3 November 2021

Ms Anna Collyer
Chair
Australian Energy Market Commission
Sydney South NSW 1235

By electronic submission

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Dear Ms Collyer

Electricity Rule Change Proposal – Reasonable endeavours qualification for AEMO assessment of negotiated access standards

AEMO submits the attached Rule Change Proposal under section 91 of the National Electricity Law.

The National Electricity Market continues to evolve through a period of significant transformation, characterised greater penetration of inverter-based resources, a more diverse generation mix, and a more decentralised system. It is critical that the connections framework recognise the challenges of processing multiple connections simultaneously in constrained network locations where they are both interdependent and highly reliant on the accuracy of complex computer simulations.

Recognising these challenges, this rule change would apply a reasonable endeavours qualification to AEMO's obligation under National Electricity Rules (NER) 5.3.4A(d) to approve or reject a negotiated access standard proposed by a connection applicant within 20 business days. It would also clarify that the period within which an NSP must accept or reject a proposed negotiated access standard is 10 business days following the receipt of a response from AEMO, replacing the current 30 business days from receipt of the proposed standard.

The proposed change would align the assessment process for negotiated access standards with the corresponding provisions in clause 5.3.4B (for proposed system strength remediation schemes).

Queries relating to this Rule Change Proposal should be directed to Kevin Ly, Group Manager - Regulation via email kevin.ly@aemo.com.au.

Yours sincerely

Alex Wonhas

EGM System Design

Attachment: Rule Change Proposal – Reasonable Endeavours Qualification for AEMO Assessment of Negotiated Access Standards

ELECTRICITY RULE CHANGE PROPOSAL

REASONABLE ENDEAVOURS QUALIFICATION FOR AEMO ASSESSMENT OF NEGOTIATED ACCESS STANDARDS

November 2021

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CONTENTS

1. SUMMARY

The National Electricity Rules (NER) process for connection of individual generators has become increasingly challenging to apply in recent years. In some areas of the grid, multiple concurrent connection projects are progressing through NER processes in circumstances where there is limited certainty or insufficiently detailed information to adequately assess their impacts and interactions with each other and existing plant. This scenario, where several proponents are seeking connection in network locations with low system strength or other constraints such as voltage stability, transient stability or thermal limitations (referred to in this request as a 'constrained network location'), can present a serious threat to power system security.

Redesigning a NEM connections process that is fit for purpose for now and the future grid is a necessary task, but one that requires careful coordination with other NEM reforms. A successful and enduring connections framework must be consistent with, and support, the outcomes of the current reform initiatives of the Energy Security Board (ESB) and broader policy settings. Such a connections framework is in the process of being co-developed between AEMO and connections project proponents, with solid progress made to date and a high degree of consensus regarding the optimal approach.

As such, the scope of this Rule Change Proposal is limited to addressing a specific compliance risk associated with the time limit for AEMO to advise a Network Service Provider (NSP) whether a negotiated access standard proposed by a connection applicant should be accepted or rejected under NER clause 5.3.4A. The proposed rule would allow AEMO to meet the timeframe for its assessment of proposed negotiated access standards (20 business days) on a reasonable endeavours basis. The proposed amendments would align the assessment period requirements for clause 5.3.4A with those already expressed in 5.3.4B for proposed system strength remediation schemes. Critically, the change will recognise that it will not be possible in every circumstance for AEMO to meet an absolute timeframe for this assessment, whilst also meeting its power system security responsibilities[1].

2. BACKGROUND

2.1 Terms used in this Rule Change Request

This Rule Change Request references various terms which it is useful to understand at the outset. These are set out below.

Term	Meaning and explanatory notes
Access standards[2]	The standard of performance the plant must meet in order to gain access to the network, for any technical requirement that relates to generating plant under NER schedule 5.
Committed project	Connection projects for which a connection agreement has been finalised, incorporating all performance standards and details of any system strength remediation scheme.
Constrained network location	Network locations exhibiting low system strength or other constraints such as voltage stability, transient stability or thermal limitations.

[1] For example, when an FIA is required, this will need to be completed before a 5.3.4A (and 5.3.4B if required) can be finalised.
[2] Access standards and performance standards are the same thing, they just refer to a different status.

Model integration	The incorporation of the plant model for a connection project into AEMO's wide area power system model to assess the interactions between the power system and that connection project.
Negotiated access standard	In relation to a technical requirement of access for a particular plant, an agreed standard of performance determined in accordance with clause 5.3.4A and identified as a negotiated access standard for that technical requirement in a connection agreement (NER definition).
Performance standard	An access standard that has been included in a completed connection agreement, and that AEMO has registered as a performance standard
Uncommitted project	Connection projects undergoing assessment under an application to connect This includes assessment of proposed negotiated access standards and system strength remediation schemes.

2.2 Current connections framework

The connection process under the NER is largely the legacy of the state-based codes that preceded a national framework, devised at a time when generation technology and markets were fundamentally different. The NER have remained largely unchanged in terms of the main process steps and associated time limits, and the assumption of individual progression of applications. The NER do not contemplate the complexities created by the simultaneous development of multiple inverter-based generators in remote areas of the grid.

