(c) The *minimum access standard* is a *schedule 5.3 plant* must provide automatic *interruptible load* in accordance with clause 4.3.5 of the *Rules*, which must be capable of being *disconnected*.

The final rule also introduces a general requirement for the connection agreement to record the nature of the load shedding capability, including any quantities of active power available for fast reduction and the corresponding rates of reduction.[576]

The issue being addressed by the final rule

Under clause S5.3.10, Schedule 5.3 Participants who have an expected peak demand above 10 MW must provide automatic interruptible load in accordance with clause 4.3.5 of the NER. Interruptible load is "a load which is able to be disconnected, either manually or automatically initiated, which is provided for the restoration or control of the power system frequency by AEMO to cater for contingency events or shortages of supply".[577] The level of automatic interruptible load must be at least 60 per cent of the participant's expected demand, or such other minimum level as the Reliability Panel may determine from time to time. This interruptible load must be progressively and automatically disconnected following a power system underfrequency condition described in the power system security standards.[578]

Prior to this final rule, 'disconnection' meant that a load's facility would be divided into predefined blocks that could be disconnected automatically. If system frequency fell to a specified threshold, a relay or control scheme would trigger the disconnection of the designated block or blocks.

Now that IBLs are a common plant type in the NEM, relying solely on discrete block disconnection may present limitations:

- Due to the configuration of most load blocks, it is possible that more load will be shed than was specified by AEMO, possibly leading to further frequency instability, and could even trigger the need for over-frequency generation shedding.[579]
- Full block disconnection may unnecessarily interrupt industrial or IBL processes where a temporary and rapid reduction in demand could achieve the required security outcome with less disruption. As noted in AEMO's rule change request, some loads may be more flexible with the ability to ramp down their load in an emergency rather than disconnection.[580]

Accordingly, the Commission considers that the prior interruptible load framework could not fully accommodate the capabilities of modern large loads to provide fast, proportional demand reduction. The prior framework could limit the precision and efficiency of the overall frequency control regime as the power system continues to transition.

The Commission's final rule introduces flexibility into how the standard could be met

To address the issues outlined above, the Commission's final rule introduces an automatic and minimum access standard, which is consistent with the draft rule determination.[581]

576 Final rule, clause S5.3.10(d).

577 NER Chapter 10 glossary definition of '*interruptible load*'.

578 NER clause 4.3.5. The Commission notes that load shedding may be applied or determined in accordance with AEMO's and participating jurisdictions' procedures, per NER clause S5.3.10.

579 The Commission notes that TNSPs must use best endeavours to minimise any load shed in excess of the amount directed, per section 3.1 of AEMO's 2019 Manual Load Shedding Standard.

580 AEMO rule change request overview, 4 April 2024, p 71.

581 Final rule, clause S5.3.10.

The minimum access standard maintains the existing requirement for Schedule 5.3 plant to provide automatic interruptible load through disconnection in blocks. This preserves a clear and robust baseline security mechanism, consistent with clause 4.3.5 of the NER and the established load shedding framework.

The automatic access standard builds on this baseline by requiring capable plant to provide both:

- disconnection in blocks; and
- fast reduction of active power consumption (fast ramp-down capability).

The automatic access standard is designed to incentivise the provision of fast ramp-down capability where it is technically feasible and efficient to do so. However, consistent with the access standards negotiation framework, it is not mandatory. A Schedule 5.3 plant that is only technically capable of disconnection in blocks may meet the relevant access standard on that basis.

The final rule design is informed by stakeholder feedback

In response to the Commission's consultation paper, stakeholders generally expressed support for AEMO's rule change proposal to allow load shedding by way of fast ramp-down.[582]

Notably, Transgrid encouraged the Commission to incentivise fast reduction capability through the automatic access standard.[583] The Commission reflected this feedback in the draft rule by enabling technically capable loads to meet their automatic interruptible load obligations through fast, proportional reductions in consumption, rather than relying solely on block disconnection.

Consistent with stakeholder feedback on the importance of flexibility, the draft rule did not mandate fast ramp-down capability. Instead, it accommodated different technical capabilities by retaining block disconnection for meeting the minimum access standard. The draft rule also required the relevant fast reduction capability, including the quantity of active power that can be reduced and the corresponding rate of reduction, to be documented in the connection agreement.[584]

This approach promotes the use of fast ramp-down where technically feasible while maintaining flexibility for connecting parties and supporting power system security and reliability. The Commission received broad stakeholder support for the draft rule, which is highlighted below.

8.1.2 Stakeholders supported the draft rule, which will promote power system security and reliability

Stakeholders were broadly supportive of the Commission's draft rule, and recognised that fast, proportional demand response would strengthen power system resilience, reduce unnecessary outages and reliance on costly frequency control services, and lower costs for consumers.[585] For instance, Antora submitted that "fast ramp-down is a system asset, and that their load can be reduced to zero in a controlled and recoverable manner in response to an external operator signal. This is a designed and verifiable capability that provides exactly the fast flexible demand response the Commission's fast ramp-down [under frequency load shedding] provision seeks to enable and should be explicitly recognised as such in the framework".[586]

582 Submissions to the consultation paper: Ergon Energy and Energex, p 9; Transgrid, p 4; Hydro Tasmania, pp 4-5; EPEC, p 7.
583 Transgrid submission to the consultation paper, p 20.
584 Draft rule, clause S5.3.10.
585 Submissions to the draft determination: Tesla, p 5; Ergon Energy and Energex, p 5; Hydro Tasmania, p 1; ElectraNet, pp 7-8; Transgrid, p 3.
586 Antora submission to the draft determination, pp 2-3.

Several stakeholders also called for more guidance on how load shedding can be achieved as the overall framework has become more complex.[587] For example, Sungrow submitted that "additional guidance may be beneficial regarding how large IBLs interact with under-frequency load shedding, special protection schemes, remedial action schemes, and broader emergency control systems. Very large loads may materially alter regional load composition and contingency response behaviour. Sungrow suggested that clarification regarding whether these facilities may participate in, be exempt from, or require coordination with existing system protection frameworks would improve understanding of operational impacts".[588]

In light of this feedback, the Commission notes that AEMO is required to publish modelling guidelines for Schedule 5.3 Participations under the final rule, which should contemplate all Schedule 5.3 access standards, including clause S5.3.10.[589]Through this process, AEMO can consult with industry on the type of guidance necessary and include this in the guidelines. This is preferable to prescribing such guidance in the NER as it may lead to an inflexible application of the fast ramp-down capability.

The Commission recognises that Transgrid recommended extending the fast ramp-down and load shedding framework to address under-voltage conditions.[590] The Commission acknowledges that fast reduction of active power consumption may provide an additional mechanism for responding to certain power system disturbances. However, under-voltage conditions involve different system dynamics from under-frequency events, and the effectiveness of load reduction will depend on the characteristics and location of the disturbance.

The Commission has not made changes to the draft rule to address under-voltage conditions in the final rule.[591] The final rule focuses on enabling technically capable Schedule 5.3 plant to satisfy existing automatic interruptible load obligations through fast ramp-down, while maintaining the established minimum requirement for block disconnection. Further technical assessment may be warranted to determine whether additional requirements for under-voltage response would deliver material power system security benefits and how such requirements could be appropriately designed and coordinated with existing protection arrangements. This could be considered by AEMO in their next review of the technical requirements (access standards) set out in schedules 5.2, 5.3, and 5.3a of the NER, which they are required to do at least once every five years.[592]

The final rule contributes to the achievement of the NEO by ensuring power system security and reliability

The final rule contributes to the achievement of the NEO by enhancing power system security and reliability while supporting the efficient operation of the power system. By allowing technically capable Schedule 5.3 plant to meet their automatic interruptible load obligations through fast, proportional reductions in active power consumption, the final rule enables a more precise and flexible response to power system disturbances. This can reduce the risk of excessive load shedding, cascading outages and further frequency instability, while minimising unnecessary disruption to consumers and other network users.

The final rule also promotes efficient investment and operation by accommodating the capabilities of modern loads, including large IBLs, and incentivising fast ramp-down capability

587 Submissions to the draft determination: Ergon Energy and Energex, p 5.

588 Sungrow submission to the draft determination, p 6.

589 For more information on the Schedule 5.3 Participant guidelines, see chapter 4 of this final rule determination.

590 Transgrid submission to the draft determination, pp 3, 19.

591 Final rule, clause S5.3.10.

592 NER clause 5.2.6A. For more detail on the requirement for AEMO to review the technical requirements, see chapter 1 of this final determination.

where technically feasible and efficient. By retaining block disconnection as the minimum access standard, the final rule maintains an established mechanism for supporting power system security while providing flexibility for connecting parties. These changes support the secure integration of new loads into the NEM and have the potential to reduce reliance on costly frequency control services, contributing to the long-term interests of electricity consumers.

