

RULE

Australian Energy Market Commission

CONSULTATION PAPER

ENHANCING INVESTMENT CERTAINTY IN THE R1 PROCESS

PROPONENT

Clean Energy Council

17 AUGUST 2023

INQUIRIES

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Reference: ERC0363

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 all live and work. We pay respect to all Elders past and present and the continuing connection of Aboriginal and Torres Strait Islander peoples to Country. The AEMC office is located on the land traditionally owned by the Gadigal people of the Eora nation.

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SUMMARY

- 1 Decarbonising the electricity grid will require the connection of an unprecedented amount of generation capacity at an unprecedented rate. The Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) forecasts that variable renewable energy resource generation capacity will need to triple between now and 2030. This growth in generation capacity is evidenced by the number of new projects seeking to connect, with an increase in the size of the connection queue from 389 projects in July 2022 to 524 projects in May 2023.¹
- 2 The Clean Energy Council (CEC), alongside AEMO, network service providers (NSPs) and renewable energy developers have collaborated through the Connections Reform Initiative (CRI) to address concerns over the increasing size of the connection queue, driven in part by the larger number of generation projects seeking to connect and also by the increasing complexity of the connections process and delays in finalising new connections. The Commission acknowledges the excellent and collaborative nature of the CRI's process, which has aimed to establish workable solutions to the challenges involved in the current connections assessment and registration process, and has assisted in the AEMC in implementing some recent reforms.² Key to the CRI delivering these outcomes has been its capacity to bring together a range of parties, often with competing interests, into a genuinely collaborative process that has identified a pragmatic way forward.

3 On 17 May 2023, the CEC submitted a rule change request to the Australian Energy Market Commission (AEMC) seeking to provide greater clarity in the National Electricity Rules (NER) on the requirements, process steps, and responsibilities associated with assessing and approving the connection of new generation to the National Electricity Market (NEM).

- 4 The CEC's proposed changes focus specifically on the period between the execution of a connecting generator's connection agreement and its market registration (referred to as the R1 process). The CEC has submitted these changes to address its members' concerns regarding the:
 - amount of time it takes to produce a valid R1 modelling package that provides AEMO and NSPs sufficient certainty that the plant is going to meet the agreed performance specifications
 - 2. amount of modelling rework that is needed to provide AEMO and NSPs sufficient certainty that all plausible contingency events have been captured
 - 3. final requirements that may be imposed on the generators including whether additional equipment(e.g. harmonic filters) may be required to ensure that the plant can deliver the appropriate response.
 - We have heard that, in combination, these factors can impose significant additional costs that

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¹ This includes projects across the connection process from the enquiry stage to commissioning.

² The CRI's work has led to the AEMC implementing a final rule that establishes a lower minimum standard for reactive current capability for inverter-based resources. See: https://www.aemc.gov.au/rule-changes/efficient-reactive-current-access-standardsinverter-based-resources

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can arise from unearned revenue because project delivery is delayed and/or because of additional unanticipated project costs. These costs are inevitably recovered through higher wholesale prices, or by investors demanding higher risk premia for the debt or equity finance that they provide to fund the project.

This consultation paper is the first stage in the AEMC's assessment of this rule change request. We are seeking stakeholders' input on the need to reform the way the R1 modelling package is evaluated, if the proposed solution meets the National Electricity Objective (NEO), and if there are alternative solutions that better meet the NEO. Stakeholder submissions are due by 28 September 2023.

What is the R1 assessment procedure and what issues have the CEC identified?

- The R1 package development typically begins following confirmation of generator performance standards (GPS) and the receipt of an offer to connect, commonly referred to as the 5.3.4A letter. A connection agreement follows the receipt of this letter and signals the end of the 'Application phase' and the commencement of the 'Completion phase'.³
- 8 In the Completion phase, generation project proponents are required to develop an R1 package. This is a suite of technical design and electrical plant system modelling alongside a commissioning plan that shows AEMO and NSPs that the technical standards agreed in the 5.3.4A letter are satisfied by the plant's detailed design. If AEMO and NSPs are satisfied that there are no discrepancies between the plant design, plant models, and the performance parameters previously agreed, the generator receives approval to register as a market participant. After the generator receives registration, they are required to undertake R2 commissioning exercises, which is when generation proponents are required to demonstrate that the actual performance of the plant meets the negotiated GPS.
 - In evaluating the R1 package, we understand that AEMO and NSPs typically request clarifications to understand:
 - how the plant's design has changed between the R1 stage and earlier confirmation of the plant's GPS, if at all, and
 - whether the proponent has taken into account changes in external network conditions that have also emerged in the intervening period.
 - Design changes typically arise as the project proponent makes substantial investments to confirm the plant's detailed electrical design, procures equipment, and constructs the physical infrastructure. These engineering, procurement, and construction (EPC) works typically reveal issues with the validity of earlier assumptions (e.g. electrical distance between wind turbines, the layout of the wind or solar farm, software updates to inverter technology) that may mean that the generator may not be able to precisely meet the full range of technical parameters that it agreed with NSPs and AEMO earlier. Discrepancies in a generator's capacity to meet the relevant technical performance parameters can also arise through external network

³ Based on AEMO's NSP connection process diagram https://www.aemo.com.au/-/media/Files/Electricity/NEM/Network_Connections/NSP-connction-process-diagram-v20.pdf

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changes, such as other new generators connecting and generator retirements.

- The CEC's rule change request notes that the technical discrepancies in a generator's technical performance can typically lead to:
 - AEMO and NSPs requesting a substantial amount of additional modelling work to confirm implications for power system security and stability across a range of operational scenarios
 - substantive renegotiation of the generating plant's technical performance standards, and/or
 - additional capital investments to address power system factors that affect AEMO's ability to operate the system securely.
- 12 The CEC's rule change request notes that any one of the above factors can lead to significant project delivery delays.

We are seeking your views on the materiality of the issues arising from the delays to the R1 process

- 13 The potential for associated time penalties to project delivery can lead to the generator not being able to earn revenue to recoup the capital outlay, having to bear additional costs from procuring equipment that they did not anticipate, and financial penalties associated with not being able to deliver on energy offtake agreements. In concert, the CEC considers that these factors lead to project financiers incorporating higher risk premia into their financing structures, and proponents pricing in the cost of foregone revenue, and/or additional expenditure into future wholesale market energy pricing offers.
- 14 The CEC also notes that the delays can lead to higher wholesale prices through other market mechanisms, such as generation not being delivered ahead of significant amounts of generation exiting the system. Additionally, systematic delays in the assessment of generator's project registration applications can also lead to increased concentration in the market for EPC services, as contractors would need to hold buffers to manage their own schedule, cash and workforce planning risks. These factors may ultimately see less wholesale market competition as projects are increasingly proposed by generators with the financial capability to manage the risk of delays.

We are also seeking views on establishing the appropriate balance between timing and robust analysis for the R1 process

- 15 The Commission is also interested in understanding what power system security and stability risks NSPs and AEMO aim to manage through their assessment of the R1 suite of models. We acknowledge the inherent physical uncertainty in operating a system with a large and increasingly high penetration of inverter based generation especially as it displaces synchronous generating capacity.
- 16 These physical uncertainties mean that it is currently difficult to establish consensus on what types of technical performance deviations in a generator's performance standards are likely

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to be material and what deviations are likely to be inconsequential and can therefore be accepted. There can also be substantial differences in how and what conclusion different engineers across the industry come to on what constitutes a scale and scope efficient solution to address a power system risk that is identified at the R1 assessment stage. Moreover, we understand that the significant loss of power system engineering capability across the industry has exacerbated the above issues.

The Commission is therefore interested in understanding stakeholders' views on the ways in which:

- gaps in the regulatory framework are making the efficient assessment of R1 modelling packages more difficult, and
- broader issues outside of the regulatory framework, including the extent to which engineering and human resource challenges associated with the transition are contributing to the problems identified in the CEC's rule change request.

We are seeking views on whether the proposed framework will improve generator's technical performance negotiations

- 18 The Commission is interested in stakeholders' views on the CEC's proposed framework, including whether the framework would be likely to work in practice and whether there are alternative approaches which may be more efficient or more effective.
- 19 As part of the current R1 modelling package, the generator is required to outline:
 - 1. whether there is a material difference between its R1 modelled performance, and the generation performance standard under the 5.3.4A connection agreement
 - 2. whether the material difference is attributable to project design or due to changes in external network circumstances and
 - 3. what the system security impact of the material difference in plant performance is likely to be and who should be responsible for remediating this (this should be set out in a plan with defined timeframes for completion).
- 20 The CEC proposes that NSPs be required to approve the R1 model and allow AEMO to proceed with approving registration. The CEC also proposes that generation project proponents should be allowed to receive conditional approval without the resolution of all issues. This would be subject to the generation proponent satisfying both AEMO and NSPs that they have a clear plan for satisfactory resolution of issues identified in the conditional approval.
- A key part of the CEC's proposal lies with the NSP validating its agreement with the generator's assessment that the R1 package falls within a relevant 'Type' category at the R1 stage. The introduction of these new 'Type' categories would provide applicants with different pathways to registration. The CEC proposes that the relevant 'Type' be proposed by the applicant during the R1 stage, and subsequently agreed or rejected by the NSP in consultation with AEMO. NSPs would be required to provide clear and justified reasons to disagree with the applicant's proposed Type self-classification, following consultation with AEMO.

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	that NSPs would need to approve, are:	
	Type 0: R1 modelling identifies no issues	
	• Type 1: Applicant has non-material differences from the requirements of the negotiated access standard	
	• Type 2: Applicant has material differences which are due to changes in the external network conditions	
	• Type 3: Applicant to resolve minor issues as part of a conditional registration that specifies issues need to be remediated within a defined timeframe (e.g. commissioning or operation)	
	• Type 4: Applicant commits to resolve major issues with the plant design before registration is approved.	
23	The CEC proposes that a formal NSP assessment of materiality would be determined individually for each connection in accordance with a new guideline developed by AEMO and through negotiations between connecting parties as the R1 package is developed.	
24	If the NSP determines that the applicant's R1 package should proceed under the Type 0 or 1 action plan, the generator would proceed to registration with the parameters proposed in the R1 package.	
25	If the NSP determines that the applicant's R1 package should proceed under the Type 2 action plan, then it would inform AEMO to approve the generator's registration and take actions to remediate issues and recover costs from consumers. These actions may involve retuning the generator to local electrical conditions or addressing a network infrastructure gap through a RIT-T process. The costs TNSPs face in undertaking this work would be recovered through transmission use of system charges.	
26	If the NSP determines that the applicant's R1 package falls under the Type 3 action plan, then the generator would be required to resolve minor issues as part of commissioning or in some instances when they enter operation. This would require a mechanism to govern the conditional approval. The CEC proposes that an element to enforce the commitments within this new mechanism may be imposition of constraints or civil penalties.	
27	If the NSP determines that the applicant's R1 package is deficient under the Type 4 action plan, it would need to undertake major additional remedial work before an application to register the plant can be assessed.	
28	The Commission is interested in stakeholder views on whether the CEC's proposed framework would work in practice and whether there are any alternative proposals which may be more efficient or effective.	
29	The Commission is also interested in stakeholder views on whether the proposed framework would deliver the benefits that the CEC has identified. Namely, that the process would:	
	 speed up the entry of new generation which will place downward pressure on wholesale prices 	

The Type categories that a connecting generator would be required to self-assess under, and

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- provide more certainty for investors on the process and timeframe for registration which would flow into lower risk premia on generation investments and lower wholesale prices, and
- lower costs of managing power system issues by allocating the costs and risk of managing power system security more efficiently, and realising scope and scale economies.