The connection process has several assessment phases which place a series of obligations on the applicant, connecting NSP and AEMO, as follows:

- Connection applicants are responsible for providing complete, accurate and up-to-date information to the NSP about their proposed plant and its performance at the network location to which it is to be connected. This process requires extensive engagement between the NSP and the proponent. Proponents must provide site-specific models and associated connections studies report(s) detailing and demonstrating plant performance; propose a negotiated access standard for each technical requirement; propose, where relevant, system strength remediation. Prior to registration and connection of their plant, they must provide updated information and models, demonstrate that the constructed plant can meet or exceed its agreed performance standards and remediation performance, and provide a commissioning plan.
- NSPs (including AEMO for applications to connect to the Victorian transmission network) have primary responsibility for processing connection applications. This includes assessing whether the proposed connection access standards are consistent with the NSP's performance requirements and maintaining quality and security of network service to other network users, and undertaking system strength impact assessments. In consultation with AEMO, NSPs must negotiate the access standards and any applicable system strength remediation to be documented in connection agreements. Prior to connection, NSPs confirm that the requirements of the connection agreement are met, and review and approve the commissioning plan.
- AEMO (as system operator) has an assessment and approval role in relation to:
    - *Negotiated access standards*: where the connection applicant does not propose the automatic access standards for technical requirements that are 'AEMO advisory matters'.
    - *System strength impact assessments and proposed remediation*: NSPs consult with AEMO on the results of their system strength impact assessments and AEMO must assess remediation proposals.

- *Registration as a generator*: AEMO must not register a generator unless it is satisfied that the generating system will be capable of meeting its performance standards and the applicant otherwise demonstrates an ability to comply with the NER.
- *Commissioning programs*: Generators must cooperate with the NSP and AEMO in developing procedures to ensure commissioning of a connection and associated facilities does not adversely affect other registered participants, power system security or quality of supply.

The type and extent of additional plant that can be accommodated in a network location depends on the capacity of the network to support a new connection, and its impact on the surrounding power system. While this aspect of network connections is not new, emerging issues as discussed in the subsection below, mean that frequent and iterative model changes can now occur, particularly during the application stage, which can change outcomes for other generation in the area.

2.3 Existing challenges and emerging issues

The performance of inverter-based generation is dependent on the behaviour of, and interaction with, other connected plant, the assessment of which relies on complex computer simulations. This means that model development can be iterative and subject to frequent adjustment in all phases of the connection process. Under the connections framework, access standards and system strength assessments for a given generation project must account for existing generation and 'other relevant projects'.

These dependencies have become increasingly critical and have produced greater challenges in recent years as the NEM continues to transition. As the nature of the overall generation mix continues to change, it is becoming more difficult to undertake accurate power system studies, particularly for decreasing system strength in many parts of the grid. As system strength reduces, the interactions between grid connected equipment become more complex. Models are adjusted as access standards are negotiated, and access standards and generator capabilities are increasingly dependent on the connection location, current or likely power system conditions and co-development of system strength remediation.

A more detailed description of these challenges is provided below in section 3.2.

3. STATEMENT OF ISSUE

3.1 Current Rules

3.1.1 Connections framework

While the connections process includes several timebound obligations on AEMO and NSPs, this rule change proposal relates to the approval or rejection of a proposed negotiated access standard relating to 'AEMO advisory matters' under clause 5.3.4A. Approval of negotiated access standards is a precondition for an NSP to make an offer to connect. Specifically, the rules require the following:

- 5.3.4A(d): AEMO must advise an NSP whether to approve or reject a proposed negotiated access standard on an AEMO advisory matter, within 20 business days of receipt of the proposal and all supporting information; and
- 5.3.4A(e): an NSP must accept or reject a proposed negotiated access standard, within 30 business days of receiving the proposal and all supporting information.

Clause 5.3.4A assessment by AEMO can be required for a submission by an applicant seeking to establish or modify a connection under NER clause 5.3.4; to alter a generating system for which performance standards have been previously accepted under clause 5.3.9; or to establish or modify a connection for an embedded generating system under clause 5.3A.9.

The following rules relate to the assessment of system strength remediation scheme proposals, which are also critical to finalising an offer to connect:

- 5.3.4B(j): AEMO must use reasonable endeavours to respond to an NSP regarding a system strength remediation scheme proposal, within 20 business days of submission of that proposal.
- 5.3.4B(k): A NSP must within 10 business days following the receipt of a response from AEMO to a proposal for a system strength remediation scheme, accept or reject the proposal.

While AEMO is permitted to meet the timeframe associated with system strength remediation on a reasonable endeavours basis, the same qualification is not made for timeframes associated with the assessment of negotiated access standards. Similarly, while the time for the NSP to make a determination on a proposed system strength remediation scheme commences on receipt of AEMO's advice, for a negotiated access standard the NSP timeframe is expressed to run from receipt of the proposal and supporting information from the connection applicant.

Finally, clause 5.3.6 currently allows for the overall timeframe for an NSP to make an offer to connect to be extended where AEMO's response under clause 5.3.4B takes more than 20 business days but does not contemplate any corresponding extension in respect of advice under clause 5.3.4A.