8.2 The final rule strengthens the testing, assessment and commissioning framework

The Commission's final rule strengthens the testing, assessment and commissioning framework by extending its application to Schedule 5 plant and Schedule 5 Participants, and enhancing mechanisms to verify and address non-compliance.

Most significantly, the final rule allows all Schedule 5 Participants to request testing or assessment of Schedule 5 plant where there are reasonable grounds to believe that the plant may not comply with the NER or an applicable connection agreement, including as part of the commissioning process.[593]

Prior to publication of the final rule, only registered participants that were parties to the relevant connection agreement could request testing. Similarly, only plant belonging to a registered participant could be subject to testing under this framework. Extending this framework to all Schedule 5 Participants is important because, as AEMO noted in its rule change request, plant may contravene the NER or an applicable connection agreement and adversely affect power system security, regardless of its owner's registration status. Accordingly, the ability to request testing and the ability for plant to be subject to testing should not depend on registration status.[594]

These reforms support the identification, investigation and resolution of potential non-compliance, helping to mitigate risks to power system security and reliability and contribute to the achievement of the NEO.

The remainder of this section provides a detailed description of the final rule, which is consistent with the draft rule, and highlights stakeholder feedback.

8.2.1 The final rule makes several NER amendments that will promote power system security and reliability

The final rule improves the testing, assessment and commissioning framework by extending existing requirements to Schedule 5 plant and Schedule 5 Participants, regardless of registration status. In particular, the final rule:

- **Expands the right to request testing and assessment:** Amends clause 5.7.2(a) to allow Schedule 5 Participants, as well as Registered Participants, to request testing or assessment where there are reasonable grounds to believe that equipment associated with a connection agreement may not comply with the NER or the applicable connection agreement.[595] Consistent with the current framework, the cost of tests or assessments must be borne by the requesting party, unless the equipment is found to be non-compliant, in which case the owner of that equipment is liable for the costs.[596] The purpose of this is to deter frivolous requests.

593 Final rule, clauses 5.7.2, 5.8.1A.
594 AEMO rule change request overview, 4 April 2024, p 71.
595 Final rule, clause 5.7.2(a).
596 NER clause 5.7.2(d).

- **Strengthens AEMO's ability to verify compliance:** Amends clause 5.7.3(d) to enable AEMO to request testing of Schedule 5.2, 5.3 and 5.3A plant where it reasonably believes the plant may not meet applicable technical requirements or performance standards. The relevant Schedule 5 Participant must comply with the request within 25 business days.[597] Clause 5.7.3(f) also enables AEMO to require a Schedule 5 Participant to operate plant at a specified active power level, pattern or profile, or in a particular mode, where specified non-compliance or inadequate modelling impedes, or is likely to impede, AEMO's power system security functions. These requirements may remain in place until satisfactory evidence of compliance and model performance is provided.[598]
- **Extends commissioning requirements to relevant Schedule 5 plant:** Introduces clause 5.8.1A to define a Relevant Schedule 5 Participant by reference to new or replacement Schedule 5.2, 5.3 or 5.3A plant with a nameplate rating of at least 30 MW or 30 MVA, subject to AEMO determining that the commissioning requirements should not apply, having regard to the expected effect on power system security and after consulting relevant NSPs.[599] The rule extends commissioning coordination requirements to these participants,[600] including developing procedures with NSPs and AEMO to protect power system security, quality of supply and other participants' equipment.[601]
- **Strengthens commissioning planning and testing:** Amends clauses 5.8.4 and 5.8.5 to apply commissioning program and testing requirements to Relevant Schedule 5 Participants. These include providing advance notice of commissioning programs and proposed test procedures, allowing NSPs and AEMO to request changes to protect power system security, safety and quality of supply, and demonstrating compliance through commissioning test results. Where commissioning tests identify non-compliance, the relevant participant must promptly meet with the NSP to agree on a process to achieve compliance. AEMO may also direct that commissioning and subsequent connection must not proceed where the equipment does not meet the applicable requirements.[602]
- **Reinforces remediation and ongoing compliance monitoring:** Amends clause 5.7.3(a) and (c) to require relevant participants to notify the NSP and AEMO of non-compliance, advise of proposed remedial steps and timelines, diligently undertake remedial work, report monthly on progress, and conduct further testing or monitoring to confirm compliance. Clause 5.7.3(g) also requires relevant participants to retain records of technical performance and monitoring for seven years and make them available to AEMO on request.[603]

Together, these amendments broaden the application of testing and commissioning requirements, strengthen AEMO's ability to verify and address non-compliance, and support the secure and reliable operation of the power system.

597 Final rule, clause 5.7.3(d).

598 Final rule, clause 5.7.3(f1)-(f2).

599 Final rule, clause 5.8.1A. See also chapter 7 of the Commission's draft determination, which explains how clause 5.8.1A was included in the draft rule in response to feedback from SA Power Networks submission to the consultation paper, p 7.

600 Final rule, clause 5.8.2.

601 Final rule, clause 5.8.4.

602 Final rule, clause 5.8.5(c)-(e).

603 Final rule, clause 5.7.3(a), (c), and (g). Note: The Commission recommends that this be reclassified as a Tier 2 civil penalty provision. This obligation relates to provision of information to confirm that connection agreements (including applicable performance standards) are being adhered to. This is important for efficient market operation for the long term interests of consumers, including to ensure that Network Service Providers are made aware of any potential issues relating to compliance with performance standards prior to a significant adverse system event. See appendix C.5.

8.2.2 Stakeholder feedback was broadly supportive, but sought further guidance on the testing and compliance arrangements

In response to the draft rule, which is consistent with the final rule described above, stakeholders generally supported extending testing, assessment and commissioning requirements to Schedule 5 plant and Schedule 5 Participants, recognising the benefits for compliance and power system security. For instance, VeriConnex submitted that extending testing rights is one of the most practically significant changes in the draft rule.[604]

However, several stakeholders emphasised the importance of ensuring that the expanded testing powers are exercised appropriately, with clear expectations about when testing may be requested and safeguards against unnecessary costs and regulatory burden.[605] The final rule addresses these concerns by retaining the requirement for reasonable grounds to believe that plant may not comply with the NER or an applicable connection agreement before testing or assessment can be requested.[606] It also retains the existing cost allocation arrangements, under which the requesting party bears the costs of testing unless non-compliance is identified, in which case the equipment owner bears the reasonable costs.[607] These arrangements provide safeguards against unjustified testing requests and help ensure that the costs of investigating non-compliance are appropriately allocated.

VeriConnex and Origin called for clearer guidance on what constitutes 'reasonable grounds' for requesting testing and what constitutes an adequate compliance record for a non-registered participant.[608]

As discussed in chapter 4 of this final determination, the final rule requires all connection applicants to include in their connection agreement a commitment to ongoing compliance with the proposed performance standards. This includes explaining how the connection applicant intends to comply with those standards, consistent with good electricity industry practice.[609] The Commission encourages applicants to have regard to the Reliability Panel's Template for Compliance Programs, which was recently revised to now consider additional plant types other than generators, such as integrated resource systems (including utility-scale batteries), synchronous condenser systems, loads and HVDC links.[610] The Commission considers that this provides guidance on what reasonable compliance entails. Further, the Commission will consider issuing a 'terms of reference' to request that the Reliability Panel undertake a targeted review of the Template to incorporate the new load access standards being introduced by this final rule.[611]

The Commission has also had regard to the practical challenges of commissioning large loads that may take several years to reach full demand. Transgrid supported extending commissioning requirements to Schedule 5 Participants but highlighted that testing may need to be staged as demand increases.[612] While the final rule provides a framework for coordinating commissioning programs and testing, it does not expressly establish a multi-year staged testing process. However, applicants may wish to include in their connection agreement arrangements for staged commissioning and testing as a large load progressively increases its demand.

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604 VeriConnex submission to the draft determination, p 2.
605 Submissions to the draft determination: Snowy Hydro, p 2; VeriConnex, p 2; Origin, p 3; APA, p 4.
606 Final rule, clause 5.7.2(a).
607 Final rule, clause 5.7.2(d).
608 Submissions to the draft determination: VeriConnex, p 2; Origin, p 3.
609 Final rule, clause 5.3.7(b)(1)-(2).
610 AEMC Reliability Panel, *Compliance Template Review 2026*, Final report, 30 July 2026. The 2026 Template for Compliance Programs is available here.
611 AEMC Reliability Panel, *Compliance Template Review 2026*, Final report, 30 July 2026, section 1.7.
612 Transgrid submission to the draft determination, p 3.