We are also seeking views on the assessment criteria the Commission will use in making a draft determination

Considering the NEO, Section 7 of the National Electricity Law (NEL), and the issues raised in the rule change request, the Commission proposes to assess the rule change request against five assessment criteria.

31 Please provide feedback on our proposal to assess the request against the following criteria.

- **Ensuring a reliable, safe, and secure power system at least cost:** We have selected this criterion given that a key aim of the R1 process is to assess how a new connection will impact power system stability outcomes across a range of operational scenarios (i.e the assessment process validates that the plant will be able to operate within the agreed technical limits and not present significant system security risks).
- Decarbonisation: We have selected this criterion as the efficient and timely connection
 of renewables will be critical to meeting national emissions goals. This criterion also
 recognises the relevance of the introduction of the new emissions reduction limb of the
 NEO. It is relevant to this project as our connections process is having a material impact
 on project delivery timelines, which could slow down the connection of renewables, and
 delay the timely achievement of emission reduction targets.
- **Implementation considerations:** The CEC's proposed solution relies on AEMO and NSPs forming a view on what technical performance parameter deviations are material and what material constitutes. As the CEC acknowledges, defining materiality is likely to be complex and costly because the development, assessment and iteration of the R1 package is time consuming and relies on scarce, highly specialised power system engineering capabilities. Implementation considerations will be important for designing a durable definition of materiality, as it will need to account for generator type, system conditions, and new issues that are discovered as inverter-based resource (IBR) penetration increases.
- **Principles of good regulatory practice:** The CEC's proposal notes that the current regulatory framework is not fit for purpose. This will require the Commission to consider the right balance of setting prescriptive obligations in the rules versus principles that specify the outcomes that are in the best interest of consumers. This balance will be evaluated in relation to questions like how the R1 modelling package should be prepared, how the R1 package is evaluated, and the split between AEMO and NSPs assessment responsibilities, and their expectations of connection proponents.
- **Innovation and flexibility:** We consider innovation and flexibility important principles for resolving delays in the R1 process. This is both from the perspective of process

innovations and innovations in finding solutions to system security issues uncovered through the R1 process.

Submissions are due by 28 September 2023 with other engagement opportunities to follow

- 32 There are multiple options to provide your feedback throughout the rule change process.
- 33 Written submissions responding to this consultation paper must be lodged with Commission by 28 September 2023 via the Commission's website, <u>www.aemc.gov.au</u>.
- 34 There are other opportunities for you to engage with us, such as one-on-one discussions or industry briefing sessions. See the section of this paper about "How to engage with us" for further instructions and contact details for the project leader.

How to make a submission

We encourage you to make a submission

Stakeholders can help shape the solutions by participating in the rule change process. Engaging with stakeholders helps us understand the potential impacts of our decisions and, in so doing, contributes to well-informed, high quality rule changes.

We have included consultation questions in this paper, however, you are welcome to provide feedback on any additional matters that may assist the Commission in making its decision.

How to make a written submission

Due date: Written submissions responding to this consultation paper must be lodged with Commission by 28 September 2023.

How to make a submission: Go to the Commission's website, <u>www.aemc.gov.au</u>, find the "lodge a submission" function under the "Contact Us" tab, and select the project reference code ERC0363.⁴

You may, but are not required to, use the stakeholder submission form published with this consultation paper.

Tips for making submissions are available on our website.⁵

Publication: The Commission publishes submissions on its website. However, we will not publish parts of a submission that we agree are confidential, or that we consider inappropriate (for example offensive or defamatory content, or content that is likely to infringe intellectual property rights).⁶

⁴ If you are not able to lodge a submission online, please contact us and we will provide instructions for alternative methods to lodge the submission.

⁵ See: https://www.aemc.gov.au/our-work/changing-energy-rules-unique-process/making-rule-change-request/our-work-3

⁶ Further information is available here: <u>https://www.aemc.gov.au/contact-us/lodge-submission</u>

Other opportunities for engagement

There are other opportunities for you to engage with us, such as one-on-one discussions or industry briefing sessions.

For more information, you can contact us

Please contact the project leader with questions or feedback at any stage.

Project leader:Ashok KaniyalEmail:ashok.kaniyal@aemc.gov.auTelephone02 8296 7800

Full list of consultation questions

QUESTION 1: DO YOU AGREE THAT THE ABSENCE OF NER OBLIGATIONS ON PARTIES TO THE R1 PROCESS IS CONTRIBUTING TO POOR ENGAGEMENT AND PROCESS DELAYS?

QUESTION 2: HOW DO CONNECTING PARTIES CURRENTLY MANAGE UNCERTAINTY REGARDING TIMEFRAMES FOR THE R1 MODELLING PACKAGE ASSESSMENT AND TO WHAT EXTENT DOES PUBLIC DATA (E.G. AEMO CONNECTION SCORECARDS) ASSIST?

QUESTION 3: DOES THE EXISTING PROCESS FOR RENEGOTIATING TECHNICAL PERFORMANCE STANDARDS CREATE BARRIERS FOR ENABLING CONNECTING PARTIES TO NEGOTIATE EFFICIENT SYSTEM SECURITY AND RELIABILITY OUTCOMES?

QUESTION 4: DO YOU AGREE THAT THERE ARE PROBLEMS WITH THE WAY THE R1 PROCESS SEEKS TO RESOLVE EXTERNAL SYSTEM SECURITY ISSUES?

> QUESTION 5: HOW MATERIAL IS THE ABSENCE OF AN INDEPENDENT, EXTERNAL DISPUTE RESOLUTION PROCESS FOR THE EFFICIENT NEGOTIATION OF TECHNICAL PERFORMANCE PARAMETERS BEFORE REGISTRATION APPROVAL?

QUESTION 6: WOULD THE PROPOSED TIMELINES PROVIDE SUFFICIENT CERTAINTY ABOUT THE DURATION OF THE R1 MODEL ASSESSMENT PHASE?

QUESTION 7: DO YOU AGREE WITH THE CEC'S PROPOSAL FOR MATERIALITY GUIDELINES, INCLUDING WHETHER THEY COULD APPROPRIATELY DEFINE MATERIALITY THRESHOLDS FOR THE CATEGORISATION OF CONNECTION TYPES?

QUESTION 8: WHAT ARE YOUR VIEWS ABOUT THE PROPOSED PATHWAY FOR EACH CONNECTION TYPE, INCLUDING THE ASSIGNMENT OF OBLIGATIONS AND THE ALLOCATION OF COSTS AND RISKS?

QUESTION 9: WHAT ARE YOUR VIEWS ABOUT THE CEC'S PROPOSAL FOR DISPUTE RESOLUTION?

QUESTION 10: DO YOU SUPPORT THE CEC'S PROPOSED MODEL OR DO YOU PREFER AN ALTERNATIVE APPROACH? ARE THERE ANY MODIFICATIONS TO THE CEC PROPOSALS THAT YOU BELIEVE MAY IMPROVE IT?

QUESTION 11: DO YOU AGREE WITH THE PROPOSED ASSESSMENT CRITERIA? ARE THERE ADDITIONAL CRITERIA THAT THE COMMISSION SHOULD CONSIDER OR CRITERIA INCLUDED HERE THAT ARE NOT RELEVANT?

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THE CONTEXT FOR THIS RULE CHANGE REQUEST

This consultation paper seeks stakeholder feedback on the rule change request submitted by the CEC on 17 May 2023. The rule change proposal relates to a critical part of the registration and connections process. It seeks to clarify the obligations and timeframes for the provision of updated technical models of expected generator performance (often referred to as the pre-connection registered data or "R1"), and the assessment of these by NSPs and AEMO.

In the rule change request, the CEC identifies the issue that the current framework is leading to unacceptable delays to the timely connection and registration of generation projects. The CEC say that this is leading to generation proponents bearing significant costs that arise from delays to the project getting revenue, unanticipated project costs and/or financiers applying higher risk premia to reflect the cost of these delays.⁷

We have set out the issues and the proponent's solution in this consultation paper and have included questions in each chapter to guide feedback. You are also welcome to provide feedback on any relevant matters that may assist the Commission in making its draft decision.

1.1 Connections reform is a key priority for the transition

In recent years, there has been a significant increase in the number of connection applications compared to previous decades. From July 2022 until May 2023, the connection queue grew from 389 projects to 524 projects.⁸ This queue includes projects across the connection process from enquiry to commissioning.

As noted in AEMO's recent Q2 2023 Quarterly Energy Dynamics (QED) report⁹, the amount of new capacity progressing through application to commissioning increased by 5GW between Q2 2022 and Q2 2023. Furthermore, AEMO notes a large increase of 4.2GW to 6.8GW in connection applications getting approved from FY22 to FY23 as well as 2.9GW of generation completing commissioning.

There are two significant factors that are driving delays to the timely connection and registration of new generation. These are:

- 1. the amount of generation that is seeking connection, to facilitate both the transition to lower emissions, and to replace ageing thermal generation that is exiting the market, and
- 2. a lengthy process for approving new applications that is not being cleared quickly because of the nature of the inverter-based technologies that are now seeking connection.

While in the past, the composition of the grid was mostly large synchronous fossil fuel generators, today's generation composition is becoming increasingly inverter-based

⁷ CEC rule change request, p. 17

⁸ For more information see https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/participate-in-themarket/network-connections/connections-scorecard

⁹ For more information see https://aemo.com.au/-/media/files/major-publications/qed/2023/qed-q2-2023-report.pdf?la=en

renewables and batteries. The technology behind synchronous generators is different to inverter-based resources in multiple ways. An important difference between inverter based and synchronous technologies is the system services they are capable of providing. New technologies are being developed to include grid-forming inverters which are capable of offering additional system services above that of grid-following counterparts. We are starting to see some of these technologies being used in the NEM, and are likely to see a growth in these technologies in the future. The evolving technological capabilities of inverter-based resources, together with the large number of new connections, is contributing to a shifting landscape that is currently characterised by a degree of power system assessment uncertainty.