3.1.2 Power system security

As system operator, AEMO must use its reasonable endeavours to maintain system security in accordance with the standards and responsibilities defined in the NER. AEMO's key power system security responsibilities are summarised in NER clauses 4.3.1 and 4.3.2. Relevantly, the connection of new or altered grid-scale plant to the network will typically change the way the power system operates. AEMO's understanding and assessment of the impacts of connecting plant must be sufficient to determine whether that the power system is likely to continue to operate securely in a range of foreseeable conditions.

3.2 Problem definition

Challenges have emerged for AEMO in meeting its power system security obligations whilst adhering to regulated assessment time limits for connections in constrained network locations. As previously noted, the NEM is going through a significant period of transition to a system with increased inverter-based resources, a more diverse generation mix, and a more decentralised system. Outcomes of this transition converge with pre-existing factors inherent in plant and model development to create significant complexity and compliance challenges for AEMO.

3.2.1 Pre-existing factors – accounting for other relevant projects

Connection assessments are highly dependent on complex computer simulations, which rely on the accuracy of detailed models for both the subject plant and for existing and expected plant that may interact with it. Accordingly, under the connections framework, negotiated access standards for a given connection project must account for existing generation and 'other relevant projects', requiring some consideration of expected generation[3]. The need to account for other relevant projects is a longstanding requirement, but is now impacting AEMO's ability to comply with the connections framework given relatively recent developments associated with the transition of the NEM.

There is currently no reliable means of assessing access standards in a way that accurately reflects the impact and performance of other inverter-based projects that are likely to proceed in a similar timeframe. AEMO cannot readily account for all "expected" generation connections, because certain model information provided with the proposed negotiated access standards may not be suitable or sufficient for

[3] AEMO and NSPs, as a rule, try to account for 'committed' projects, which have entered connection agreements including agreed GPS and (if applicable) system strength remediation.

assessment. For example, the model may be adjusted as the proposed negotiated access standards are negotiated and are dependent on the connection location, current or likely power system conditions and co-development of system strength remediation.

Multiple connections

Each time a model is updated it can affect the performance of other projects and cause adverse interaction with other plant in the same or different stages of the connections process. Most often the impact is in the way it responds to disturbances on the power system. A typical connection project would go through at least three iterations at the application stage.

Timing uncertainty

Delays in project development occur for many and varied reasons at different stages, often unrelated to the NER connections process. This means that some projects may progress rapidly and overtake others that may have been in the connection process for some time, while others may ultimately not become connected, or their construction and commissioning may be substantially delayed after becoming committed. During any AEMO or NSP assessment process, several additional projects may become committed, requiring the assessment studies to be re-run because each project will make a material difference to the NER imperatives to maintain power system security and quality of supply, and not adversely impact other users.

3.2.2 Emerging factors

In some circumstances, AEMO is at risk of breaching its obligation to approve or reject a negotiated access standard proposed by a connection applicant within 20 business days. This is contributed to by three emergent factors arising out of the significant degree of transformation the NEM is undergoing. The three factors are as follows:

- *Rapid growth in inverter-based energy resources*: The NEM is experiencing a rapid growth in inverter-based energy resources with at least 26 GW of wind and solar generation capacity required to replace the existing coal-fired generation fleet as these units are retired[4]. More renewables, and therefore more renewable connections, are required to replace conventional generators because of their naturally lower capacity factor.
- *Multiple connections sought in a similar timeframe and location*: The rapid influx of inverter-based resources means that there are increasingly more projects seeking connection at a similar timeframe, and frequently in close proximity to one another as proponents seek to take advantage of locations benefits such as energy resource availability, low-cost land and lower levelized cost of energy. For example, the West Murray Zone (WMZ) has attracted significant investment in grid-scale solar and wind generation. Appendix B shows a snapshot of the extent of current interest in this zone.
- *Proponents seeking connection in constrained network locations*: As the nature of the overall generation mix continues to change, the levels of synchronous generation in the system are reducing and therefore so too is system strength in some areas. For example, levels of system strength or inertia in some NEM regions are projected to be near minimum limits, with indications that the conditions for declaring shortfalls could arise in the near future[5].

The above changes are affecting industry participants. In the WMZ in late 2019, these challenges became sufficiently severe to necessitate a departure from the connection process in the NEM, with connection integration assessments processed 'one at a time' to ensure system security was not compromised.

[4] AEMO 2020 Integrated System Plan, sC3.
[5] AEMO 2020 System Strength and Inertia Report December 2020, p.3.

3.2.3 Impact on assessment timeframes

The challenges of assessing multiple inverter-based projects in parallel mean that the assessment timeframes associated with negotiated access standards have increased in constrained network locations. This is due to three key effects of the above factors:

- *Time-intensive assessments*: The potential complex interactions of inverter-based resources requires extensive simulation studies and a wider scope of assessment conditions across multiple NSPs requiring wide area modelling.
- *High volume of assessments*: There is a high volume of new connections, and connection alterations, sought for inverter-based resources. For example, in the WMZ alone there were 21 projects totalling 2 GW in the application stage as of October 2021.
- *Sequenced assessment*: Integration of connection project models into the wide area network model may need to be sequenced, that is performed on a 'one-at-a-time' basis, to allow a reasonably certain base case against which to determine a proposed plant's effect on the network. In constrained network locations, sequenced integration may be a necessary step for AEMO to meet its power system security obligations.