8.3 The final rule allows AEMO to extend the timeframe for future access standards reviews

The Commission has made a final rule allowing AEMO to extend future technical reviews due to complexity or material changes.[613]

As discussed in section 1.2.1, AEMO must periodically review some or all of the technical requirements set out in schedules 5.2, 5.3, and 5.3a of the NER to assess whether they need updating.[614] Pursuant to clause 5.2.6A(e) of the NER, AEMO is required to complete each review within 12 months of publishing the approach paper.

While conducting their first review that led to the *Improving the NEM access standards - Package 2* rule change request, AEMO observed that this 12-month time limit can inhibit the necessary analysis and consultation needed to develop fit-for-purpose rule change proposals that give effect to the review criteria. This is because the reviews require a large volume of matters to be evaluated, many of which are highly technical and require extensive consultation.[615]

Allowing AEMO to extend the timeframe for publication of a final report by up to six months, where there are matters of material complexity or a material change in circumstances, reduces the risk of incomplete analysis or conclusions based on outdated assumptions. This flexibility would enable more comprehensive modelling, validation and risk assessment, supporting technically sound outcomes that enhance system security and stability.

Importantly, the extension power is constrained by procedural safeguards. AEMO must publish a notice of extension at least one month before the expiry of the original 12-month period, clearly identifying the matters of complexity or material change and outlining how it intends to address them, including through stakeholder engagement.[616] This requirement promotes transparency, accountability and regulatory certainty, which are critical to maintaining investor confidence and facilitating efficient operational and investment decisions.

This section provides a description of the final rule and highlights how guardrails have been put in place to ensure transparency with stakeholders. It also outlines why the Commission's final rule allows for a six-month extension period, rather than three months as proposed in the draft rule determination.

8.3.1 The final rule allows AEMO to extend the timeframe for future access standards reviews for up to six months

The final rule amends clause 5.2.6A of the NER to allow AEMO to extend the 12-month deadline for publishing its final report on technical reviews by up to a further six months, where there are matters of material complexity or a material change in circumstances. To exercise the option for an extension, AEMO must publish a notice at least one month before the original 12-month deadline, explaining the reasons for the extension and how it intends to address them, including its plans for stakeholder engagement.[617]

The notice requirement provides an important guardrail

The notice requirement is an important guardrail that promotes transparency and accountability in the development of technical advice that informs access standards. Requiring AEMO to explain

613 Final rule, clause 5.2.6A(e)-(e2).
614 NER clause 5.2.6A.
615 AEMO rule change request overview, 4 April 2024, p 75.
616 Final rule, clause 5.2.6A(e2).
617 Final rule, clause 5.2.6A(e)-(e2).

the matters of material complexity or changes in circumstances necessitating an extension, and how it intends to address them, including through stakeholder engagement, helps ensure that reviews are informed by robust technical analysis and appropriate stakeholder input.[618]

Requiring notice at least one month before the original deadline also provides stakeholders with advance visibility of the revised timeframe and AEMO's proposed approach, supporting effective engagement and planning. These requirements help balance the need for timely reviews with the need for technically sound outcomes, ultimately supporting the efficient investment in, and operation of, electricity services in the long-term interests of consumers.

This approach was supported by stakeholders in response to the consultation paper.[619] For instance, Transgrid submitted that AEMO should publish a notice when an extension is needed, outlining the reasons as they may relate to complexity/difficulty, or a material change in circumstances.[620]

Stakeholders broadly supported AEMO being able to extend the time for future reviews, based on there being appropriate guardrails are in place

In response to the draft determination, which proposed an extension period of up to three months, the Commission received the following feedback which was supportive of the draft rule:

- Transgrid submitted that they did not object to AEMO being permitted to extend access standard review timelines where justified, provided appropriate transparency and safeguards are maintained. The requirement for AEMO to publish a notice of extension, including the reasons for the extension and its stakeholder engagement plan, provides an appropriate level of transparency.[621]
- APA indicated they were supportive of the reform to allow AEMO to extend the publication of a final report by up to three months, allowing for greater accuracy and completeness of assumptions and analysis, particularly for complex reforms. APA also submitted that an extension to the final report publication should also include a commensurate extension to the industry consultation window, to ensure comprehensive stakeholder input on complex reforms.[622] The Commission notes that, in order for AEMO to extend publication of the final report, their notice must explain the plan for stakeholder engagement.[623]

The final rule allows AEMO a further six months, rather than three months as proposed in the draft rule

AEMO's rule change request sought the option to extend the timeframe for future reviews, but did not propose a time cap.[624] In response to the Commission's consultation paper, several stakeholders suggested there should be time limits for extensions.[625]Accordingly, the Commission's draft rule determination proposed that the time for publication of the final report may be extended by AEMO for an additional period of up to three months.[626]

However, following submissions to the draft determination in May 2026, AEMO observed that a six-month extension would better support technically sound outcomes by reducing the risk of incomplete analysis or conclusions based on outdated assumptions. This was observed in

618 Final rule, clause 5.2.6A(e2).
619 Submissions to the consultation paper: SA Power Networks, p 7; CPU, p 5; AWS, p11; EPEC, p 8; SA Power Networks, p 7.
620 Transgrid submission to the consultation paper, p 25.
621 Transgrid submission to the draft determination, pp 3, 20.
622 APA submission to the draft determination, p 5.
623 Final rule, clause 5.2.6A(e2).
624 AEMO rule change request overview, 4 April 2024, p 75.
625 Submissions to the consultation paper: SA Power Networks, p 7; CPU, p 5; AWS, p11; EPEC, p 8; SA Power Networks, p 7.
626 AEMC, Draft rule determination, 12 March 2026, chapter 7.

response to the quantum and complexity of work stemming from the Commonwealth Department of Climate Change, Energy, the Environment and Water of Australia (DCCEEW) led working group on data centres that reports to the Energy and Climate Change Ministerial Council (ECMC).[627] The working group includes all Australian jurisdictions and the NEM market bodies, including the AEMC.

Having considered this further, and discussing the practicalities of the task with AEMO, the Commission is now of the view that a six-month extension will provide AEMO with greater flexibility to undertake sufficiently comprehensive technical reviews. This has better regard to the scale and complexity of emerging IBL connections, changing power system dynamics and the rapid evolution of the data centre industry. The scale of individual IBL connections, and the potential cumulative impacts of multiple connections, may require complex modelling and assessment of their interactions with other connected plant. These assessments are becoming increasingly important as coal-fired generation retires and inverter-based generation becomes more prevalent, changing power system dynamics and potentially affecting system strength, stability and the performance of connected plant. At the same time, the data centre industry is connecting and evolving at pace, meaning that the scale, configuration and technical characteristics of proposed loads may change materially during a review.

In these circumstances, a three-month extension may not provide sufficient time for AEMO to undertake additional modelling, assess material changes in circumstances and engage with stakeholders where necessary. Allowing an extension of up to six months therefore provides a more appropriate balance between timely reviews and the need for robust, evidence-based technical advice.

627 For more information, see Commonwealth DCCEEW's website.

9 The final rule will be implemented immediately, with a six-month grace period in certain cases

Box 24: Key points in this chapter

The final rule commenced on 12 November 2026, with publication of this final determination. The final rule provides a six-month grace period for some connection applications and plant alteration proposals which are in progress at the commencement date. It also requires AEMO to develop the Schedule 5.3 Participant Modelling Guidelines, and update the Power System Stability Guidelines (PSSG) and Power System Model Guidelines (PSMG) if necessary or desirable to take into account the final rule, within 12 months of commencement of the rule.

Immediate implementation of the final rule will contribute to the achievement of the National Electricity Objective (NEO) by putting the strengthened access standards into effect as soon as possible. The Commission acknowledges that stakeholder feedback was divided on the timing for implementing the final rule. However, we consider that immediate implementation with a six-month transition period balances the system security imperative with the need to provide time for industry to implement the new requirements, and avoid excessive disruption to ongoing connections.

The final rule applies the grace period later in the connection process, compared to what we proposed in the draft rule. Connection applicants who have received confirmation of acceptance of their technical requirements under clause 5.3.4A of the National Electricity Rules (NER) will be able to continue using the old access standards for six months from the commencement date (until 12 May 2027). This will enhance system security by applying the new access standards to more inverter based load (IBL) connections.