Related to this is the increased need for engineering resourcing to develop generators and assess power system needs. The GPS negotiation and R1 stages are highly intensive engineering processes that require adequate resourcing. The inherent nature of human capital within technological transitions is that skill sets are slow to develop and scale. We understand that the issues in the connections process can be attributed in part, to the industry struggling to have sufficient engineering resources in the context of increasing power system complexity and a high number of connections to process.

The NEM is not alone in facing these transitional challenges that give rise to delays and complications in the connections process. Jurisdictions around the world are facing similar key challenges and quirks around technical, economic and resourcing factors.

1.1.1 This rule change has emerged as an initiative from the Connections Reform Initiative

The CRI¹⁰ was formed in 2021 by AEMO and the CEC to address connection concerns, in particular the amount of time to achieve successful connection and the amount of analysis and rework required to address AEMO and NSP concerns about a generator's impact on the system. The CRI plays an important role in accelerating the energy transition. Concerns about connection issues are driving initiatives across the connection process from enquiry to commissioning.¹¹

A number of initiatives have already been delivered achieving:

- the adjustment to S5.2.5.5 minimum access standards¹²
- processes to change AEMO guidelines, and
- forums and initiatives for industry collaboration.

Other CRI elements range from the handling of Original Equipment Manufacturer (OEM) data and modelling to proposing changes to the processes around altering a connected generator's performance. Trials are also taking place under the Streamlined Connections Process (SCP) initiative of the CRI which aims to identify opportunities for greater efficiencies

¹⁰ For more information see https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forumsand-working-groups/connections-reform-initiative

¹¹ The connection process is discussed further in section 1.2.1

¹² For more information see https://www.aemc.gov.au/rule-changes/efficient-reactive-current-access-standards-inverter-based-resources

across the connections process. It is expected that work under the SCP will produce valuable results to improve the broader connections process.

This rule change relates to the R1 process that occurs before registration and prior to commissioning. It is a key pillar of the CRI and has emerged from review and consultation with developers, investors, OEMs, networks and AEMO.

To develop this rule change, the CRI held a series of workshops with their members and other stakeholders. This includes sessions with AEMO, Energy Networks Australia (ENA), the CEC's members, CRI leadership and delivery groups.

Another CRI element which is referenced within the rule change request relates to adjustments to the process around altering a connected generator's performance under NER cl. 5.3.9¹³ of the NER. The rule change notes that these provisions¹⁴ for collective generator retuning are reforms still being considered under the CRI. This access standards review is particularly relevant to this rule change request, as a project's R1 package is assessed against its previously negotiated access standards.

1.1.2 Other work in the connections space

In addition to the CRI, AEMO is focussing on improvements across the connection process. AEMO notes in the recent QED report that it is making proactive efforts to engage early with developers, OEMs and NSPs to collaborate across the connection process. This appears to already be delivering results with the time taken to assess R1 compliance reduced from 5.9 months in July 2022 to 5.2 months in June 2023, despite the growth in the overall connection queue.¹⁵

Additionally, the Australian Energy Regulator (AER) has identified opportunities to improve the ring-fencing arrangements for connection services provided by NSPs. The AER has consulted with stakeholders to understand the issues and potential solutions. On 18 July 2023, the AEMC received a rule change request¹⁶ on this matter from the AER to amend the NER with the aim to improve the connections process. We are yet to initiate this rule change request.

1.2 The CEC has proposed a rule change to clarify the generator connection and registration process known as the R1 process

The CEC's rule change identifies a need to clarify and codify the R1 process. It is suggested by the CEC that the current broader connection framework lacks significant post connection agreement prescription which is an alleged shortfall of the rules¹⁷. Therefore, this rule change

¹³ Procedure to be followed by a Generator proposing to alter a generating system. For more information see https://energyrules.aemc.gov.au/ner/477/272719#5.3.9

¹⁴ CEC rule change request, p. 57.

¹⁵ For more information see https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/participate-in-themarket/network-connections/connections-scorecard

¹⁶ For more information see https://www.aemc.gov.au/rule-changes/expanding-transmission-ring-fencing-framework

¹⁷ CEC rule change request, p. 21

presents an opportunity to improve the regulatory framework around the R1 assessment to ensure that the obligations and requirements for each party are clear.

This section provides a brief overview of the R1 process, a summary of the issues the CEC has identified, and a summary of the proposed solution and benefits. These are set out in more detail in the following chapters.

1.2.1 The purpose of the R1 process is to verify performance standards

The connection process has broadly been categorised into the following four categories:

- 1. Pre-feasibility
- 2. Enquiry
- 3. Application
- 4. Completion.¹⁸

The R1 package development typically begins following confirmation of the GPS and the receipt of an offer to connect commonly referred to as a 5.3.4 letter. This relates to the end of the Application phase and the beginning of the Completion phase. The R1 package is the suite of technical designs and supporting modelling of plant performance required in accordance with AEMO requirements.¹⁹

The purpose of the R1 process is to assess generator performance against the agreed standard with which the generator and NSP had negotiated. Furthermore, it sets out the commissioning plan that the generator will take to prove performance and achieve registration and energisation. Altogether, the R1 process assessment is a mechanism to provide confidence around plant performance.

¹⁸ For more information see Box 1 of the CEC's rule change request https://www.aemc.gov.au/sites/default/files/2023-05/CRI%20Investment%20certainty%20in%20R1%20-%20Final%20rule%20change%20request.pdf and AEMO's connection process diagram https://aemo.com.au/-/media/files/electricity/nem/network_connections/nsp-connction-process-diagramv20.pdf?la=en

¹⁹ For more information see https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/participate-in-themarket/network-connections/modelling-requirements

Figure 1.1: The R1 stage in context of the connection process

A high-level general connection process



Source: Based loosely off of AEMO's NSP connection process diagram https://www.aemo.com.au/-

/media/Files/Electricity/NEM/Network_Connections/NSP-connction-process-diagram-v20.pdf and NSP's online resources Note: The above diagram serves only as an illustration to contextualise the connection process.

1.2.2 The CEC has identified issues with the R1 process

The CEC has expressed concerns²⁰ around the current prescription of the rules in relation to the R1 process. Lack of prescription is claimed to have raised uncertainty around how decision-making and timeframes are being treated for the R1 studies²¹. Without overarching guiding principles, the CEC's members have been exposed to some of the following risks when their R1 package is being assessed:

- applicants are potentially exposed to changes or additions to the plant
- plant models are being revisited with potentially significant remodelling
- the lack of clear and prescribed timeframes are leading to open-ended delays, and
- assessment decisions that are made are not reviewable in any practical way.

The CEC has suggested that these issues are not just a concern for CEC members but have broader implications²². The CEC describes these as follows:

- Higher wholesale prices caused by:
 - risks which are borne by applicants leading to projects being delayed or not proceeding at all. This results in higher wholesale prices as applicants seek to recover the associated extra costs with those delays and/or costs foregone

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²⁰ CEC rule change request, p. 21.

²¹ CEC rule change request, p. 22.

²² CEC rule change request, chapter 7

- delays in the new entry of generation and storage assets resulting in greater supply side concentration, reducing wholesale market competition and driving inefficiently high wholesale market price outcomes, and
- inefficient allocation of responsibility with regard to power system issues being addressed by newly connecting applicants, that may not be best suited to do so.
- Reliability issues caused by a slower pace of connections insufficient to meet the energy replacement of retiring generation.
- State and national emission targets not being met quickly enough due to connection delays impacting renewable generation.

1.2.3 The CEC has proposed a solution that it considers will advance the NEO

The CEC has proposed a solution with the following components²³:

- a preliminary R1 self-assessment step to classify the connection pathway
- a materiality threshold framework which sets out different connection pathways based on plant impacts
- prescribing obligations and timeframes to provide clarity about the process and roles and responsibilities, and
- a facilitated review that encourages collaborative solutions prior to dispute resolution.

The CEC say its rule change would lead to more effective connections that would advance the NEO in the following ways²⁴:

- Lowering uncertainty to investors
- Reducing costs to consumers
- Improving reliability
- Supporting decarbonisation
- Efficiently allocating risks
- Improving power system management.

The rule change can be found on the AEMC's project page²⁵.

1.3 We have started the rule change process

The AEMC has held initial conversations with the CEC, AEMO, NSPs and expert grid engineers in the industry. These conversations have been useful, and we look forward to continued engagement with stakeholders throughout the project.

This paper is the first stage of our formal consultation process. The Commission invites stakeholders to make submissions on this consultation paper by 28 September 2023. To make a decision on this proposal, we seek stakeholder feedback on how we propose to

²³ CEC rule change request, p. 32

²⁴ CEC rule change request, p. 53

²⁵ For more information see https://www.aemc.gov.au/rule-changes/enhancing-investment-certainty-r1-process

assess the stated problem and the proposed solutions outlined in chapter 2 and chapter 3. A list of the key questions is provided at the end of the Summary section above.

We will use the standard rule change process for this request. This includes the following formal stages:

- 1. A proponent submits a rule change request.
- 2. The Commission commences the rule change process by publishing a consultation paper and seeking stakeholder feedback.
- 3. Stakeholders lodge submissions on the consultation paper and engage through other channels to make their views known to the AEMC project team.
- 4. The Commission publishes a draft determination and draft rule (if relevant).
- 5. Stakeholders lodge submissions on the draft determination and engage through other channels to make their views known to the AEMC project team.
- 6. The Commission publishes a final determination and final rule (if relevant).

The key dates for this process are outlined in Table 1.1 below.

MILESTONE	KEY DATE
The AEMC received the rule change request	17 May 2023
Consultation paper published	17 August 2023
Close of submissions to the consultation paper	28 September 2023
Publication of draft determination (and draft rule)	7 December 2023
Close of submissions to the draft determination	8 February 2024
Publication of final determination (and final rule)	21 March 2024

Table 1.1: Key project dates

Note: The Commission will consider the timing for the publication of the draft and final determinations based on stakeholder feedback to this consultation paper.

Information on how to provide your submission and other opportunities for engagement is set out at the front of this document at the end of the Summary section.

You can find more information on the rule change process in *The Rule change process* – *a guide for stakeholders*.²⁶

²⁶ The rule change process: a guide for stakeholders, June 2017, available here: https://www.aemc.gov.au/sites/default/files/2018-09/A-guide-to-the-rule-change-process-200617.PDF

2

THE PROBLEM RAISED IN THE RULE CHANGE REQUEST

The CEC's rule change request suggests there are some deficiencies in the NER regarding how the R1 package is defined, assessed and determined. These are as follows:

- that the obligations on parties responsible for evaluating connection applications are unclear and that there are no clear timeframes for decision making
- that there is insufficient flexibility to manage minor issues after registration is provided, and/or revise the technical standard
- that generators are held responsible for changes in the electrical environment that are outside of their control, and
- that decisions on the assessment of the R1 package are not reviewable.²⁷

This chapter discusses the above issues and sets out our questions for stakeholder feedback.