3.2.4 NER not fit for purpose in constrained network locations

In practice, certain key assumptions underpinning the NER connection framework no longer hold. In making determinations on negotiated access standards, the existence of parallel projects at the same or different stages of the connection and commissioning cycle means there is often no reasonably certain base case against which to determine the impact of a proposed project on the network; and the range of variable parameters that can quickly change that case is very large and can occur across multiple networks. Therefore, the time required to assess, adjust, and reassess proposed negotiated access standards is exceeds what was originally contemplated by Rule 5.3.4A(d).

3.3 Impacts

There are several impacts resulting from the above issues, particularly in areas of low system strength or otherwise constrained network locations. These issues were most recently illustrated in the WMZ, but issues associated with constrained network locations will become an increasing issue in the future. The impacts of increased assessment timeframes in constrained network locations are summarised below.

3.3.1 Compliance risk – regulatory time limits

Where multiple projects concurrently seek connection to constrained network locations, AEMO is at risk of not meeting the 20 business day time limit under 5.3.4A(d), if it is to appropriately discharge its power system security responsibilities under the NER. This issue is being experienced both with new connections, and where a Generator proposes to alter a connected generating system, in a constrained network location.[6]

Where given factors converge, AEMO may need to adopt a sequenced process for model integration at each key stage in the connection process. Without this step AEMO is unable to adequately confirm the impact of a connection, risking very significant impacts on the future operation of existing connected plant as well as those in the connection process. This has not been considered as an acceptable option in developing this rule change proposal.

Should AEMO exceed 20 business days to complete its assessment of proposed negotiated access standards, NSPs are consequently at risk of missing the regulated time limit to accept or reject the

[6] Under NER clause 5.3.9, where a Generator proposes to alter a connected generating system or a generating system for which performance standards have been previously accepted by the NSP, AEMO obligations relating to negotiated access standards and system strength remediation apply.

proposed negotiated access standards. This is because the NSP's 30-business day timeframe commences on receiving the proposal and all supporting information from a connection applicant, with no allowance for any additional time taken by AEMO.

3.3.2 Compliance risk – power system security obligations

The primary objective of connection assessments is to minimise the risk that new connections will adversely affect power system security, quality of supply, power transfer capability or use by other network users. If negotiated access standards proposed for a project cannot be assessed against a model that incorporates realistic, reasonably certain parameters representing the performance of all considered (existing and expected) generation in that part of the grid, there is a material risk that:

- previous stability solutions will be invalidated by the integration of further generation; and
- assessments of proposed generation will result in inadequate or unachievable performance standards.

The above outcomes could potentially lead to further adverse security impacts or major disturbances, greater and deeper constraints, investment losses and stranded assets, and more costs to consumers. These outcomes present clearly unacceptable risk both for the system and for the generators themselves, and AEMO must in some circumstances take longer to make its assessments. That is, if a project is to be assessed on a basis that better incorporates a realistic base case, the time allowed to meet key obligations under the connections process are too short for AEMO to comply with in all instances.

3.3.3 Uncertain project timeframes

Where AEMO cannot meet assessment timeframes due to the more critical need to meet power system security obligations in constrained network locations, inevitably this contributes to delays and investment uncertainty for connection proponents, such as delayed projects and increased investment uncertainty.

While attempts to complete multiple integration assessments in parallel could present more significant risks either prior to connection or during operation, AEMO recognises that longer and more uncertain connection timeframes are a critical concern for industry. As such, AEMO has been working with key stakeholders to develop an enduring regulatory solution that will better address the complexities of the changed connections landscape. Further detail regarding this work is provided in section 3.5.1. This rule change proposal does not seek to address these broader and deeper issues; it is instead focussed is on a minimal change to recognise that the strict time limit for advising on proposed negotiated access standards will not be reasonably achievable in all circumstances.

3.4 Evidence and validation – the WMZ experience

The current circumstances in the WMZ, spanning parts of western Victoria and south-western New South Wales, illustrate how the process contemplated by the NER for assessing proposed negotiated access standards is not fit-for-purpose in a rapidly transforming grid. The network in the WMZ was not designed to host large-scale generation. It is remote from the high-voltage backbone of the grid and a considerable distance from any major synchronous generation centre to provide system strength to support the connection of inverter-based resources. By the beginning of 2020, 14 grid-scale generators were already operating in the WMZ, with a further five in commissioning, 16 committed and about 25 connection applications. Many more enquiries had been received by the NSPs.

In September 2019, AEMO had to impose network constraints to manage oscillatory stability issues in the WMZ resulting from the interaction of five existing solar generators. Once those interactions were resolved, to a point where the power system was marginally stable (in April 2020), new connection and commissioning integration activities could only then be resumed by ensuring the performance and

interactions of each new project with the existing network and generation in the WMZ could be modelled with confidence and assessed incrementally.

To manage the connection process in the WMZ from this point while minimising risks to system security, AEMO therefore adopted a sequenced approach to the integration of each project. WMZ projects were assessed sequentially, based on objectively ascertainable sequencing criteria, applied first for commissioning and committed projects. In April 2021, AEMO extended this sequencing approach to model integration for projects in the application phase. While NSPs and AEMO still progressed their due diligence assessments and negotiation of proposed access standards, the sequencing approach meant that the final stage in this process prior to AEMO issuing its advice could be held up. Although not necessarily meeting the 20 business day time limit envisaged by 5.3.4A(d), the sequencing approach in WMZ has allowed projects to progress with greater certainty that material interdependencies and performance issues had been identified. This reduces the need for, and extent of, further studies and equipment alterations, contributing to more timely and efficient outcomes overall, as well as minimising operational risk.