We have also made changes to apply a defined grace period to plant alteration proposals to ensure the new access standards are applied in a timely manner. Schedule 5 Participants who have submitted an alteration proposal under clause 5.3.9 or clause 5.3.12 before the commencement date will also be able to negotiate under the old access standards until 12 May 2027.

Finally, we have adjusted the requirements for new and updated guidelines to align with the rest of the final rule and other related processes.

In this chapter:

- Section 9.1 explains why the final rule is to be implemented immediately.
- Section 9.2.1 explains how the six-month grace period works for advanced connection applications, our rationale for this approach, and how we have considered stakeholder feedback.
- Section 9.3 explains how the six-month grace period works for alteration proposals.
- Section 9.4 sets out the requirements for AEMO to develop new guidelines and update relevant existing guidelines.

9.1 The final rule commenced on 12 November 2026

The final rule commenced on the date of publication, being 12 November 2026. Implementing the final rule immediately will contribute to achieving the NEO, as it supports system security by applying the new access standards to as many IBL connections as practicable, including most connection applications currently underway. This is important given the pace of data centre connections to the National Electricity Market (NEM) and growing size of those data centres. The immediate commencement of the final rule is consistent with what we proposed in the draft rule.

However, the Commission recognises that some connection applicants will be close to finalising negotiations with the Network Service Provider (NSP) and AEMO when this final rule is published. Applying the new access standards immediately in these cases could cause significant disruption, prolong connection negotiations, and add costs. The final rule therefore provides a six-month grace period for advanced connection applications, discussed further in section 9.2.1.

The parts of the final rule that are not directly linked to the connection process also commenced on 12 November 2026. This includes the changes to compliance, testing and commissioning arrangements; new and updated glossary definitions; and AEMO's ability to extend the time for its review of the access standards.[628]

9.2 The final rule provides a six-month grace period for certain connection applicants

The final rule allows connection applicants who are well advanced in negotiations to continue using the old access standards for six months from the commencement date.[629] This approach recognises that some applicants are close to finalising negotiations as at the commencement date of the final rule. Allowing these applicants to continue under the old access standards for a further six months minimises disruption to advanced connection applications, while ensuring that new and less developed applications are subject to the final rule from commencement. It therefore balances the need to strengthen system security with the practical implementation burden for connection applicants and NSPs.

9.2.1 How the final rule applies to existing connection applications

Figure 9.1 illustrates the transitional arrangements for in-progress connection applications. The six-month grace period applies to connection applicants who have:[630]

- made a valid application to connect; and
- received confirmation of acceptance under clause 5.3.4A for any negotiated access standards proposed in the connection application; and
- not yet received an offer to connect.

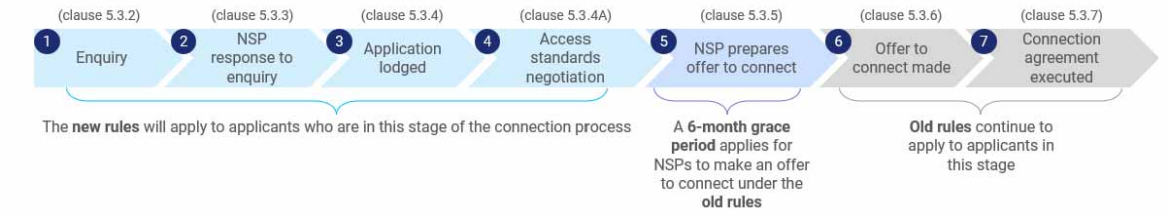
If an offer to connect is not made before the expiry of the six-month grace period (12 May 2027), the new access standards will apply to that connection application.[631]

Connection applicants may also elect to apply some or all of the new access standards to their connection application during the grace period.[632] If so, they must notify the NSP as soon as reasonably practicable.[633] Connection applicants may prefer to use the new access standards if, for example:

- The new access standards are clearer or more flexible. For example, this may be the case for the Schedule 5.3a system strength requirements, the Schedule 5.2 disturbance ride-through access standard, or the Schedule 5.3 load shedding access standard.[634]
- The connection applicant considers it is unlikely to reach agreement with the NSP and AEMO using the old access standards by 12 May 2027.

628 Final rule, clauses 5.2.6A, 5.7.2, 5.7.3; Chapter 10, Glossary.
629 Final rule, clause 11.197.3.
630 Final rule, clause 11.197.3(a)(1), (b)(1)-(2).
631 Final rule, clause 11.197.3(c)(2)(i).
632 Final rule, clause 11.197.3(c)(1).
633 Final rule, clause 11.197.3(d).
634 Final rule, clauses S5.3a.7, S5.2.5.5, S5.3.10.

Figure 9.1: Implementation arrangements for the final rule



The option to use the new access standards differs from the draft rule, which would have applied the new access standards by default but allowed eligible connection applicants to elect to apply the old access standards during the grace period.[635]

As shown in Figure 9.1, the new access standards apply to connection applications that have not received clause 5.3.4A acceptance before the commencement date, and all connection applications submitted on or after the commencement date.[636]

If an applicant has received an offer to connect from an NSP, or executed a connection agreement, before the final rule commenced, the old rules will continue to apply.[637]

Box 25: Changes between the draft and final rule

We have made a number of changes to the transitional arrangements between the draft rule and final rule. These changes will better support system security as well as clarifying the arrangements.

The final rule:

- Applies the grace period from a later stage in the connection process. Connection applicants need to have received acceptance of technical requirements under clause 5.3.4A in order to use the six-month grace period. Under the draft rule, the grace period would have been available for all submitted connection applications.
- Applies the transitional arrangements including the grace period to all Schedule 5 connection applications, not only Schedule 5.3 connection applications.
- Provides a six-month grace period for alteration proposals submitted under clause 5.3.9 or clause 5.3.12 to use the old access standards.
- Applies the old access standards by default to relevant connection applications and alteration proposals during the grace period, and allows connection applicants or Schedule 5 Participants to elect to apply some or all of the new access standards.
- Does not explicitly require AEMO to update the System Strength Impact Assessment Guidelines (SSIAG).
- Requires AEMO to develop and publish the Schedule 5.3 Participant Modelling Guidelines within 12 months of the commencement date.

Source: AEMC.

635 Draft rule, clause 11.[XXX].3(b), (f).
636 Final rule, clause 11.197.2(a)-(b).
637 Final rule, clauses 11.197.4, 11.197.5.

These transitional arrangements apply to all Schedule 5.2, Schedule 5.3 and Schedule 5.3a connection processes, rather than only Schedule 5.3 as proposed in the draft rule.[638]

The final rule specifies timeframes in which the NSP must provide a connection applicant with written details of the technical requirements applying to its plant, where those technical requirements have changed as a result of this rule. The final rule also extends or enables NSPs to extend relevant timeframes for responding to connection enquiries and applications, due to the changes to the access standards.[639] Transgrid suggested that NSPs should be permitted to extend the time for providing written details of the relevant technical requirements in response to a connection enquiry to 60 business days instead of 30 business days, due to the "high volume of existing Connection Enquiries".[640] The Commission has retained the 30-business day timeline for the final rule, noting that technical requirements under the new access standards are generally standardised.

9.2.2 The final rule applies the grace period at a later point in the connection process

Under the final rule, connection applicants can use the old access standards during the grace period if they have received confirmation of acceptance of the technical requirements for the plant under clause 5.3.4A before the commencement date.[641] This is a change from the draft rule, which would have allowed connection applicants to access the grace period as long as a valid connection application had been submitted.[642]

Linking the grace period to the clause 5.3.4A acceptance stage will better support system security and addresses stakeholder feedback. If the grace period was linked to an earlier stage, as in the draft rule, more IBLs would be able to connect under the old access standards and this would contribute to system security risks including disturbance ride-through. For example, Transgridnoted it had already received a significant volume of data centre applications and considered that using the existing access standards for these projects would present a "material system security risk".[643] Applying the grace period later in the connection process helps address this risk by reducing the number of eligible connection applications. It will also mitigate the risk, raised by VicGrid, of premature applications being submitted shortly before the commencement date to access the grace period.[644]

The clause 5.3.4A acceptance stage is an appropriate and practical point to apply the grace period. Stakeholder feedback in submissions and bilateral discussions indicates that plant technical design is committed by this stage.[645] Allowing applicants who have reached this stage to continue using the old access standards will avoid unnecessary rework and connection delays. The final rule approach prioritises system security while providing certainty for these connection applicants who are well advanced in negotiations.