2.1 The CEC is concerned about the lack of clear obligations on the parties at the R1 stage

The CEC considers that the NER is unclear on the requirements, timeframes, and responsibilities associated with assessing and approving a generator's technical performance in the period between the GPS agreement and market registration.²⁸ While the NER does specify that AEMO should be provided with registered planning data that conforms to Power System Model Guidelines and Data Sheet requirements,²⁹ the CEC considers that there are no clear obligations regarding the characteristics of a complete R1 modelling package or other aspects of the process and decision-making. The CEC suggests that the absence of clarity on how AEMO and NSPs consider the R1 application, and reach their decisions, leads to significant risks being borne by generation investors.³⁰

The CEC's rule change request notes that these uncertainties arise from project proponents having contractual time-bound commitments for project construction and plant energisation.³¹ The CEC also considers that if issues with the current process are not resolved to deliver a more timely process for the entry of new generators and storage projects, there will be delays to energising sufficient generation that will lead to less supply-side competition, which will place upward pressure on wholesale prices. The CEC notes that higher wholesale prices result from project financiers bearing all the risk of project delays, even if these delays arise from factors that are outside of the applicants' direct control or factors that reflect uncertainty in the registration process.³² The CEC advises that the costs of these delays will

²⁷ CEC rule change request, pp. 21-9.

²⁸ CEC rule change request, pp. 17-18.

²⁹ NER cl. 2.2.1(e)(3) and S5.2.4(b). The CEC has advised us that sometimes the applicants submit their R1 model alongside their commissioning program, which includes test procedures, equipment that will be used in commissioning and when that information that will be submitted.

³⁰ CEC rule change request, pp. 21-2.

³¹ CEC rule change request, p. 25.

³² Ibid

eventually be priced into the financial terms of the project, which are recovered from consumers through higher energy charges.³³

The CEC further notes that the assessment of the R1 modelling package currently depends on a three-way dialogue between applicants, NSPs and AEMO. In practice, the CEC advises that AEMO and the NSP are responsible for model assessment and this results in repeats of the connection studies, to check that the expected performance of the plant meets the GPS agreement.³⁴ The CEC notes that this also leads to confusion regarding who has the primary responsibility because AEMO has overarching responsibility for system security (and agreeing the performance standards which is part of AEMO's advisory functions) but NSPs have primary responsibility for negotiating performance standards in the connection agreement.³⁵

Additionally, the R1 assessment takes considerable engineering resourcing to complete. As of the end of May 2023, the average engineering time for R1 assessment was 420 hours³⁶. In the current state of transition, NSPs and AEMO are carrying the risks of operating the power system and are attempting to grow resourcing to address new connections. Despite this, it is difficult to address all applications in a timely manner and, the connection queue is growing with the onus on NSPs and AEMO to process these connections.

We note that AEMO has made some steps to resolve these issues by making improvements to its process for engaging with connection applicants to enable more efficient assessment of R1 modelling packages that the CEC acknowledges in its rule change request. For instance, we are aware that AEMO has improved its processes by:

- providing guidance to connection proponents outlining how the R1 modelling package should be structured including how to communicate the power system stability impacts of changes in plant design or external conditions, why those changes are acceptable or otherwise and/or what remedial action will be needed³⁷
- holding more frequent collaborative workshops with generation project applicants to enable the identification of the power system stability impacts that have arisen from updates to plant design and/or changes to other external conditions³⁸, and
- engaging independent engineers to facilitate discussions between project proponents and AEMO/NSPs to mediate competing opinions regarding the materiality of power system stability issues that emerge from the R1 modelling package.³⁹

Early conversations have indicated that these changes have had a positive impact.

For the Commission to assess whether the current obligations in the NER are causing issues, we are interested in feedback on:

³³ Ibid

³⁴ CEC rule change request, p.22.

³⁵ CEC rule change request, p. 22.

³⁶ AEMO Connection Scorecard, May 2023

³⁷ CEC rule change request, p.57.

³⁸ CEC rule change request, p. 57

³⁹ CEC rule change request, p. 57.

- clarity of AEMO and NSPs requests in the lead up to receiving the R1 package and whether this has improved with the steps that AEMO has taken recently
- whether these expectations are defined in public documentation or privately as part of interactions between connecting parties, and
- whether existing communication and information provision practices by project proponents are creating problems for AEMO and NSPs in undertaking a robust review of the R1 modelling package.

QUESTION 1: DO YOU AGREE THAT THE ABSENCE OF NER OBLIGATIONS ON PARTIES TO THE R1 PROCESS IS CONTRIBUTING TO POOR ENGAGEMENT AND PROCESS DELAYS?

2.1.1 The CEC is concerned that the timeframes for the R1 assessment are not clear

The CEC considers that the absence of clear timeframes⁴⁰ for how and when AEMO and NSPs are required to communicate, provide their assessment, and request clarifications on R1 modelling packages exacerbates investment uncertainty and clear decision-making (see the above section for more details).

Currently, NER specified timeframes apply two requirements, namely that AEMO has:

- 1. five business days to inform the applicant whether further clarifications are required to support the application, and
- 2. 15 business days to determine whether to register the generator after the date AEMO receives a valid application.⁴¹

However, the CEC has noted that AEMO is often not satisfied as to a generating system's capability to meet or exceed its agreed performance standards. In these cases, AEMO does not consider the applications to be valid and the 15 business day clock is deemed to not have commenced.^{42 43}

For the Commission to evaluate the materiality of the problem relating to lack of clarity regarding timeframes for decision making, we would need to understand how connecting parties currently manage and seek clarity on timeframes through general project management practices. We will also need to understand why existing information, such as AEMO connection scorecard data does not provide clarity regarding how long the R1 assessment process should take and what aspects of this data are unclear. We are interested in your feedback on the above matters in response to the stakeholder question below.

⁴⁰ CEC rule change request, p. 25.

⁴¹ NER cl. 2.9.1 and 2.9.2.

⁴² NER cl. 2.2.1(e)(3).

⁴³ CEC rule change request, Box 4, p. 25.

> QUESTION 2: HOW DO CONNECTING PARTIES CURRENTLY MANAGE UNCERTAINTY REGARDING TIMEFRAMES FOR THE R1 MODELLING PACKAGE ASSESSMENT AND TO WHAT EXTENT DOES PUBLIC DATA (E.G. AEMO CONNECTION SCORECARDS) ASSIST?

2.2 The CEC considers that the R1 process is too inflexible

The CEC has identified two issues with the regulatory framework that are leading to AEMO and NSPs not having sufficient flexibility to manage the uncertainties inherent in the technical assessment of the R1 modelling package.⁴⁴ The CEC has identified these issues as being that:

- even minor reductions in the level of performance standard capability between GPS agreement and energisation are not accepted, and
- AEMO and NSPs are not able to provide generation applicants conditional registration, validate those conditions are met, and take enforcement action where appropriate.

<u>The CEC considers that the current process for revising down GPS capability to be</u> <u>time-consuming, ineffective and cumbersome</u>

The CEC has identified that difficulties in the current process for renegotiating a generation proponents' technical performance arise from applying the NER cl. 5.3.9 process which requires that any renegotiated access standard must be no less onerous than the existing performance standard.⁴⁵

The CEC considers that this means that one element of the performance standard cannot be revised down, even if it does not lead to any negative power system impact, without reopening negotiation of all aspects of the performance standards. The CEC's rule change request notes that this typically leads to significant amounts of rework for connection applicants, which often lead to minimal, if any, system security benefits.⁴⁶

NER cl. 5.3.9 was made to provide a safe harbour for operators of legacy plant who were not able to meet the minimum access standard outlined in Chapter 5 as part of the National Electricity Amendment (Generator technical performance standards) Rule 2018 No. 10.⁴⁷ However, the CEC has advised that this clause creates significant problems, when used in the context of new plant having to renegotiate performance standards during the R1 stage. The CEC notes that as the clause strictly prevents any reduction of the performance standard, it has stopped applicants, NSPs and AEMO adjusting performance standards to less onerous levels – even if these still exceed the minimum access standard and if the revision would be appropriate from the perspective of system security and operability.⁴⁸

⁴⁴ CEC rule change request, p. 23

⁴⁵ NER cl. 5.3.4A(b)(1A), CEC rule change request, p. 23.

⁴⁶ CEC rule change request, p. 23.

⁴⁷ See: https://www.aemc.gov.au/rule-changes/generator-technical-performance-standards

⁴⁸ CEC rule change request, p. 23.

For the Commission to understand how the existing process creates inflexibility, we need to understand the specific circumstances under which a downward revision of a technical performance standard was appropriate but was difficult under the current rules. We are also interested in understanding the implications of maintaining current arrangements, including how much time renegotiation of technical performance standards under the NER cl. 5.3.9 process takes currently and why that is problematic.

QUESTION 3: DOES THE EXISTING PROCESS FOR RENEGOTIATING TECHNICAL PERFORMANCE STANDARDS CREATE BARRIERS FOR ENABLING CONNECTING PARTIES TO NEGOTIATE EFFICIENT SYSTEM SECURITY AND RELIABILITY OUTCOMES?

2.3 The CEC considers that generators are held responsible for changes outside of their control

The CEC considers that generation connection applicants face significant risks of delays to project delivery by being held responsible for any external changes in conditions that occur in the time between finalising performance standards, executing the connection agreement with AEMO/NSPs, completion of the R1 assessment, and confirming registration. The CEC considers this to be because any external changes to the power system will be reflected in the R1 modelling, impacting on the ability to demonstrate compliance with the agreed standards.⁴⁹ These external changes in the power system may be attributable to:

- nearby generation or load modifying its technical settings
- closure of nearby generation, e.g. exit of thermal plant
- new generation or load connecting to the network nearby, and
- changes to network design due to the introduction of new elements to the transmission grid.

The CEC notes that if any of these changes happen before the R1 assessment is finalised, generators have to remodel their technical performance.⁵⁰ This results in delays and sometimes additional capital investment. The CEC's view is that generators bear a disproportionately high burden for managing the impact of these external events, and the allocation of these risks to generators typically leads to developers adding risk premia to recover the additional costs or lost revenue attributable to delays.

The CEC suggests that the effects of external power system changes could be managed at a lower cost if a broader suite of solutions is considered.⁵¹ The CEC considers that this is likely to be best achieved through collective action, or an action on the shared network, which the applicant cannot typically coordinate or finance effectively on its own. For example, one of

⁴⁹ CEC rule change request, p. 55.