3.5 Future reforms

In developing this rule change AEMO considered the potential for other reforms to address the problems described above. Notably, both the joint AEMO-Clean Energy Council Connections Reform Initiative (CRI) being codeveloped with industry, and the recently made Efficient management of system strength Rule (System Strength Rule), have the potential to address connections process issues.

3.5.1 Connections Reform initiative and 'batching'

The outcomes of the CRI have potential to address a broad range of connections issues being encountered by industry, NSPs and AEMO. The CRI is underpinned by a collaborative working model between industry, AEMO and the NSPs, with attendance by other key stakeholders such the AEMC. It was established to develop a consistent and predictable connections process that reduces rework, improves efficiency and quality of information, and addresses information asymmetry. To meet these objectives, workstreams under the CRI are assessing improvements to procedural, information and timing elements, some of which might require rule changes. The CRI is exploring ways to implement reforms without the need for a rule change, whilst leveraging the collaborative model to achieve broad consensus on the need and form for any that are considered necessary.

Importantly, one CRI workstream is rapidly progressing an approach to targeting issues at the application stage of the connections process. This 'batching' approach appears to have broad acceptance among CRI participants, with potential for comprehensive, mutually beneficial and enduring connections reform.

It is anticipated that this proposed batching approach will enable AEMO to most effectively and efficiently undertake its assessments in a contemporary connections environment whilst appropriately discharging its power system security obligations. Batching should avoid the need to repeat assessments for all affected applicants each time a new generator is committed and will reduce the demand on AEMO and NSP engineering resources. It should also facilitate coordination of system strength mitigation schemes between proponents seeking connection within similar timeframes. These outcomes should deliver significantly more certain and generally shorter paths to commitment of a project from a network connection perspective.

The high-level design of the batching approach is at an advanced stage of development, with a final approach due for completion in November 2021.

While 'batching' holds considerable potential, there will be significant work and therefore lead time in refining options in the detailed design and developing a fully worked rule change proposal for consultation by the AEMC. This lead time, and the lack of certainty about ultimate outcomes has driven this proposal for a targeted rule change to address the key compliance risk in the interim.

3.5.2 System Strength Rule

The System Strength Rule recently made by the AEMC requires that TNSPs, in consultation with AEMO, will be responsible for providing system strength on a forward-looking basis, rather than on a case-by-case basis determined via a proponent's application to connect. Should the benefits of this reform be realised, any system strength issues leading to more complex interactions and the need to sequence connection projects could abate, because more system strength may be available for connecting parties.

However, these benefits may not be realised for a considerable time. The final System Strength rule was made on 21 October 2021, with revised system strength mitigation provisions for new or altered connections to commence on 1 December.

4. PROPOSED RULE

4.1 Description

AEMO proposes that a reasonable endeavours qualification be applied to its obligation under NER 5.3.4A(d) to advise on the approval or rejection of a proposed negotiated access standard within 20 business days of receipt. Further, it is proposed that the timeframe for an NSP to accept or reject a negotiated access standard be amended to reflect that it is dependent on an AEMO determination, that is, within 10 business days following the receipt of a response from AEMO.

A reasonable endeavours provision means that the allowable timeframe is not absolute, but still requires that AEMO do its best to achieve the timeframe. While what is reasonable depends on the individual circumstances, the rule would acknowledge that such circumstances can and will arise – for example where it is not practical time assess multiple connection projects in parallel with sufficient confidence of power system security outcomes. .

The proposed rule continues to place a high degree of responsibility on AEMO to meet the timeframe for providing its advice within 20 business days. Where this is not reasonably possible AEMO would still need to achieve the negotiated access standards (and system strength remediation scheme) assessments collectively and individually as quickly as practicable.

4.2 Rationale

4.2.1 Reflects the complexities of AEMO role

While tension between meeting power system security obligations and connections process time limits also exists at registration and commissioning stages for connections in constrained network areas, the application stage presents a more material compliance risk in relation to meeting timeframes. This is due to the significantly higher project volumes at this stage, the additional steps that may be required to provide sufficient assurance about the impacts of each connection, and the nature of the response AEMO must provide. Taking into account stakeholder feedback and recognising the CRI work under way, AEMO is therefore proposing to limit the application of a reasonable endeavours qualification to the application stage. This will align the assessment provisions for advice on proposed negotiated access standards with the rules on system strength remediation proposals, which are also conducted at the application stage.

4.2.2 Reflects dependency of NSPs on AEMO determination

NSPs are reliant on AEMO advice to approve or reject negotiated access standards relating to AEMO advisory matters. In circumstances where AEMO is unable to complete its assessment within 20 business days, the relevant NSP would not be able to meet its obligation to respond to the applicant within 30 business days of receiving the proposal and all supporting information. Therefore, the proposed rule allows

the NSP 10 business days, the implied time currently available under rule, after receiving AEMO advice to accept or reject a proposed negotiated access standard.