638 Final rule, clause 11.197.1.

639 Final rule, clause 11.197.2(c)-(f).

640 Transgrid submission to the draft determination, p 21.
Final rule, clause 11.197.2(e)(1).

641 Final rule, clause 11.197.3(a)(1), (b)(1)-(2), (c)(2)(i).

642 Draft rule, clause 11.[XXX].3(a), (f).

643 Transgrid submission to the draft determination, p 21.

644 VicGrid submission to the draft determination, p 2.

645 Submissions to the draft determination: AWS, p 3; DCA, p 4.

The Commission acknowledges that stakeholders were divided on how the final rule should be implemented

Stakeholders expressed differing views on the appropriate transitional arrangements for implementing the final rule, particularly the length of the transition period, the timing of implementation relative to AEMO's updated technical guidelines, and the treatment of connection applicants already progressing through the connection process.

In response to the proposed six-month transitional period, the preferred approaches ranged from applying the new Schedule 5.3 access standards immediately to providing a transition period of up to two years. For instance:

- Transgrid supported the new rule commencing immediately upon publication but did not support the six-month grace period, because of the potential system security risks associated with the current connection queue.[646]
- Conversely, Data Centres Australia (DCA) and Amazon Web Services (AWS) advocated a 24-month transition, with AWS emphasising the 12–36 month connection and commissioning cycle for large data centres and the time required for original equipment manufacturers to develop and validate compliant models.[647]Similarly, VisIRGrid suggested an 18-month transition window based on "a typical 9 to 12 mth generator-equivalent modelling cycle plus the time required to absorb the new obligations into in-flight design and contracting commitments."[648]
- The Energy Users Association of Australia (EUAA) proposed a 12-month period during which applicants could connect under existing standards, while Jemena sought at least 12 months or clearer criteria for materially advanced projects and staged expansions.[649]
- Ausgrid also emphasised the significant investment applicants may have already made in technical modelling before receiving an offer to connect, recommending that applicants who had provided the modelling necessary for the network service provider's options study be permitted to continue under the existing standards.[650]
- AWS further proposed linking the end of the transition period to the publication of relevant AEMO guidelines, with at least 12 months allowed after their publication and no fixed calendar deadline.[651]

The Commission recognises that stakeholder views on transitional arrangements reflect different priorities and assessments of risk. In particular, we acknowledge stakeholders' feedback that the duration of the connection process is typically 12 months or longer. The grace period in the final rule, which applies from the clause 5.3.4A acceptance stage, is only intended to capture connection applications at a late stage of the process. We expect that six months will be sufficient for these connection applicants to finalise negotiations and for NSPs to make an offer to connect.

Some stakeholders also suggested applying the grace period at different points in the connection process. AWS and DCA considered that projects that had received confirmation of acceptance under clause 5.3.4A should automatically continue using the existing access standards, which the final rule now allows.[652]VisIRGrid and EUAA suggested that parties who have submitted a connection enquiry (not application) should be able to access a grace period.[653]As outlined above,

646 Transgrid submission to the draft determination, p 21.
647 Submissions to the draft determination: DCA, p 4; AWS, pp 3-4.
648 VisIRGrid submission to the draft determination, p 3.
649 Submissions to the draft determination: EUAA, p 4; Jemena, p 3.
650 Ausgrid submission to the draft determination, p 3.
651 AWS submission to the draft determination, p 3.
652 Submissions to the draft determination: AWS, p 3; DCA, p 4.

we consider that applying the grace period at an early stage, such as the enquiry stage, would increase the system security risks associated with large IBL.

The Commission has considered all stakeholder feedback in the context of the likely technical, financial and procedural impacts of alternative transitional arrangements. By linking the grace period to a later stage in the connection process, the final rule addresses stakeholder feedback on the risks associated with the current connection queue and potential premature applications. The final rule balances the need to implement the strengthened access standards promptly with the need to provide a defined period for affected connection applicants and network businesses to prepare for the new requirements.

9.3 The final rule provides a six-month grace period for plant alteration proposals

The Commission has considered transitional arrangements for proposed plant alterations that may affect the plant's performance standards, under NER clause 5.3.9 (for Schedule 5.2 plant) or clause 5.3.12 (for Schedule 5.3 and Schedule 5.3a plant). The final rule allows a six-month grace period for Schedule 5 Participants who have submitted a valid alteration proposal to negotiate using the old access standards.[654]

Applying a grace period for alteration proposals is a change from the draft rule. The draft rule would have allowed alteration proposals submitted before the commencement date to use the old access standards indefinitely, unless the Schedule 5.3 Participant, AEMO and the NSP agreed otherwise, or unless AEMO considered there would be an adverse impact on power system security or achievement of the system standards.[655] The final rule also clarifies that the transitional arrangements apply to alteration proposals under both clause 5.3.9 and clause 5.3.12.[656]

The final rule approach will better support system security compared to the draft rule. Allowing a limited grace period rather than applying the old access standards indefinitely will ensure that plant alterations use the new access standards from 12 May 2027. As discussed above for connection applications, applying the new access standards as soon as practicable will maximise their system security benefits, while providing a grace period will avoid unnecessary disruption to in-progress alteration proposals. Alteration proposals and connection applications are now treated in a more consistent manner.

The grace period for alteration proposals works differently to the grace period for connection applications because these processes have different stages. Schedule 5 Participants who have submitted a valid alteration proposal before the final rule commenced will have six months from the commencement date to receive confirmation that the NSP and AEMO are satisfied with the plant's updated technical requirements under clause 5.3.10 (for Schedule 5.2 plant) or clause 5.3.13 (for Schedule 5.3 and Schedule 5.3a plant).[657] If this confirmation is not received by 12 May 2027, the new access standards will apply to the alteration proposal.[658] Schedule 5 Participants who have submitted an alteration proposal may also elect to apply some or all of the new access standards for negotiation during the grace period.[659]

653 Submissions to the draft determination: VisIRGrid, p 3; EUAA, p 4.
654 Final rule, clause 11.197.3(a)(2), (b)(1), (b)(3), (c)(2)(ii).
655 Draft rule, clause 11.[XXX].5(c).
656 Final rule, clause 11.197.3(a)(2).
657 Final rule, clause 11.197.3(a)(2), (b)(1), (b)(3).
658 Final rule, clause 11.197.3(c)(2)(ii).
659 Final rule, clause 11.197.3(c)(1).

The final rule also stipulates that the new access standards apply to any amendment of performance standards in an existing connection agreement after the commencement date, in cases where the above grace period will not apply.[660] This means the new access standards will apply to all alteration proposals submitted on or after the commencement date. Transgrid suggested that this clause[661]should explicitly refer to a submission under clause 5.3.12, as this is the main way for Schedule 5.3 plant performance standards to be amended.[662] However, the Commission notes that performance standards can also be amended under rule 4.14(p), for example when the amendment is not due to a plant alteration.[663]

9.4 AEMO is required to publish and update guidelines under the transitional arrangements

The transitional arrangements in the final rule require AEMO to review and make any necessary or desirable amendments to the following guidelines within 12 months after the commencement date of the final rule:[664]

- the Power System Model Guidelines (PSMG)
- the Power System Stability Guidelines (PSSG).

AEMO must also publish the new Schedule 5.3 Participant Modelling Guidelines within 12 months from the commencement date of the final rule.[665] These may be published as standalone guidelines, or form part of the PSMG and other relevant guidelines.[666]

The final rule does not require AEMO to update theSSIAG, as substantial reforms to the system strength framework are being considered under the Commission's *Security framework enhancements* rule change.[667]The Commission expects that the SSIAG will be updated after that rule change is completed. References to large IBLs in the SSIAG should be taken to have the meaning of large IBL in the final rule.[668] However, to minimise confusion among connection applicants, AEMO may wish to publish information on its website to clarify that its IBL classification framework in the SSIAG is no longer applicable.[669]

660 Final rule, clause 11.197.5(b).
661 Draft rule, clause 11.[XXX].5(b).
662 Transgrid submission to the draft determination, p 22.
663 AEMO, NER 5.3.9, S5.2.2, 4.14(p) Fact Sheet: Change Mechanisms for generating systems and integrated resource systems, April 2025, website, pp 2-4.
664 Final rule, clause 11.197.6.
665 Final rule, clause 11.197.7.
666 Final rule, clause S5.3.1aa(d).
667 Details on the *Security framework enhancements* rule change are available on our website.
668 Final rule, clause 11.197.6(c).
669 AEMO, SSIAG, v 2.2, website.