⁵⁰ CEC rule change request, p. 18.

⁵¹ CEC rule change request, p. 55.

the most efficient ways for NSPs to meet their system strength obligations has been identified to be through collective inverter retuning for multiple generators. Such collective retuning would be coordinated by the NSP, with any costs incurred recoverable through the new system strength charging mechanisms.

The Commission is interested in stakeholder feedback to better understand both the impact on AEMO/NSPs' ability to assess the implication of a given connection on their ability to maintain secure system operation, and the impact on generation project proponents meeting project delivery goals from being required to take into account external circumstances outside of their control or awareness (e.g. what project development stage a nearby generator is at). This includes:

- AEMO and NSPs' current process for determining the range of external factors that should be considered in the R1 modelling package and how this internal process was arrived at
- AEMO and NSPs' process for excepting project proponents from considering a change in external circumstances that has emerged late in the R1 modelling package assessment process (e.g. change in the commitment of a nearby generator or design of network element), and
- implications for project delivery from being required to undertake remodelling to account for external circumstances (including the time taken and costs of undertaking the work).

We are interested in your feedback on the above matters when responding to the stakeholder question below.

QUESTION 4: DO YOU AGREE THAT THERE ARE PROBLEMS WITH THE WAY THE R1 PROCESS SEEKS TO RESOLVE EXTERNAL SYSTEM SECURITY ISSUES?

2.4 The CEC is concerned that R1 decisions are not reviewable

The NER frameworks provide for three dispute resolution processes relevant to connections: the Independent Engineer⁵², Commercial Arbitration ⁵³, and Dispute Resolution⁵⁴processes. These frameworks aim to provide recourse for market participants who find themselves in intractable disputes when engaging with NSPs and/or AEMO. A brief description of each of these frameworks is provided below. ⁵⁵

- 1. The **independent engineer process** was introduced to advise on technical issues that relate to connection where the services being provided by TNSPs are negotiated transmission services (e.g., connections).
- 2. The **commercial arbiter** can consider any dispute referred to it that arises between a TNSP and a Connection Applicant as to the terms and conditions of access for the

⁵² NER cl. 5.3

⁵³ NER cl. 5.5

⁵⁴ NER cl. 8.2

⁵⁵ CEC rule change request, pp. 26-7.

provision of prescribed transmission services, the provision of negotiated transmission services.

3. The dispute resolution process applies to proposed access arrangements or connection agreements for connection applicants for connection and access to distribution networks or to the transmission network in Victoria. The AEMC determined in 2017 that this process should not be open to parties negotiating transmission access as they are likely to be well-resourced and therefore do not require access to the prescriptive process set out in Chapter 8 of the NER. The Commission at the time noted that "the independent engineer process is more fit-for-purpose compared to the mediation and scoping stages provided for in the Chapter 8 process, since disagreements are likely to be technical in nature".⁵⁶

In relation to the independent engineer process, the CEC has advised that the scope of the independent engineer's role is limited to the provision of advice on technical issues only, and therefore does not include advice on the cost, commercial terms, process or timing of a connection.⁵⁷ A further issue with the independent engineer process is that decisions of the independent engineer are not binding on the parties who are seeking arbitration.

The CEC has noted that dispute resolution processes are intended to address the relative information asymmetries that exist in negotiations with natural monopolies.⁵⁸ However, the CEC has noted that existing dispute resolution processes do not apply to all the considerations that are made through the R1 process. Furthermore, there is limited ability for applicants to have any decisions made during this stage independently reviewed. The absence of certainty on the applicability on the stages, and timing of the R1 process would also make getting any decision reviewed difficult. For example, when an applicant provides R1 planning data to AEMO, AEMO has no clear and express obligation to assess this information and determine if it is incomplete or if it contains information upon which AEMO requires clarification.⁵⁹

For the Commission to inform its assessment of the implications of gaps in existing dispute resolution frameworks, we are interested in understanding whether the changes that AEMO has made to its internal assessment process have or are likely to improve the effectiveness of communications between connecting parties. The Commission is also interested in understanding the implication of circumstances where independent, external dispute resolution would have been beneficial but was not available to connecting parties.

⁵⁶ Transmission Connections and Planning Arrangements (TCAPA) rule change final determination, p 220. https://www.aemc.gov.au/sites/default/files/content/906c54d0-8546-4a83-8172-2a5fb4d5bd93/Final-determination.pdf

⁵⁷ CEC rule change request, p. 28.

⁵⁸ CEC rule change request, p. 27.

⁵⁹ NER cl. 5.2.4(b)

> QUESTION 5: HOW MATERIAL IS THE ABSENCE OF AN INDEPENDENT, EXTERNAL DISPUTE RESOLUTION PROCESS FOR THE EFFICIENT NEGOTIATION OF TECHNICAL PERFORMANCE PARAMETERS BEFORE REGISTRATION APPROVAL?

3

THE PROPOSED SOLUTION AND IMPLEMENTATION

The CEC's proposed solution seeks to amend the R1 process. The current R1 process begins after the applicant gets its offer to connect and begins preparing the R1 package for submission. Once the R1 package is submitted, TNSPs and AEMO work to assess whether the plant's modelled performance will meet its negotiated GPS. At this stage, the plant's performance is based on modelling as the plant has not completed construction yet.

The proposed solution is to amend the R1 process so that it can better manage the challenges associated with the transition such as the complexity associated with connecting new technologies at scale. The proposed solution incorporates the following three key elements⁶⁰:

- applicants undertaking a self-assessment to determine whether there is a material discrepancy between the R1 modelling results and that agreed at the earlier stage defined under NER cl. 5.3.4A.
- NSPs and AEMO's obligations to evaluate whether the applicant's self-assessment is valid and determine the actions that NSPs, AEMO and the applicants will need to take to confirm registration, and
- a facilitated review process to manage disagreements between applicants.

This chapter seeks feedback on this framework and includes questions for stakeholders to consider.

3.1 The CEC proposes that the R1 process should begin with selfassessment

The CEC proposes that a revised R1 process would begin with the applicant performing a self assessment accompanied by an 'R1 assessment report'. The purpose of self-assessment would be to resolve issues associated with the applicant, the NSP and AEMO making different assumptions based on a changing power system.⁶¹The CEC proposes that this new requirement on applicants to develop and submit a self-assessment would be supported by a suite of R1 modelling and design information.⁶² It would also require:

- all parties to hold discussions and collaborate in advance of the formal submission of the applicant's R1 self-assessment⁶³, and
- the applicant to provide advance notification to inform NSPs and AEMO of when applications and R1 assessment reports will be submitted.⁶⁴

The CEC proposes that self-assessment would require proponents to compare the plant's performance against the agreed performance standard defined in NER cl. 5.3.4A and

⁶⁰ CEC rule change request, pp 32-33.

⁶¹ CEC rule change request, p. 35

⁶² Ibid.

⁶³ CEC rule change request, pp. 35, 40.

⁶⁴ Ibid.

recommend an action pathway to registration. The CEC proposes that these pathways to registration fall within one of five Type categories:

- Type 0: All obligations of the negotiated access standard are met.⁶⁵
- Type 1: There are non-material deviations between the R1 model and negotiated access standard and the R1 modelled plant capability should replace the original GPS.⁶⁶
- Type 2: There are material issues due to changes in the external network environment that should be addressed by NSPs.⁶⁷
- Type 3: There are minor issues and registration should be approved with conditions and a defined plan for meeting those conditions.⁶⁸
- Type 4: There are major issues that need to be rectified before registration.⁶⁹

The applicants' recommendation of a Type pathway and associated actions (including no action) would identify whether there is a discrepancy between the R1 modelled performance and that agreed earlier through the NER cl. 5.3.4A process. It would also identify whether this discrepancy would have a material impact on the power system.⁷⁰ This definition of materiality would be a critical new element of the R1 assessment process (see section 3.2.2). The rule change request suggests that, prior to the R1 submission, the expectation is that a lot of work would be done collaboratively between the applicant, NSPs and AEMO. In doing this, the expectations of the type of connection would be more aligned.⁷¹

⁶⁵ CEC rule change request, p. 5.

⁶⁶ CEC rule change request, p. 5.

⁶⁷ CEC rule change request, p. 6

⁶⁸ CEC rule change request, p. 6.

⁶⁹ CEC rule change request, pp. 6-7.

⁷⁰ CEC rule change request, pp. 35-7.

⁷¹ CEC rule change request, Box 8.



Figure 3.1: The CEC's proposed new R1 process

3.2

The CEC proposes a framework for R1 package evaluation obligations to offer more predictability in evaluation of registration applications

The second part of the R1 framework requires NSPs to evaluate the applicant's selfassessment with input from AEMO and to confirm whether they agree with the action Type the applicant has proposed. Following this, AEMO would be required to confirm the terms under which the applicant's plant is registered or to reject the application. This section sets out the CEC's proposed new obligations that require:

- NSPs and AEMO to review the R1 package and come to a decision to accept or to reclassify the generator's application within a Type category within a defined timeline, and evidence their decisions (see section 3.2.1)⁷²
- AEMO to develop and maintain a new guideline to define the materiality that would guide connecting parties' consideration of the technical performance parameters that are 'material' to stable power system performance and otherwise (see section 3.2.2)⁷³
- 3. NSPs and AEMO to ensure that applicants remediate potential power system impacts before registration is confirmed or for NSPs to take actions themselves to mitigate the impact of new connections, if there are external circumstances. The CEC proposes that this would require AEMO and/or the AER to maintain a second guideline to inform what

⁷² CEC rule change request, p. 37.

⁷³ CEC rule change request, pp. 35-6, 39-40.

constitutes external circumstances and how NSPs can recover the costs of remedial activities arising from R1 package evaluation (see section 3.2.3).⁷⁴

3.2.1 The CEC proposes that timelines for R1 process evaluation should be made consistent with those that apply to the evaluation of GPS as part of the NER cl. 5.3.4A process

The CEC proposes that a new, time-limited process be introduced to require AEMO and NSPs to identify and assess any discrepancies in modelled behaviour between the R1 and the earlier confirmation of the GPS under NER cl. 5.3.4A.⁷⁵ This is consistent with other elements of the connection process, including under NER cl. 5.3.4A, where NSPs are subject to a defined timeline for either rejecting or approving the negotiated access standard proposed by the applicant (with reference to advice from AEMO if relevant). For consistency, the CEC proposes the implementation of similar prescription for the R1 process.⁷⁶

This framework would place the onus on the applicant to provide quality, correct data and models to resolve any identified issues in the lead up to submission of the R1 package. Equally, it would also require AEMO and NSPs to ensure that they are satisfied with the way the modelling data has been prepared, the scenarios that have been considered, and the reasons for any discrepancies between the R1 model and the GPS negotiated earlier.⁷⁷ After the R1 package is formally submitted, the CEC proposes that:

- AEMO advises NSPs on AEMO advisory matters within 20 business days of the submission of the R1 package⁷⁸, and
- at the same time, the NSP completes its review of the R1 model within **30 business** days of the submission of the R1 package.⁷⁹

The CEC proposes that the primary obligation on the NSP in this timeframe would be to determine whether to accept the applicant's self-assessed Type classification that is evidenced by its R1 model. Once a decision is made, the NSP would provide the applicant either with its R1 approval, which can be used to demonstrate compliance under NER cl. 2.2.1(e)(3), or the onus would be on the NSP to evidence why the applicant should not be approved (and therefore registered) without further work.⁸⁰

QUESTION 6: WOULD THE PROPOSED TIMELINES PROVIDE SUFFICIENT CERTAINTY ABOUT THE DURATION OF THE R1 MODEL ASSESSMENT PHASE?