4.2.3 Consistency with other NER provisions

For system strength remediation scheme assessments, AEMO must use reasonable endeavours to respond to an NSP within 20 business days of submission of that proposal. It is assumed that in making this rule in 2017 (after the negotiated access standards rule was made), the AEMC recognised that it would not always be reasonably practical to meet an absolute timeframe. AEMO's proposed amendment would bring rule 5.3.4A(d) into line with 5.3.4B(j). This is appropriate given that both assessments are made at the same stage of the connections process, are typically performed concurrently, are subject to the same challenges and uncertainties, and acceptance of these is prerequisite to an NSP making an offer to connect.

Reasonable endeavours qualifications for obligations apply to many obligations throughout the rules. This provides a well-established precedent for dealing with obligations that cannot always be strictly complied with.

4.2.4 Alignment with future reforms

Through the CRI, AEMO and connections project proponents are codeveloping a solution to create a coordinated connection application assessment process. The solution proposes to batch projects with similar timeframes to undertake integrated NEM-wide assessments to inform negotiated access standard and system strength remediation determinations. AEMO anticipates that this solution will be an enduring solution which will resolve issues encountered in the evolving power system.

Depending on the ultimate design of the batching solution, a batching rule change might replace or materially change the application of 5.3.4A(d) and (e), in which case the reasonable endeavours rules change would be effectively replaced. To the extent a batching solution does not impact the two rules, AEMO considers that it would be appropriate for the reasonable endeavours rule change to endure and would be required to ensure it can meet its power system security obligations and its regulatory time limits.

4.3 Consequential or minor rule changes

As a consequence of the proposed change to clause 5.3.4A(d), the timeframes for making an offer to connect under clause 5.3.6 must also allow for extensions to reflect any additional time taken for AEMO's advice on proposed negotiated access standards. This is consistent with the existing allowance for AEMO responses on system strength remediation scheme proposals under clause 5.3.4B.

AEMO has also identified a cross-referencing error to be corrected in clause 5.3.4B(k).

At this stage AEMO has not identified the need for any transitional rule changes and anticipates that amendments will be contained to NER chapter 5.

4.4 Alternative options

AEMO considered alternative options to address the problem, as summarised below:

4.4.1 Sequencing

AEMO had developed a draft rule change proposal to permit it to apply a sequenced connections process in limited circumstances where it is unable to adequately discharge its power system security obligations whilst also meeting certain regulatory time limits under the connections framework. Where triggered, a sequenced connections process would have comprised two key elements:

- *Time limit relaxation* – time limits applying to seven specific assessment or approval requirements in the NER would not apply to the extent necessary to enable AEMO and/or NSPs to meet power system security responsibilities.
- *Specified sequenced connections process* – AEMO would be required to develop, publish and review the process it would apply once a sequenced connections process is initiated for a given constrained network location.

Supporting elements were also proposed in response to connections proponent feedback, intended to further enhance transparency and certainty associated with any sequenced connections process, for example to develop a more predictable trigger for a sequenced connections process.

Ultimately, AEMO decided not to pursue this rule change after extensive engagement with key stakeholders via the Clean Energy Council. While it had been intended as a targeted, interim solution to address multiple timebound connections obligations, the nature of concerns raised by stakeholders indicated that consensus on the proposal could not be achieved within a reasonable timeframe, or at all. In light of the relatively advanced progress of the batching solution being developed under the CRI; the significant degree of stakeholder buy-in; and the enduring nature of this solution, the incremental benefit of the sequenced connections process was no longer clear. It was considered that pursuing the sequencing work would duplicate work for AEMO, AEMC and interested stakeholders but would not deliver material benefits before being replaced by batching.

Instead, AEMO has opted to pursue a minimal change to address the priority compliance issue that is likely to endure in constrained network locations until broader connection reforms can be consulted on and implemented.

4.4.2 Regulatory sandbox to trial a sequenced connections process

Although not yet implemented, AEMO considered whether the proposed 'regulatory sandbox' framework could be used to facilitate new ways of processing connections.[7] However, given the limited scope of this proposal and the potential need for specific solutions tailored to individual network locations when stability issues emerge, a sandbox arrangement was considered unsuitable. It could in future be a useful option to trial substantially different approaches to connection.

4.4.3 Resourcing, systems and process enhancements

While assessments are resource-intensive, the time taken to integrate projects into the wide area model is not driven by inadequate resourcing. Where model integration needs to be performed on a sequenced basis in a constrained network location, additional engineering and computing resources cannot practically reduce overall timeframes. Similarly, system performance improvements to reduce assessment times is not possible. The systems used by AEMO for integration assessments are powerful and improvements have been made over the last two years to halve computational time. As such, in the short-term, systems have been optimised to achieve peak processing power and cannot be further enhanced to reduce assessment times.

AEMO has, however, delivered a range of supporting measures to facilitate, and help proponents to navigate, the connection process. Since the issues canvassed by this rule change proposal emerged, AEMO has continued its efforts to minimise uncertainty. This has been achieved through stakeholder engagement and communication, providing information on existing and emerging constraints to inform decision-making, and by encouraging industry involvement in developing technical solutions to facilitate assessment

[7] Statutes Amendment (National Energy Laws) (Regulatory Sandboxing) Bill 2021 has been introduced but not passed by South Australian Parliament.

and integration of inverter-based resources. These are in addition to AEMO's ongoing national transmission planning work and forecasting information resources provided for under the NER.