A Submissions raised matters that are being considered in other AEMC processes

Table A.1: Matters raised in submissions that are being considered in other AEMC processes

Topic	Feedback	Applicable process
Integrated facilities and co-located generation and storage	DAME proposed assessing behind-the-meter IBLs co-located with existing variable renewable energy generators based on their incremental impact on the grid-facing generator, rather than requiring the IBL to independently meet the full suite of proposed standards. It also cautioned against reopening existing generator performance standards solely because a load is added. Syncline also supported integrated compliance assessments at a single connection point, while Sungrow sought greater clarity on how facilities that switch between importing and exporting electricity would be assessed under the framework. Canus and Syncline similarly emphasised the importance of distinguishing, where relevant, between a facility's net behaviour at the connection point and the underlying behaviour of its computational load, particularly when assessing system security and compliance with flexible operating commitments. GPE and Celero, as well as Tesla, noted that co-located BESS can provide grid-supportive capabilities, including load smoothing and fault ride-through.	The Commission notes that these matters have been raised in the Minister for Climate Change and Energy's rule change request to *Improve the NEM connections framework for integrated facilities, co-located plant and flexible loads*. We expect to initiate this rule change process in Q1 2027.
Demand flexibility	DAME considered that the framework should distinguish flexible or scheduled loads from inflexible base load loads. Moreover, GPE and Celero proposed reviewing rule 4.9 of the NER to accommodate BESS responses to local frequency deviations and introducing a limit on load ramp rates to mitigate system security risks. Tesla also noted the potential grid benefits of BESS	The Commission notes that demand flexibility has been raised in the Minister for Climate Change and Energy's rule change request to *Improve the NEM connections framework for integrated facilities, co-located plant and flexible loads*. Further, AEMO's *Operational integration and visibility of large inverter-based loads* rule change request recommends

Topic	Feedback	Applicable process
	response to frequency deviations. VisIRGrid sought clarity on how certain IBLs would be represented in NEMDE and whether controllable data centre loads could be scheduled or semi-scheduled.	reforms relating to ramp rates and registration, including how large IBLs integrate with market based requirements. The Commission initiated this rule change process on 12 November 2026.
Operational visibility	VeriConnex supported introducing monitoring infrastructure for certain IBLs to build operational capability.	The Commission is considering this matter through the *Operational integration and visibility of large inverter-based loads* rule change process, initiated on 12 November 2026.
Cyber security	Sungrow suggested guidance on cyber security, communications resilience and controlled reconnection during system restoration.	On 12 December 2024, the AEMC published a final determination and final rule to confirm and clarify AEMO's cyber security role in the NER. This enables AEMO and the energy industry to better prepare for and respond to potential cyber security incidents. As noted in the final determination, "AEMO will continue to have stewardship of the Australian Energy Sector Cyber Security Framework, organise testing and scenario training exercises to test the cyber resilience of the power system, and provide guidance and advice to industry in the form of written materials, digital tools and working groups."
Harmonics	Sungrow suggested additional guidance regarding harmonic emission limits, harmonic interactions, and harmonic modelling of IBLs, including those with co-located IBR.	NER clause S5.3.8 provides an access standard for harmonic voltage distortion that applies to Schedule 5.3 plant (including both IBL and non-IBL). AEMO may consider whether these requirements remain fit-for-purpose, particularly considering the continued growth of large IBLs, in its next access standards review.
R1 modelling	ElectraNet, Tesla, and AWS noted that Schedule 5.3 modelling requirements need to be aligned with the R1 modelling requirements process.	The Commission is considering market registration of IBLs through the *Operational integration and visibility of large inverter-based loads* rule change process, initiated on 12 November 2026. Through that process, the Commission may consider aligning IBL modelling requirements introduced through this final rule with the R1 modelling requirements.

Topic	Feedback	Applicable process
Australian Standards	Ausgrid submitted that the AEMC could consider the development of Australian Standards for all load-based power electronic equipment, similar to those available for distributed solar photovoltaic inverters (AS/NZS 4777.2).	The Commission's rule making power does not extend to the Australian Standards. In any case, there is also already an AS standard for UPS systems (i.e. AS 62040 series), as well as other power electronic devices. Therefore, the Commission does not recommend the development of any certain standards at this stage.

Source: Submissions to the draft determination: DAME, p 2; Syncline, pp 1-2, 4; Sungrow, pp 4-6; Canus, pp 6-7; Celero and GPE, pp 2-3, 9; VisIRGrid, p 2; VeriConnex, p 2; Sungrow, pp 3-4; AEMO, p 11; Tesla (supplementary), pp 2-5; Ausgrid, pp 2-3; ElectraNet 17; AWS, p 2.

B Rule making process

A standard rule change request includes the following stages:

- A proponent submits a rule change request.
- The Commission initiates the rule change process by publishing a consultation paper and seeking stakeholder feedback.
- Stakeholders lodge submissions on the consultation paper and engage through other channels to make their views known to the AEMC project team. In this instance we formed a technical working group, which met three times between the consultation paper and draft determination.
- The Commission publishes a draft determination and draft rule (if made).
- Stakeholders lodge submissions on the draft determination and engage through other channels to make their views known to the AEMC project team. In this instance, the technical working group met another time between the draft determination and final determination.
- The Commission publishes a final determination and final rule (if made).

You can find more information on the rule change process on our website. [670]

B.1 The process to date

On 8 May 2025, the Commission published a notice advising of the initiation of the rule making process and consultation in respect of three rule change requests, and the consolidation of those rule change requests.[671] The rule change requests are:

- *Improving the NEM access standards - Package 2*, submitted by AEMO
- *Conditions for generator protection systems*, submitted by Rod Hughes Consulting
- *Definitions of protection system requirements*, submitted by Rod Hughes Consulting.

The Commission also published a consultation paper identifying specific issues for consultation on the consolidated rule change request. The Commission received 29 submissions on the consultation paper. We discussed and responded to the issues raised in those submissions in the draft rule determination.

The Commission extended the time for making the draft determination from August 2025 to 12 March 2026 because the consolidated rule request raised issues of sufficient complexity and difficulty. On 12 March 2026, the Commission published a draft rule determination including a draft rule. The Commission received over 30 submissions on the draft rule determination.

The Commission extended the time for making the final determination from 18 June 2026 to 29 October 2026, and then extended it further to 12 November 2026, again because of the issues of sufficient complexity and difficulty. We have discussed and responded to issues raised in submissions to the draft determination throughout this final rule determination.

670 See our website for more information on the rule change process: https://www.aemc.gov.au/our-work/changing-energy-rules.

671 This notice was published under sections 93 and 95.

B.2 AEMO proposed amendments to the NER to support the projected increase of large loads

AEMO's Package 2 rule change request proposed several amendments to the technical requirements for connecting to the NEM, especially in Schedule 5.3, which contains the access standards for load connections.

B.2.1 The proposal addressed the potential system security impacts of large loads, as well as other minor issues with Chapter 5 of the NER

AEMO's Package 2 rule change request is one of two requests it submitted in April 2024 after completing its first review of the technical requirements for connecting to the NEM (Access Standards Review), which it must complete every five years. The focus of the Package 2 rule change request is the projected increase of large loads connecting to the power system and their potential to adversely impact power system security. AEMO noted that large loads, including new hydrogen electrolysers, smelters, and data centres to support AI technologies, have the potential to scale up to several hundred MW within the next few years. The proponent was particularly concerned with how large loads would behave during a power system disturbance or instability and how this would impact power system security, supply to consumers, and the costs of managing power system security risks.

The rule change request also included other proposals for changes to Chapter 5, in relation to system strength requirements for high voltage direct current networks (HVDC links), disturbance ride-through requirements for generators and integrated resource systems, testing and commissioning for schedule 5.2, 5.3 and5.3a plant, and an extension of time for AEMO to complete future access standards reviews. These proposals arose from AEMO's broader access standards review, but had not been sufficiently consulted on to be included in the fast-tracked Package 1 rule change process.

B.2.2 AEMO proposed improvements to the NEM access standards in areas including system strength,disturbance ride-through, and stability

In the Package 2 rule change request, AEMO proposed a number of changes to address the impacts that large loads may have on system security. AEMO proposed to:[672]

- **Improve the ride-through capability of large loads to promote system security**, by:
  - Requiring Schedule 5.3 Participants to cooperate with NSPs in the design of protection systems and settings to maximise ride-through capability where possible.
  - Increasing the visibility of loads' ride-through capability for NSPs and AEMO.
- **Address the potential system stability impacts of large IBL** by creating a new access standard for detection and response to instability for large IBL.
- **Limit the application of short circuit ratio requirement**s for customer loads to large IBLs, and allow flexibility to agree to larger short circuit ratio thresholds for those loads.
- **Allow for the fast ramp-down of loads** to facilitate under-frequency load shedding.