⁷⁴ CEC rule change request, pp. 43-9.

⁷⁵ CEC rule change request, p.37.

⁷⁶ Ibid.

⁷⁷ Ibid.

⁷⁸ Ibid.

⁷⁹ CEC rule change request, pp. 37-8.

⁸⁰ CEC rule change request, p. 37.

3.2.2 The CEC proposes that AEMO develop guidelines to define 'materiality" and how it should be applied to assessment of the R1 package

One of the CEC's main concerns about the existing process is that connecting parties can form differing opinions on whether a deviation between performance agreed under the NER cl. 5.3.4A process and the R1 stage is likely to have a material impact on power system stability. The CEC's proposal for materiality guidelines would aim to address this by creating incentives for connecting parties to develop pragmatic engineering solutions to assess and manage power system risks.⁸¹

The rule change proposal notes that an assessment of materiality is essential to having sensible conversations regarding the likely magnitude of power system impacts from a deviation in a connecting plant's technical performance and the probability of a power system security/operability event being caused by that deviation.⁸² To establish a credible, and durable definition for materiality, the CEC proposes that AEMO work with industry to determine:

- the performance parameters that will be assessed under the framework⁸³
- how materiality thresholds would be re-negotiated as part of the R1 package and assessed as part of different connection scenarios⁸⁴, and
- how issues with the materiality framework would be identified and addressed, including by taking into account the lessons from connections that have used this framework.⁸⁵

The CEC also proposes that the materiality guideline should outline the specific conditions under which it may be appropriate to apply quantitative thresholds that would allow parties to easily determine if their R1 package exceeds a materiality threshold.⁸⁶ The CEC suggests that it is appropriate that AEMO has lead responsibility in developing this guideline with NSP input, as they are the parties whose NER compliance obligations are impacted by the introduction of a new materiality threshold framework.⁸⁷ They also recommend considering the merits of extending the guideline to provide clarity on how NSPs and AEMO generally consider issues, including how common issues are tackled, and the range of solutions that are explored to minimise the risk of delays.

The request also notes that the CRI's process offers a good model for collaboration, which should be applied to the development of this guideline. Further collaboration can be achieved by requiring that guideline development meet the NER defined consultative framework.⁸⁸

83 CEC rule change request, p. 39.

⁸¹ CEC rule change request, Box 8, p. 40.

⁸² Ibid.

⁸⁴ Ibid

⁸⁵ Ibid

⁸⁶ CEC rule change request, pp. 39, 41.

⁸⁷ CEC rule change request, p. 40.

⁸⁸ CEC rule change request, p. 40.

> QUESTION 7: DO YOU AGREE WITH THE CEC'S PROPOSAL FOR MATERIALITY GUIDELINES, INCLUDING WHETHER THEY COULD APPROPRIATELY DEFINE MATERIALITY THRESHOLDS FOR THE CATEGORISATION OF CONNECTION TYPES?

3.2.3

The CEC proposes obligations on AEMO and NSPs to evaluate generator's self-assessment of the Type classifications

As discussed earlier in this chapter, the CEC considers that giving connecting applicants the ability to self assess the Type pathway that their project falls into, would enable more efficient allocation of system security risks between generators, NSPs and AEMO (see section 3.1). The second part of the process requires AEMO and NSPs to either validate their agreement with the connecting applicant's assessment or recommend reclassification of the R1 package, with accompanying evidence, and in doing so make one of the following conclusions regarding the applicant's R1 package:

- 1. There are no deviations between the GPS agreed at the NER cl. 5.3.4A stage and that outlined in the R1 package (Type 0).⁸⁹
- 2. There are non-material or minor deviations between the NER cl. 5.3.4A GPS and the R1 package that the NSP will accept (Type 1).⁹⁰
- 3. There are material deviations between the NER cl. 5.3.4A GPS and the R1 package and NSPs will be required to identify and procure the lowest cost solution to resolve the external power system issues that are contributing to discrepancies between the applicant's R1 stage and the GPS agreed earlier (Type 2).⁹¹
- There are minor deviations between the NER cl. 5.3.4A GPS and the R1 package that can be resolved after registration is approved as part of a conditional registration process (Type 3).⁹²
- 5. There are material deviations between the NER cl. 5.3.4A GPS and the R1 package that the NSP will have to evidence and require connecting parties to resolve (Type 4).⁹³

This section outlines in more detail the CEC's proposal for each connection Type, including what obligations would be placed on AEMO and NSPs.

Proposed Type 0: NSPs and AEMO would confirm Type 0 if there are no deviations between NER cl. 5.3.4A GPS and R1 package

If there are no deviations between the negotiated performance standard agreed under NER cl. 5.3.4A and the R1 modelling package, the CEC propose that NSPs would simply accept the applicant's proposal and AEMO would confirm the applicant's market registration. The CEC's

⁸⁹ CEC rule change request, p. 38.

⁹⁰ CEC rule change request, p. 39.

⁹¹ CEC rule change request, p. 43.

⁹² CEC rule change request, p. 49.

⁹³ CEC rule change request, pp. 50-1.

rule change proposal accepts that there are unlikely to be many projects, whose registration would be confirmed under this typology. This is because there are typically some differences between the models used to agree performance standards through the standard NER cl. 5.3.4A process and the more detailed R1 package.⁹⁴

Proposed Type 1: NSPs and AEMO would confirm registration if there are non-material or minor deviations from the NER cl. 5.3.4A GPS

The CEC asserts that currently AEMO and NSPs undertake strict interpretations of any deviations between the GPS negotiated at the NER cl. 5.3.4A stage and that presented at the R1 stage. These strict interpretations lead to delays that do not enable an efficient assessment of locationally appropriate generator technical performance standards.⁹⁵

To address this issue, the CEC proposes that if NSPs and AEMO determine that the R1 package shows minor or non-material deviations from the GPS negotiated at the NER cl. 5.3.4A stage, they should be provided with the option to either:⁹⁶

- accept the capability demonstrated in the R1 model and that this should 'replace' the
 originally determined performance standards. The CEC notes that this is not permitted
 under current arrangements and instead AEMO and NSPs are required to request plant
 redesign and/or remodelling for relatively minor deviations identified in the R1 process⁹⁷,
 or
- provide for minor adjustments to the generator's performance standard relative to materiality thresholds that would apply to a defined set of technical performance parameters that would be based on independent AEMO/NSP assessments.⁹⁸

The CEC also notes that a connection proponent could also identify deviations from the NER cl. 5.3.4A GPS and propose thresholds for a new negotiated performance standard that is evidenced by the R1 modelling package. This negotiation would consider the specific needs of the network at the location of the connection. The CEC's proposed materiality thresholds would then enable more efficient assessment of how a new plant can progress through to registration while also informing the GPS that would apply to their operation post-registration.⁹⁹ The materiality thresholds would therefore set reasonable boundaries that would facilitate the finalisation of the performance standards that would apply to the generator when it is in full operation.¹⁰⁰

Proposed Type 2: NSPs would be required to take actions to mitigate the impact on generator's technical performance from changes due to external network changes

Unforeseen external network conditions can often lead to a connecting generator's R1 modelling package showing deviations in a set of technical performance parameters relative

⁹⁴ CEC rule change request, p. 38.

⁹⁵ CEC rule change request, p. 39.

⁹⁶ Ibid.

⁹⁷ CEC rule change request, p. 42.

⁹⁸ Ibid.

⁹⁹ CEC rule change request, p. 41.

¹⁰⁰ CEC rule change request, pp.39-42.

to the GPS that was agreed at the NER cl. 5.3.4A stage.¹⁰¹ The CEC notes that this can occur through changes in external network conditions such as the unexpected retirement of a large synchronous unit in the electrical vicinity, energisation of major transmission augmentations, or the successful energisation of a local generator.¹⁰² We understand that these changes can result in interactions with a newly connecting generator, which may result in system security or power quality issues.

The CEC proposes that the Type 2 process would help resolve these issues. This would require TNSPs to identify the lowest cost solution to resolve the relevant system security issues.¹⁰³ The CEC asserts that TNSPs are best positioned to resolve these kinds of issues at the lowest cost to consumers, as this approach is consistent with the system strength framework. The system strength framework incorporates measures to manage converter driven instability by establishing a standardised requirement to deliver 'efficient levels' of system strength. The CEC considers that an equivalent TNSP responsibility would allow economies of scale and scope to be leveraged to ensure that system security issues identified through the R1 stage are managed at least cost.¹⁰⁴

The CEC asserts that the solution it proposes contrasts with the existing process where multiple generators try to independently resolve these issues and that this may be leading to some inefficiencies. Specifically, the CEC considers that, under this Type, NSPs would:

"leverage ... access to information, as well as scale and scope of efficiencies, to manage the impacts of changes in external power system conditions. Rather than having multiple generators trying to independently resolve issues, the TNSP can coordinate and identify the single lowest cost solution."¹⁰⁵

The CEC also proposes that any measure taken by the TNSP would be a regulated activity, which would be recoverable either as capital or operating expenditure, through the regulatory determination process.¹⁰⁶

The CEC proposes that the Type 2 process would require¹⁰⁷:

- development of a new NSP guideline to allow applicants to consistently assess the network implications of their suite of R1 models, and
- cost recovery mechanisms to allow NSPs to identify issues that would need to be resolved at the R1 stage, and fund implementation of the least cost solution to these issues (see Box 1).

¹⁰¹ CEC rule change request, p. 43.

¹⁰² Ibid.

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

¹⁰⁷ CEC rule change request, pp 43-49.