Specific initiatives established to support connections projects include:

- Development of a Connections Simulator Tool for which MVP is underway and being trialled with two OEMs and a developer;
- development of a methodology to define system strength zones to increase certainty for proponents, NSPs and AEMO;
- transparent communication with current and prospective connection applicants on the AEMO website and via the State of the System updates;
- consultative development and communication of the sequencing approach used in the WMZ;
- validation of system model against measured event data to confirm adequacy of the model in respect to actual performance;
- training for current and prospective proponents on the connections process; and
- development and publication of additional guidance where a need is identified, for example guidance on commissioning in constrained network location.

5. IMPACT ASSESSMENT

5.1 Contribution of the proposed rule to the NEO

The proposed rule change better realises the National Electricity Objective (NEO) compared to the status quo in constrained network where AEMO is unable to meet its 20 business day time limit for advice on proposed negotiated access standards. That is, the long-term interests of consumers with respect to security of energy supply will be improved by ensuring that AEMO is able to discharge its system security obligations appropriately without putting negotiated access standards timeframes at risk.

Hypothetically, if AEMO was held to strict regulatory time limits, system security risks would increase, potentially resulting in a need for greater and deeper constraints or, in the worst case, major network disturbances. Such an approach is not a realistic outcome, representing a far more serious breach and more significant and enduring consequences for all current and prospective users of the power system.

5.2 Expected benefits and costs of the proposed rule

5.2.1 Benefits

The benefits of the proposed rule change for connections in a constrained network location are as follows:

- *Avoids trade-off between connection obligations*: AEMO, and NSPs where relevant, can appropriately perform key tasks under the connections framework without breaching time limits where those tasks reasonably require more time. This will appropriately set expectations of proponents in the interim period until broader connections reform is introduced.
- *Readily implemented*: The proposed rule change is a straight-forward solution to a scenario that has arisen in the WMZ and could arise in the near future, particularly in constrained network locations.

- *Consistency with other NER timebound obligations*: The proposed rule will ensure consistency between 5.3.4A(d) and 5.3.4B(j); and 5.3.4A(e) and 5.3.4B(k) which is logical given that assessments for negotiated access standards and system strength remediation schemes is performed at the same stage and typically in parallel.
- *Reflection of current reality in constrained network locations*: The proposed rule reduces ambiguity about the approach to be taken by AEMO should it encounter issues in constrained network locations that require assessments in excess of 20 business days. In practice, wherever such challenges are faced by AEMO, it may be forced to exceed permitted time limits where necessary to adequately assess the impacts of a connection.

5.2.2 Costs

The costs of implementation of the proposed rule change are anticipated to be minimal. This is because the rule will not require any amendments to procedures or processes and reflects a best practise approach that AEMO would seek to apply anyway where its power system security obligations were inconsistent with timeframes for assessment of negotiated access standards.

Industry has expressed concern that a key cost of increased timeframes is increased uncertainty. If AEMO were otherwise able to complete sufficiently comprehensive and detailed assessments to provide reasonable certainty and clarity of power system outcomes within NER timeframes, this would be a fair assessment. However, given the issues driving the assessment requirements in constrained network locations, as explained in this proposal, longer assessment timeframes are already unavoidable in some cases. The proposed rule change therefore seeks to eliminate conflict between regulatory obligations that cannot be reconciled.

5.3 Transitional matters

AEMO has not identified any transitional matters that would need to be considered in transitioning to the new rule. The amended rule could commence soon after the AEMC's final determination.

6. STAKEHOLDER ENGAGEMENT

Over the last year AEMO has continued to engage with its stakeholders regarding the connections process, particularly for projects seeking connection in the WMZ. This consultation was carried out in two key phases: feedback on a Consultation Paper regarding high level options and later a draft Rule Change Proposal for a sequenced connections process in certain circumstances.

While the options originally consulted on were quite different to what has been ultimately proposed in this Rule Change Proposal, details of the consultation are included below to demonstrate the extent of stakeholder engagement and how it informed the proposed rule.

6.1 Consultation Paper

In the second half of 2020 AEMO started to investigate regulatory options to address the compliance issue presented by the sequenced integration process in the WMZ. After providing an initial overview to an NSP Connections Forum and an NSP GM Forum (at which no material concerns were raised), in December 2020 AEMO circulated a Consultation Paper setting out a high-level option for a sequenced connections process to be applied on meeting specified criteria. This paper was released to connections process stakeholders. The sequencing approach used currently in the WMZ was proposed as an example, but it was suggested

that the regulatory framework should allow flexibility for alternative approaches within a set of specified criteria and objectives.

Stakeholders representing two generation investment groups and two DNSPs provided feedback on the approach.

Issues raised were diverse and included requests for further detail on specific elements of the design of the proposed rule change, as well as more general feedback on how an alternative framework should apply.