In addition, AEMO proposed to:[673]

- **Clarify the disturbance ride-through access standards for generators and integrated resource systems** by defining and restricting the scope of credible contingency events in relation to the automatic and minimum access standards for Schedule 5.2 plant.

672 AEMO rule change request overview, 4 April 2024.
673 AEMO rule change request overview, 4 April 2024.

- **Support efficient investment in and operation of HVDC links** by allowing Schedule 5.3a Participants to procure system strength services from a third party to meet short circuit ratio requirements.
- **Support compliance with the Schedule 5.2, 5.3 and 5.3a access standards** by expanding testing and commissioning arrangements to all Schedule 5 Participants, including those that are not Registered Participants.
- **Enable deeper analysis and consultation in future reviews of the NEM access standards** by extending the time for AEMO to complete these reviews if there are complex issues or a material change in circumstances.

B.3 Rod Hughes Consulting proposed a rule to clarify NER definitions relating to protection systems

Rod Hughes Consulting submitted the *Definitions of protection system requirements* rule change request (ERC0361) in March 2023.[674] This rule change request sought to update some NER definitions and add new definitions to improve clarity in the access standards for generator protection systems.

B.3.1 The proposal addressed the potential confusion or inconsistency that may result from protection terms not being formally defined

Rod Hughes Consulting considered that:

- the distinction between primary, back-up, and breaker fail protection systems is unclear because some of these terms are not explicitly defined in the NER
- provisions requiring redundancy in primary protection systems, such as clause S5.1.9(d) and clause S5.2.5.9(a)(2), lack clarity on the level of redundancy required
- as a result of these and other issues, it may be unclear to participants how much duplication of protection equipment is required across primary, back-up and/or breaker fail protection systems.

The proponent considered that this lack of clarity could result in differing interpretations or confusion among industry participants, and inconsistent application of the rules.

B.3.2 It proposed to do so by adding and updating several NER definitions relating to protection systems

Rod Hughes Consulting proposed amendments to the NER that would:

- add or update several definitions for types of protection systems and related terms
- use the term 'main protection system' instead of 'primary protection system'
- clarify the requirements for redundancy in protection systems by introducing the concept of an'independent alternative main protection system', which would also be explicitly defined.

The proponent considered that this rule change would support power system security by clarifying the protection systems requirements and ensuring that new connections meet those requirements, without building in more redundancy than necessary. This would also help to reduce the cost of new connections, and the time and cost of negotiating performance standards.

674 Rod Hughes Consulting rule change request, 23 March 2023.

B.4 Rod Hughes Consulting also proposed a rule to clarify the access standards for generator protection systems

Rod Hughes Consulting submitted the *Conditions for generator protection systems* rule change request (ERC0355) in January 2023.[675]

B.4.1 The proposal addressed an apparent drafting inconsistency in the schedule 5.2 access standards

Rod Hughes Consulting considered there is a drafting inconsistency in clause S5.2.5.9, which sets out the requirements that apply to generators for protection systems that impact on power system security. Specifically, clause S5.2.5.9(b) contains a provision for AEMO or the NSP to require certain additional redundancy in a generator's protection systems as part of the automatic access standard, if necessary to maintain power system security. However, the proponent considered this is inconsistent with the automatic access standard because the automatic access standard includes that additional redundancy by default.[676]

In addition, Rod Hughes Consulting considered that the minimum access standard in clause S5.2.5.9 does not provide enough discretion for AEMO or the NSP to require additional redundancy if necessary for system security.

B.4.2 It proposed to do so by updating the automatic access standard and minimum access standard to improve clarity and better support system security

Rod Hughes Consulting proposed to delete clause S5.2.5.9(b) to remove the inconsistency it had identified. The proponent considered this would clarify that the additional redundancy referred to in S5.2.5.9(b) is always part of the automatic access standard. The proponent considered that streamlining the automatic access standard in this way would support an efficient connections process and would not adversely impact power system security. Connection applicants would still be able to negotiate an access standard without the additional redundancy, subject to approval by the NSP and AEMO, since the additional redundancy is not required in the minimum access standard.

The rule change request also proposed adding a new provision to the minimum access standard, similar to the existing clause S5.2.5.9(b). The new provision would allow AEMO or the NSP to require the same additional redundancy currently referred to in S5.2.5.9(b) as part of the minimum access standard, if necessary to prevent certain adverse power system security impacts. Rod Hughes Consulting considered that this change would give AEMO and the NSP greater ability to assess the impacts of proposed non-redundant protection system design. This would, in the proponent's view, allow AEMO and the NSP to enforce the need for redundant protection systems where necessary to mitigate risks to power system security.

675 Rod Hughes Consulting rule change request, 10 January 2023.
676 NER clause S5.2.5.9(b).

C Legal requirements to make a rule

This appendix sets out the relevant legal requirements under the NEL for the Commission to make a final rule determination.

C.1 Final rule determination and final rule

In accordance with section 102 of the NEL, the Commission has made this final rule determination for a more preferable final rule in relation to the rules proposed by AEMO and Rod Hughes Consulting.

The Commission's reasons for making this final rule determination are explained throughout this final rule determination.

A copy of the more preferable final rule is attached to and published with this final determination. Its key features are described in chapters 3 to 8.

C.2 Power to make the rule

The Commission is satisfied that the more preferable final rule falls within the subject matter about which the Commission may make rules.

The more preferable final rule falls within section 34 of the NEL as it relates to the activities of persons (including Registered Participants) participating in the national electricity market or involved in the operation of the national electricity system.[677] Additionally, the more preferable final rule falls within the matters set out in schedule 1 to the NEL as it relates to item 11, being the operation of generating systems, transmission systems, distribution systems or other facilities.

C.3 Commission's considerations

In assessing the rule change request the Commission considered:

- its powers under the NEL to make the final rule
- the rule change requests
- submissions received during the first and second rounds of consultation
- stakeholder input received at the TWG meetings held on 31 October 2025, 19 November 2025, 4 December 2025 and 20 July 2026, as well as through bilateral meetings
- the Commission's analysis as to the ways in which the final rule will or is likely to contribute to the achievement of the NEO
- the application of the final rule to the Northern Territory.

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for the consolidated rule change requests.[678]

The Commission may only make a rule that has effect with respect to an adoptive jurisdiction (relevantly, Victoria) if satisfied that the proposed rule is compatible with the proper performance of AEMO's declared network functions in that jurisdiction.[679] The more preferable final electricity

677 Section 34(1)(a)(iii) of the NEL.

678 Under s. 33 of the NEL and s. 73 of the NGL the AEMC must have regard to any relevant MCE statement of policy principles in making a rule. The MCE is referenced in the AEMC's governing legislation and is a legally enduring body comprising the Federal, State and Territory Ministers responsible for energy.

679 Section 91(8) of the NEL.

rule is compatible with AEMO's declared network functions because they would not affect those functions.

The National Electricity (Victoria) (VicGrid) Regulations 2025 (the Victorian Regulations) made lengthy and very targeted modifications to the NER as applied in Victoria. The Commission notes that the Victorian Regulations may need to be modified for certain clauses in the final rule to apply as intended.

C.4 Making electricity rules in the Northern Territory

The *National Electricity (Northern Territory) (National Uniform Legislation) Act 2015* (the NT Act) adopts the NEL and makes amendments to the NEL to make it fit for purpose for the needs of the Northern Territory. On 7 November 2026, the *National Electricity (Northern Territory) (National Uniform Legislation) Legislation Amendment Act 2026* (the NT NER reforms) came into the effect. The NT NER reforms amend various sections of the NT Act to change the version of the NER and the National Electricity Regulations that applies in the Northern Territory from the most recent version to the version as at 31 July 2025.

The NT reforms also removes the functions and powers of the Commission to make and amend the NER as they relate to the Northern Territory. As a result of the NT reforms, the final rule will not apply in the Northern Territory.

C.5 Civil penalty provisions and conduct provisions

The Commission cannot create new civil penalty provisions or conduct provisions. However, it may recommend to the energy ministers' that new or existing provisions of the NER be classified as civil penalty provisions or conduct provisions.

The NEL sets out a three-tier penalty structure for civil penalty provisions in the NEL and the NER.[680] A Decision Matrix and Concepts Table,[681] approved by energy ministers, provide a decision-making framework that the Commission applies, in consultation with the AER, when assessing whether to recommend that provisions of the NER should be classified as civil penalty provisions, and if so, under which tier.