BOX 1: PROPOSAL FOR A SECOND, SPECIFIC GUIDELINE FOR TYPE 2 CONNECTIONS COVERING FUNDING OF SYSTEM SECURITY SOLUTIONS BY NSPS

The CEC proposes that AEMO or the AER be required to develop a guideline that would include:

- a methodology for assessing whether the R1 model has identified an external power system issue that is distinct from an issue with generator design
- a process for TNSPs to determine the optimal solution, which may include requesting changes to generator design from the applicant, and
- a methodology for calculating a fair payment for the implementation of design changes from applicants (e.g. a request from the NSP to generators that they retune the inverter control system) or a network investment to resolve a system security or operability issue.

The rule change request proposes this guideline as separate to the materiality guideline but suggests it may be merged. The Commission will consider whether it is suitable for the two guidelines to be merged. The CEC proposes that development of the guideline should be collaborative between networks and generators and there be ongoing ideas sharing.

The rule change request proposes that the fair payment amount should cover costs including the impact of delays. The CEC considers that both NSPs and the connecting generator would face strong incentives to quickly identify the most efficient, lowest cost, and fastest pathway to resolution. This is because the connecting applicant would want to be registered as quickly as possible, while the TNSP would want to minimise the cost of exercises to retune and address the identified issue.

As reasonable costs may be difficult to determine, the CEC proposes that it may be simplest to determine a standardised schedule of payments for certain actions in a Type 2 process. This could be developed by each TNSP, with the AER, generation project proponents, and OEMs. The CEC also proposes that NSPs be given optionality to recover reasonable and efficient expenditure through either or both of the following two options:

- Cost pass through that is not subject to materiality thresholds to cover shortfalls in capital
 or operating expenditure to address system security or operability issues identified
 through the R1 modelling package
 - Cost pass-throughs are generally subject to the TNSP incurring materially higher costs, where materiality is defined as 1% of the maximum allowed revenue for the TNSP in the relevant regulatory year. The CEC considers that this materiality test should be waived for costs that may be incurred through the R1 process because they are considered to be uncontrollable costs.
- Contingent project RIT-T process with triggers identified by NSPs in the current or the next regulatory control period to address broader network issues identified at the R1 stage.

If the AER agrees that the triggers for a contingent project have been met and that it
passes the RIT-T, these costs would be recovered by consumers through the
transmission use of system (TUOS) charge. The CEC considers that the reliability and
price benefits to consumers from reducing delays in connecting new generation will
far outweigh any minor increases in TUOS associated with TNSPs meeting this new
obligation. These risks in turn result in increased premiums levied by financiers, to
address the risks of material project delays.

The CEC considers that the above approach is likely to be simpler than establishing a more locally efficient pricing mechanism incorporated within the system strength charging framework. The system strength charging framework, sees TNSPs recover costs as a common prescribed service, through charges levied on generators who elect to utilise the network provided system strength and consumers through the 'postage stamp' component of the transmission use of system charge.

The CEC considers that applying a similar mechanism to sharing the costs of TNSP measures to manage the effects of external network changes in R1 may be possible. This is because retuning solutions may very closely resemble the kinds of TNSP led solutions to manage external network issues in the R1 process. However, the CEC's rule change request notes that other issues that affect projects at the R1 stage, such as harmonic interactions, may not be captured under the definitions of maintenance of voltage waveform stability.

Proposed Type 3 - NSPs and AEMO would define and enforce conditional registration specifying that minor issues be resolved by generators in commissioning or in full operation

The CEC proposes that under a Type 3 process, connection applicants could propose to resolve issues that NSPs agree to be minor, later in the connection process or potentially even beyond commissioning.¹⁰⁸ Applying this process would require NSPs to validate that connection applicants have made all reasonable efforts to resolve issues prior to being granted conditional registration and that the minor deviations between the NER cl. 5.3.4A performance standards and the R1 model are unlikely to have a negative impact on the stability of the generating system or network stability.¹⁰⁹

This proposed process would see AEMO and NSPs placing conditional obligations on the applicant, alongside the R1 model package. The CEC also posits that AEMO could allow energy export under certain conditions but require that a long-term solution from the generator be provided within a defined timeframe and plan that is agreed with AEMO and NSPs.¹¹⁰

The proposed plan may also note that issues specified in the conditional registration approval need to be rectified by the connecting generator at either the R2 stage (when actual plant performance is validated against the R1 model), or within a certain timeframe after the plant

¹⁰⁸ CEC rule change request, p. 49.

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

is in full operation.¹¹¹ For example, this may result in generator's being obliged to resolve its conditional approval commitments before being released from certain commissioning hold points.¹¹²

If a particular generator becomes a threat to system security, the CEC also notes that AEMO can use constraint equations to limit export of generation, if the generator does not meet the commitments in its conditional approval. It may also be appropriate that identified issues can be rectified beyond commissioning, once the generating system is fully energised and exporting energy at full capacity. The CEC also notes that effective implementation of conditional approval would require mechanisms for AEMO or NSPs to seek the imposition of civil penalties by the Courts, where applicants do not meet the commitments specified in the R1 package.¹¹³

Proposed Type 4 - NSPs would evidence and specify why an applicant needs to resolve material issues with the R1 package before registration is granted

The CEC proposes that the Type 4 process would apply if an NSP, on AEMO's advice, rejects the R1 application within the defined time period (see section 3.2.1). This would happen if material issues in the connecting applicant's R1 package are identified due to significant differences in the detailed design of the plant as compared to the standard design, upon which the NER cl. 5.3.4A GPS is negotiated.¹¹⁴

The CEC proposes that applying this process would require the NSP to demonstrate how connection of the plant would lead to a substantial negative impact on system security, power quality or operability.¹¹⁵ To do so, the CEC proposes that NSPs would need to demonstrate:

- how the applicant's R1 model indicates performance outside of the materiality definition
- how the changes in the modelled outcome arise from internal plant design issues and not external factors
- that connection of the plant would lead to a negative impact on power system security, quality or operability that would materially affect consumers or other market participants, and
- that the issue cannot be resolved during the R2 stage through a conditional registration approvals process.¹¹⁶

The NSP and generator applicant would also need to agree a required course of action to rectify the identified issue or set of issues. The CEC notes that design changes at this stage would likely need to be assessed under the process laid out in NER cl. 5.3.9.¹¹⁷ Under this scenario, the applicant would change its plant design to meet the required performance

¹¹¹ CEC rule change request, p. 50.

¹¹² Ibid.

¹¹³ Ibid.

¹¹⁴ Ibid.

¹¹⁵ CEC rule change request, p. 51.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

standard. The R1 model would not be accepted until the plant's performance meets NSPs expectations that there are no material deviations in the negotiated performance standard confirmed at the R1 stage relative to that agreed at the NER cl. 5.3.4A stage.¹¹⁸

QUESTION 8: WHAT ARE YOUR VIEWS ABOUT THE PROPOSED PATHWAY FOR EACH CONNECTION TYPE, INCLUDING THE ASSIGNMENT OF OBLIGATIONS AND THE ALLOCATION OF COSTS AND RISKS?

3.3

CEC proposes a facilitated review mechanism to manage disagreements that could cause delays

The rule change request notes that, where there are disagreements, it is currently unclear what options exist for coming to a resolution. The CEC proposes requirements for AEMO, NSPs and connecting generators to be brought together in facilitated discussions. The purpose of these discussions would be to focus on how issues identified at the R1 stage can be resolved pragmatically. This process will also provide a mechanism to escalate issues to find a workable solution for all parties. The proposed mechanism is in the form of a new third-party facilitator. The CEC proposes that AEMO and NSPs would be required to engage in this facilitated review process within 10 business days of the request from the applicant. The purpose of facilitated review would be to encourage healthy resolution of the issues and determine what avenues are available for connection. It is noted that the CEC has proposed that it would not have any authority to offer binding resolutions on the generator NSP or AEMO.¹¹⁹

The CEC also proposes that if there is a dispute that cannot be resolved, this should be taken through the independent engineer process, through arbitration as laid out in rule 5.5 of the NER¹²⁰, or through the dispute resolution process in NER cl. 8.2. Appropriate controls would need to be in place to ensure deficient applications and frivolous matters do not disproportionately or inappropriately utilise AEMO's and other parties' limited resources.¹²¹ The Commission will consider whether facilitated reviews would face similar challenges that the current process faces and what steps could be taken to ensure an effective review process.

The Commission is aware that AEMO has already taken steps towards establishing facilitated reviews, by engaging external independent engineers who are required to review both the R1 package and AEMO's assessment of the model.¹²² We are interested in stakeholders' views on the effectiveness of this process as it currently stands, how it can be improved, and if rule requirements are the best way of facilitating those improvements.

¹¹⁸ Ibid.

¹¹⁹ CEC rule change request, pp. 51-2.

¹²⁰ Commercial arbitration for prescribed and negotiated transmission services

¹²¹ CEC rule change request, p. 52.

¹²² CEC rule change request, p. 57.

QUESTION 9: WHAT ARE YOUR VIEWS ABOUT THE CEC'S PROPOSAL FOR DISPUTE RESOLUTION?

3.4 The Commission is interested in alternative models

The Commission acknowledges that the CEC's proposed model has been consulted on widely through the CRI working group forum. However, consistent with conducting appropriate regulatory impact analysis through the rule change process, it is important that we consider alternative options to the proposal set out by the proponent.

In assessing the rule change request we would also need to consider options including no rule change or only minimal changes. Minimal changes could include:

1. Prescribing timeframes for R1 package assessment to establish consistency between the R1 assessment process and generator performance standard negotiation through the NER cl. 5.3.4A process.

We have heard that a key barrier to faster evaluation of R1 modelling packages is an industry wide shortage of power systems engineering human resource capability. We have also heard that the issues that the R1 model evaluation aims to resolve are fundamentally uncertain and that the concept of what constitutes reasonable engineering judgement is not settled. This means that requirements to establish prescriptive guidance on what constitutes materiality, and external circumstances may not be durable to a rapidly evolving power system.

Stakeholders who are sympathetic to this view, may consider that there would be greater value in focussing efforts on solutions that sit outside of the NER, such as AEMO's recent work to deliver continual improvements to the way it collaborates with NSPs and applicants. AEMO is also trialling the engagement of independent engineers whose aim is to facilitate frank and open discussions on the power system impacts of different modelled R1 scenarios. This collaborative approach may be more effective at speeding up the R1 process and could provide the industry with more transparency on the timeframes that can be expected for R1 package assessment. However, we understand that other stakeholders may be concerned that solely relying on AEMO's process innovations may not provide sufficient additional certainty on how the R1 package is assessed.

2. Prescribing changes that would enable NSPs and AEMO to undertake a lighter touch review of the R1 package

This option would enable the analysis of actual performance data that could provide a better way to establish consensus between all connecting parties on the key power system stability issues, compared to using modelled R1 analyses. Moreover, these performance data can in turn provide a means for NSPs to negotiate remediation actions that the registered generator would need to undertake. Enforcement of these actions would then depend on NSPs verifying that remedial action has been undertaken and

where it is not undertaken, AEMO can impose constraints to require that the remedial work be completed.