6.2 Draft Rule Change Proposal

In May 2021 AEMO circulated a draft rule proposal to industry setting out its suggested 'sequencing' rule change, after considering and incorporating feedback on the earlier paper where feasible. In this draft, AEMO proposed a sequenced connections process which would be triggered by specified criteria indicating circumstances where the core power system objectives of connection assessments could not be met using a parallel integration process. The CEC and AEMO met to discuss the proposal through two workshops, with key points of concern considered by AEMO in preparing a further iteration of the proposal.

Subsequent to that, further discussions were held with a targeted group of CEC members. Through these discussions further concerns were raised by the group which would have necessitated more time to resolve and made a consensus position more difficult to achieve. While AEMO has continued to work with the stakeholders to further enhance the availability and accessibility of information about constrained network locations, the batching solution became better defined during this period, and AEMO determined that the benefits of the sequencing proposal were potentially diminished.

Given the above, AEMO significantly reduced the scope and complexity of its proposed change, by addressing only those obligations which posed the highest compliance risk. This will avoid the key concerns raised by stakeholders regarding the 'sequencing' rule change. Other issues regarding the connections process more generally will be considered in some detail via the CRI. AEMO has informally discussed the approach with a subset of stakeholders that were involved in previous discussions. Feedback from this smaller group indicates a preference for this rule change over the 'sequencing' rule change previously proposed.

APPENDIX A. DRAFT RULE

This draft is based on version 163 of the National Electricity Rules

5. Network Connection Access, Planning and Expansion

Part B Network Connection and Access

...

5.3 Establishing or Modifying Connection

5.3.4A Negotiated access standards

…

(d) *AEMO* must use reasonable endeavours to advise the *Network Service Provider* in writing, in respect of *AEMO advisory matters*, whether the proposed *negotiated access standard* should be accepted or rejected w~~W~~ithin 20 *business days* following the later of:

(1) receipt of a proposed *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3) or subparagraph (h)(3); and

(2) receipt of all information required to be provided by the *Connection Applicant* under clauses S5.2.4, S5.5.6, S5.3.1(a1) or S5.3a.1(a1)~~,~~.

~~*AEMO* must advise the *Network Service Provider* in writing, in respect of *AEMO advisory matters*, whether the proposed *negotiated access standard* should be accepted or rejected.~~

(d1) When advising the *Network Service Provider* under paragraph (d) to reject a proposed *negotiated access standard*, and subject to obligations in respect of *confidential information*, *AEMO* must:

(1) provide detailed reasons in writing for the rejection to the *Network Service Provider*, including:

(i) where the basis of *AEMO*'s advice is lack of evidence from the *Connection Applicant*, details of the additional evidence of the type referred to in paragraph (b2) *AEMO* requires to continue assessing the proposed *negotiated access standard*; and

(ii) the extent to which each of the matters identified at subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4) contributed to *AEMO*'s decision to reject the proposed *negotiated access standard*; and

(2) recommend a *negotiated access standard* that *AEMO* considers meets the requirements of subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4).

(e) Within 10 *business days* following the receipt of a response from *AEMO* under paragraph (d), ~~30 *business days* following the later of:~~

~~(1) receipt of a proposed *negotiated access standard* in accordance with clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3) or subparagraph (h)(3); and~~

~~(2) receipt of all information required to be provided by the *Connection Applicant* under clauses S5.2.4, S5.5.6, S5.3.1(a1) or S5.3a.1(a1),~~

the *Network Service Provider* must accept or reject a proposed *negotiated access standard*.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

…

5.3.4B System strength remediation for new connections

…

(k) A *Network Service Provider* must within 10 *business days* following the receipt of a response from *AEMO* under paragraph ~~(h)~~ (j) to a proposal for a *system strength remediation scheme*, accept or reject the proposal.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

…

5.3.6 Offer to connect

(a) A *Network Service Provider* processing an *application to connect* must make an offer to *connect* the *Connection Applicant's facilities* to the *network* within the following timeframes:

(1) where the *application to connect* was made under clause 5.3.4(a), the timeframe specified in the *preliminary program*, subject to clause 5.3.3(b)(6); and

(2) where the *application to connect* was made under clause 5.3A.9(b), a period of time no longer than 4 months from the date of receipt of the *application to connect* and any additional information requested under clause 5.3A.9(d), unless agreed otherwise.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(a1) The *Network Service Provider* may amend the time period referred to in paragraph (a)(1) to allow for any additional time taken in excess of the period allowed in the *preliminary program* for the negotiation of *negotiated access standards* in accordance with clause 5.3.4A or a *system strength remediation scheme* in accordance with clause 5.3.4B or any time taken by *AEMO* to respond under clause 5.3.4A(d) or 5.3.4B(j) in excess of 20 *business days*.

(a2) In relation to the timeframes fixed in paragraph (a)(2), for the purposes of calculating elapsed time, the following periods shall be disregarded:

(1) the period that commences on the day when a dispute is initiated under clause 8.2.4(a) and ends of the day on which the dispute is withdrawn or is resolved in accordance with clauses 8.2.6D or 8.2.9(a);

(2) any time taken to resolve a *distribution services access dispute*; and

(3) any time taken by *AEMO* to respond under clause 5.3.4A(d) or 5.3.4B(j) in excess of 20 *business days*.

APPENDIX B. WMZ GENERATION MAP

This map shows the WMZ as at November 2021 and the extent of generation connections in this zone, by project status.