The Commission proposes to make the following civil penalty recommendations to energy ministers' in relation to the final rule. The AER has indicated it supports these recommendations.

680 Further information is available at https://www.aemc.gov.au/regulation/energy-rules/civil-penalty-tools

681 The Decision Matrix and Concepts Table is available at: https://web.archive.org.au/awa/20210603104757mp_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20-%20Civil%20Penalties%20Decision%20Matrix%20and%20Concepts%20Table_Jan%202021.pdf

Table C.1: Amended civil penalty provision recommendations

Rule	Description of rule	Current classification	Recommended classification	Rationale
4.3.5(a)	The final rule amends this provision to provide for automatic interruptible load to be progressively automatically disconnected or reduced following the occurrence of a power system under-frequency condition.	Tier 1	Tier 1	The Commission recommends that this remain a Tier 1 civil penalty provision. Compliance with this provision is necessary to ensure appropriate supply security and reliability, and failure to comply with this provision could result in consumer harm.
5.3.12(b)	The amendment requires Schedule 5.3 and 5.3a Participants to submit to the NSP the proposed amendments to the plant's existing performance standard for technical requirements in schedules 5.3 and 5.3a, except where the alteration will not affect the performance of the plant relative to any of the technical requirements in clauses S5.3.11 or S5.3a.7.	Tier 2	Tier 2	The Commission recommends that this remain a Tier 2 civil penalty provision. This obligation relates to efficient market operation for the long term interests of consumers, including to ensure that appropriate information is submitted to the relevant Network Service Provider.
5.7.2(h) and (i)	The amendment enables the testing of non-registered schedule 5 plant to be requested in a similar manner to the approach for the right of testing of registered schedule 5 plant, including as part of commissioning.	Tier 3	Tier 3	The Commission recommends that these remain Tier 3 civil penalty provisions, noting that the nature of the obligations will not change, but those obligations would apply more broadly to Schedule 5 Participants as well as Registered Participants. These provisions relate to administrative requirements for the conduct of testing and the provision of test reports.
5.7.3(a)	The amendment extends the obligation to provide evidence of compliance with applicable technical requirements and the relevant	Tier 3	Tier 2	The Commission recommends that this be reclassified as a Tier 2 civil penalty provision. This obligation relates to provision of information to

Rule	Description of rule	Current classification	Recommended classification	Rationale
	connection agreement (including the performance standards) to Registered Participants other than Generators.			confirm that connection agreements (including applicable performance standards) are being adhered to. This is important for efficient market operation for the long term interests of consumers, including to ensure that Network Service Providers are made aware of any potential issues relating to compliance with performance standards prior to a significant adverse system event.
5.7.3(c)	The amendment extends the requirements where a test demonstrates non-compliance to Registered Participants other than Generators or Integrated Resource Providers.	Tier 1	Tier 1	The Commission recommends that this remain a Tier 1 civil penalty provision, noting that the substantive nature of the obligations will not change but those obligations would apply more broadly to all Registered Participants. Compliance with the provision is necessary to ensure appropriate supply security and reliability and failure to comply with this provision could result in consumer harm. Where a test demonstrates that a relevant plant does not comply with the relevant connection agreement or one or more performance standards, it is vital that this be addressed. It is vital that parties comply with their performance standards and any associated terms and conditions of connection agreements to ensure that the security of the NEM is not compromised. In the worst circumstances, non-compliance with connection agreements can have severe adverse effects and significant costs on other network users and consumers.

Rule	Description of rule	Current classification	Recommended classification	Rationale
5.7.3(d)	The amendment extends the ability of AEMO to request that Schedule 5 Participants conduct tests of relevant schedule 5 plant if AEMO reasonably believes that it does not meet one or more performance standards in respect of an AEMO advisory matter.	Tier 2	Tier 1	The Commission recommends that this provision be reclassified as a Tier 1 civil penalty provision, noting that it will apply more broadly to Schedule 5 participants. This testing is the main means through which non-compliance with performance standards can be detected. Failing to comply with specific notices is unacceptable market behaviour and could impact supply, security and reliability. In the worst circumstances, non-compliance can have severe adverse effects and significant costs on other network users and consumers.
5.8.5(c)	The amendment extends the obligation to submit commissioning test results demonstrating that a new or replacement item of equipment complies with the Rules or connection agreement or both. The amendment extends the obligation to a Relevant Schedule 5 Participant.	Tier 1	Tier 1	The Commission recommends that this remain a Tier 1 civil penalty provision, noting that the nature of the obligation will not change but the obligation would apply more broadly to Relevant Schedule 5 Participants as well as Registered Participants. Compliance with the provision is necessary to ensure appropriate supply security and reliability and failure to comply with this provision could result in consumer harm. It is vital that new or replacement equipment be properly tested and that the relevant Network Service Provider be provided the commissioning test results demonstrating compliance. In the worst circumstances, non-compliance with connection agreements or the Rules can have severe adverse

Rule	Description of rule	Current classification	Recommended classification	Rationale
				effects and significant costs on other network users and consumers.
S5.3.1(a1)	The amendment inserts a new subparagraph (2A) which requires the Schedule 5.3 Participant to submit to AEMO and the relevant NSP, information about the capability of the equipment to remain connected to the power system and continue operating during and after one or more frequency or voltage disturbances.	Tier 2	Tier 2	The Commission recommends that this remain a Tier 2 civil penalty provision, noting that the nature of the provision will not change but its scope will be expanded. This obligation relates to efficient market operation for the long term interests of consumers, including to ensure that appropriate information is submitted to AEMO and the relevant Network Service Provider regarding the capability of new or additional equipment to be connected to a network.

Abbreviations and defined terms

AC	Alternating current
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AESO	Alberta Electric System Operator
AFL	Available fault level
AI	Artificial intelligence
AWS	Amazon Web Services
BESS	Battery energy storage system
BDU	Bidirectional unit
Commission	See AEMC
CPU	Citipower, Powercor and United Energy
CRU	Commission for Regulation of Utilities, Ireland
CUO	Continuous uninterrupted operation
DC	Direct current
DCA	Data Centres Australia
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water of Australia
DNSP	Distribution Network Service Provider
ECMC	Energy and Climate Change Ministerial Council
EMT	Electromagnetic transient
ERCOT	Electric Reliability Council of Texas
ESOO	AEMO, 2026 Electricity Statement of Opportunities for the National Electricity Market, August 2026
EUAA	Energy Users' Association of Australia
FCAS	Frequency control ancillary services
FERC	Federal Energy Regulatory Commission, USA
FOS	Frequency Operating Standard
FY	Financial year
GPE	Global Power Energy
GPSRR	General Power System Risk Review
GW	Gigawatts
HVDC link	High voltage direct current network
Hz	Hertz
IBL	Inverter based load
IBR	Inverter based resource
IGBT	Insulated-gate bipolar transistor
IRP	Integrated Resource Provider
IT	Information technology

ITIC	Information Technology Industry Council
kV	Kilovolts
Large IBL	An inverter based load with nameplate rating of 30 MW or greater, including a group of IBLs connected at a common connection point
MCE	Ministerial Council on Energy
ms	Milliseconds
MW	Megawatts
NECA	National Electricity Code Administrator
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NER	National Electricity Rules
NSP	Network Service Provider
NT Act	*National Electricity (Northern Territory) (National Uniform Legislation) Act 2015*
NT NER	Northern Territory National Electricity Rules
OEM	Original equipment manufacturer
PJM	PJM Interconnection LLC
PMU	Phasor measurement unit
Proponent	The individual / organisation who submitted the rule change request to the Commission
PSMG	Power System Model Guidelines
PSSG	Power System Stability Guidelines
p.u.	Per unit
PUCT	Public Utility Commission of Texas
REGO	Renewable Energy Guarantee of Origin scheme
RMS	Root mean square
RoCoF	Rate of change of frequency
RTE	Réseau de Transport d'Électricité, France
SAIT RAS	South Australian Interconnector Trip Remedial Action Scheme
SCR	Short circuit ratio
SMIB	Single machine infinite bus
SSIAG	System Strength Impact Assessment Guidelines
SSLF	System strength locational factor
SSMR	System strength mitigation requirement
SSQ	System strength quantity
SSSP	System strength service provider
TNSP	Transmission Network Service Provider
TWG	Technical Working Group
TWh	Terawatt-hours
UFLS	Under-frequency load shedding
UPS	Uninterruptible power supply
VFD	Variable frequency drive
VSD	Variable speed drive