Stakeholders may favour such an approach if they held the view that the increasing complexity and volume of applications in the connection queue, means that key power system stability issues are only able to be properly understood when the generator becomes fully operational. However, other stakeholders may oppose this approach which would come with its own set of risks. For example, generators would need to manage the risks associated with AEMO imposing constraints on their output. There would also be risks for AEMO in having to proactively manage potential shortfalls in energy output from having imposed constraints on generator output.

QUESTION 10: DO YOU SUPPORT THE CEC'S PROPOSED MODEL OR DO YOU PREFER AN ALTERNATIVE APPROACH? ARE THERE ANY MODIFICATIONS TO THE CEC PROPOSALS THAT YOU BELIEVE MAY IMPROVE IT?

4

MAKING OUR DECISION

When considering a rule change proposal, the Commission considers a range of factors.

This chapter outlines:

- issues the Commission must take into account
- the proposed assessment framework
- decisions the Commission can make
- rule-making for the Northern Territory.

We would like your feedback on the proposed assessment framework.

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

The Commission is bound by the NEL to only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the NEO.

The NEO is set out in section 7 of the NEL as.¹²³

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:

- price, quality, safety, reliability and security of supply of electricity; and
- the reliability, safety and security of the national electricity system.

4.2 We propose to assess the rule change using these five criteria

Our regulatory impact analysis methodology

Considering the NEO and the issues raised in the rule change request, the Commission proposes to assess this rule change request against the set of criteria outlined below. These assessment criteria reflect the key potential impacts – costs and benefits – of the rule change request. We consider these impacts within the framework of the NEO.

The Commission's regulatory impact analysis may use qualitative and/or quantitative methodologies. The depth of analysis will be commensurate with the potential impacts of the proposed rule change. We may refine the regulatory impact analysis methodology as this rule change progresses, including in response to stakeholder submissions.

Consistent with good regulatory practice, we also assess other viable policy options including not making the proposed rule (a business-as-usual scenario) and making a more preferable rule - using the same set of assessment criteria and impact analysis methodology where feasible.

Assessment criteria and rationale

¹²³ In May 2023, energy ministers approved amendments to the national energy laws to include an emissions reduction component in the energy objectives. The legislative process is currently in train and is expected to conclude in September 2023. While this paper reflects the current NEO, future publications on this rule change will adopt the new objectives after the law change takes effect.

The proposed assessment criteria and rationale for each are provided below.

1. Safety, security, and reliability

We selected safety, security, and reliability as an assessment criterion because the R1 process aims to assess how a new connection will impact power system stability outcomes across a range of operational scenarios. The R1 process aims to validate whether the plant will be able to operate within the agreed technical limits and not present significant system security risks.

The CEC believes that AEMO and TNSPs may be conservative when it comes to establishing the system security risks of deviations in technical performance of the plant over the project development life cycle up to the point the plant is registered and commissioned. The rule change request aims to improve collaboration and clarify which deviations would be material in impacting system security to relieve tension during R1.

We understand that the CEC's proposal aims to address this risk by setting out a new process to govern the range of decisions that AEMO and NSPs can make in response to the R1 modelling results. This assessment criterion will be used to assess how any changes that are made to the R1 process will improve the efficiency of delivering system security goals at the lowest cost.

2. Emissions reduction

We will consider whether the proposed rule would efficiently contribute to the achievement of government targets for reducing, or that are likely to reduce, Australia's greenhouse gas emissions. (Note that we will apply this criterion if and when the law changes to include emission reduction targets in the NEO take effect.)

We selected this criterion in the context of the expected new emissions reduction limb of the NEO, as the efficient and timely connection of renewables will be critical to meeting emission reduction goals. The rule change request claims that complexity of our connections process may be having a material impact on project delivery timelines. This could slow down the connection of renewables, impact investor confidence and consequently have implications for the timely achievement of emission reduction targets. Addressing these issues would help to achieve emission reduction and renewable energy targets.

3. Implementation considerations

The CEC's proposed solution relies on AEMO and NSPs forming an ex ante view on what type of technical performance parameter deviations are material. Establishing consensus on materiality is likely to be complex and costly because the development, assessment and iteration of the R1 package is time consuming and relies on scarce, highly specialised power system engineering capabilities.

This means that any definition of materiality will need to account for generator type, system conditions, new issues are discovered as inverter-based resource penetration increases (i.e. through academic research, generators and system operators' experience). It will also need to balance with providing AEMO and TNSP connections the flexibility to make engineering judgements within a materiality framework.

> This assessment criterion will help us evaluate the feasibility of arriving at a credible, durable definition for materiality, and whether the benefits of such a definition would exceed the costs. If defining materiality is not feasible, this criterion will provide a way to consider the benefits of requiring NSPs and AEMO to prepare, and maintain guidelines, for example.

> We will explore the use of guidelines, or other procedure documentation to help connecting generators understand how they should approach the R1 process. This assessment criterion will help us evaluate whether such requirements would help create a body of practice that is accepted across the industry to establish more consistency in the way R1 evaluations are undertaken.

4. Innovation and flexibility

There are two categories of innovation that are relevant to this rule change request.

Process innovations – that lead to AEMO and NSPs identifying new ways to collaborate with project developers, their grid connection advisors, and OEMs. These innovations could lead to connecting parties improving their efficiency at identifying and establishing clarity on the impacts of discrepancies between generator performance standard (GPS) and the R1 package assessment. These process innovations will also improve the way AEMO, NSPs and project proponents collaborate in interpreting modelling and establishing the benefits and limitations of modelling, and thereby lessen technical uncertainty regarding power system outcomes that is leading to over-analysis.

System security solution innovations – Process innovations will, in turn, help connecting parties establish a shared understanding of the scope of technical solutions that will be available to connecting parties to resolve system stability issues at least cost, or to jointly address issues that constrain the realisation of broader market benefits.

This assessment criterion will allow the AEMC to explore how the R1 process could incentivise connecting parties to identify issues more efficiently, while avoiding inadvertently closing off opportunities for solution innovation. Two notable examples of solution innovation are briefly described below:

- NSPs coordinating the retuning of several electrically proximate inverter-based generators to site-specific electrical conditions is something that may need to happen several times over the life of a generation project
- Generators identifying how proactive investment in auxiliary equipment could ease constraints they face over the life of the project is another way of avoiding more expensive, centrally coordinated network solutions.

Providing flexibility as part of designing the R1 negotiation process will allow process innovation that can relieve pressure to assess compliance with generator system requirements within narrow NER-defined ranges for key technical performance parameters. This assessment criterion will help us explore ways to incentivise connecting parties to solve system needs iteratively through collaboration, especially as system conditions change.

5. Principles of good regulatory practice

The issues in this rule change request relate to the problem of the Rules not being fit for purpose in the context of the different types of connections and volume that we are now seeing. We have selected principles of good regulatory practice as it will be important for thinking about issues related to transparency and simplicity in the R1 process. This includes in relation to how the R1 modelling package should be prepared, how assessors evaluate the R1 package, the split between AEMO's and NSPs' assessment responsibilities, and their expectations for collaboration with connection proponents. It will also be important for considering the barriers to engaging effectively with AEMO and NSPs in the registration process. This includes the appropriateness of proponents having to manage these barriers by engaging the support of specialist grid connection engineers who advise them of the details of that process.

This assessment criterion will also help us evaluate where prescriptive guidance that may enhance the predictability of outcomes for generation project developers may be appropriate. For instance, this is likely to be particularly relevant to assessments of whether NSPs or generation project developers should bear the costs of remediating system stability issues that are discovered through the registration assessment process.

QUESTION 11: DO YOU AGREE WITH THE PROPOSED ASSESSMENT CRITERIA? ARE THERE ADDITIONAL CRITERIA THAT THE COMMISSION SHOULD CONSIDER OR CRITERIA INCLUDED HERE THAT ARE NOT RELEVANT?

4.3 We have three options when making our decision

After using the assessment framework to consider the rule change request, the Commission may decide:

- to make the rule as proposed by the proponent¹²⁴
- to make a rule that is different to the proposed rule (a more preferable rule), as discussed below, or
- not to make a rule.

The Commission may make a more preferable rule (which may be materially different to the proposed 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.¹²⁵

¹²⁴ The proponent describes its proposed rule in Sections 4 and 5 of the CEC's rule change request.

¹²⁵ Section 91A of the NEL.

4.4

We may make a different rule to apply in the Northern Territory

Parts of 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. 126

Parts of the proposed rule would apply in the Northern Territory, as it amends provisions in NER chapter 5 that apply in the Northern Territory.¹²⁷

The Commission will therefore assess the proposed rule against additional elements required by Northern Territory legislation:

- Should the NEO test include the Northern Territory electricity systems? For this rule change request, the Commission will determine whether the reference to the "national electricity system" in the NEO includes the local electricity systems in the Northern Territory, or just the national electricity system, having regard to the nature, scope or operation of the proposed rule.¹²⁸
- Should the rule be different in the Northern Territory? The Commission will consider whether a uniform or differential rule should apply to the Northern Territory, taking into account whether the different physical characteristics of the Northern Territory's network would affect the operation of the rule in such a way that a differential rule would better contribute to the NEO.¹²⁹

¹²⁶ National Electricity (Northern Territory) (National Uniform Legislation) Act 2015 (**NT Act**). The regulations under the NT Act are the National Electricity (Northern Territory) (National Uniform Legislation) (Modification) Regulations 2016.

¹²⁷ Under the NT Act and its regulations, only certain parts of the NER have been adopted in the Northern Territory. The version of the NER that applies in the Northern Territory is available on the AEMC website at: https://energy-rules.aemc.gov.au/ntner.

¹²⁸ Clause 14A of Schedule 1 to the NT Act, inserting section 88(2a) into the NEL as it applies in the Northern Territory.

¹²⁹ Clause 14B of Schedule 1 to the NT Act, inserting section 88AA into the NEL as it applies in the Northern Territory.

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CEC	Clean Energy Council
Commission	See AEMC
CRI	Connections Reform Initiative
ENA	Energy Networks Australia
EPC	Engineering Procurement and Construction
ERCOT	Electric Reliability Council of Texas
GPS	Generator Performance Standards
IBR	Inverter Based Resource
ISP	Integrated System Plan
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NER	National Electricity Rules
OEM	Original Equipment Manufacturer
Proponent	The proponent of the rule change request
QED	Quarterly Energy Dynamics
QNI	Queensland-New South Wales Interconnector
R1	Pre-connection registered data
R2	Post-connection registered data
SCP	Streamlined Connections Process