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Indicative Technical Requirements for generation and storage connections in New England Renewable Energy Zone

Discussion Paper

December 2025

Acknowledgement of Country

The Energy Corporation of New South Wales acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past and present through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Published by The Energy Corporation of New South Wales

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First published: December 2025

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TMP-MC-R-DC-V1.2

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Introduction

Renewable Energy Zones (REZ) are designed to function as modern-day power stations. REZs bring together large-scale renewable energy generation projects, storage projects and network infrastructure to provide affordable, clean and reliable electricity to homes and businesses in NSW.

The New England REZ is the largest of the REZs identified in the NSW Electricity Infrastructure Roadmap (Roadmap). The REZ will deliver new network infrastructure to unlock renewable energy generation and storage projects within the region. It will play a critical role in delivering the State's energy transition, helping to keep the lights on as coal-fired power stations retire.

EnergyCo has been appointed as the Infrastructure Planner for the New England REZ and is responsible for coordinating the delivery of the new network infrastructure, generation and storage in the REZ. This coordination is important in ensuring efficient utilisation of the new infrastructure and improving affordability for NSW electricity consumers.

One avenue for coordinating renewable energy generation in the New England REZ is an Access Scheme, where generators and storage proponents are required to obtain an Access Right or consent of the Infrastructure Planner before connecting to specified network infrastructure.

EnergyCo recently consulted on the potential design of an Access Scheme for the [New England Renewable Energy Zone Generation and Storage Consultation Paper](#) (the Consultation Paper). As part of the Access Rights Regime proposed under an Access Scheme, EnergyCo may require generator and storage projects to meet a specific set of technical requirements known as Access Standards. If applied under a New England REZ Access Scheme, the Access Standards must be met by generator and storage proponents connecting to the access rights network under the scheme, rather than those proponents negotiating technical requirements for connection under the National Electricity Rules (NER).

While some of the technical requirements set out in the Access Standards will need to be informed by detailed power system modelling, EnergyCo is providing its indicative views on a subset of technical requirements to:

- Provide an indication of EnergyCo's current thinking and early guidance to generation and storage projects intending to connect to the New England REZ, and
- Seek feedback on the indicative technical requirements to inform the development of draft REZ Access Standards to be formally consulted upon in late 2026.

What are REZ Access Standards?

Access Standards specify a range of technical requirements for access that must be met by Access Right Holders (subject to limited exceptions) under a REZ Access Scheme. This contrasts with the process under the NER where generation and storage proponents negotiate Generator Performance Standards with the relevant Network Operator and the Australian

Energy Market Operator (AEMO) within minimum and automatic access standards specified in the NER, schedule 5.2.

Access Standards applied in the New England REZ would be developed in accordance with the EII Regulation and cover all clauses in Schedule 5.2.5 - S5.2.8 of the NER.

The final Generator Performance Standards agreed under the connection agreement between the relevant Network Operator and each generator or storage plant will be based upon the REZ Access Standards, however it is proposed that the performance standards will be able to capture the actual performance of the plant at the time of the connection offer if that performance exceeds the required level of performance specified under the Access Standards. It would be at a connection applicant's discretion to commit to a level of performance that exceeds the minimum technical requirements in the Access Standards.

Indicative Technical Requirements

Purpose

EnergyCo has developed Indicative Technical Requirements to provide an early indication of EnergyCo's thinking on performance standards for generator and storage projects considering connection to specified network infrastructure in the New England REZ.

The Indicative Technical Requirements are proposed to cover solar, wind and battery projects. EnergyCo is considering treating synchronous plants (e.g. pumped hydro projects) on a case-by-case basis.

As outlined in the Consultation Paper, EnergyCo is considering appropriate transitional arrangements for Projects that have commenced the connection process under the NER.

The Indicative Technical Requirements cover clauses under Schedule 5.2 of the NER that either do not require detailed power system modelling or can be informed by New England REZ planning studies.

The Indicative Technical Requirements can be split into two categories:

1. Clauses under S5.2 where the Automatic Access Standard (AAS) or Minimum Access Standard (where the AAS is not defined under the NER) will be applied
2. Clauses under S5.2 that are proposed to, or may, deviate from the AAS

It is important to note that the Indicative Technical Requirements are indicative only and the final REZ Access Standards may differ from the indicative position in this paper.

More detail on the Indicative Technical Requirements is provided in the Appendix.

How have the Indicative Technical Requirements been developed?

The Indicative Technical Requirements have been informed by:

- Requirements that can be used as input to the plant design (e.g. protection and monitoring)
- Ongoing experience with approved technical performance levels in the National Electricity Market (NEM).

EnergyCo has also consulted AEMO in the development of the Indicative Technical Requirements.

Clauses of NER, Schedule 5.2 where the Indicative Technical Requirement is the same as the Minimum or Automatic Access Standard

Based on knowledge of prevailing performance standards in the NEM, EnergyCo proposes that the Indicative Technical Requirements for many of the clauses in Schedule 5.2 of the NER employ the current AAS¹, as these clauses are typically agreed to at the AAS.

Clauses of NER, Schedule 5.2 for which the Indicative Technical Requirement is the Automatic Access Standard

- S5.2.5.3 Response to frequency disturbances
- S5.2.5.4 Response to voltage disturbances
- S5.2.5.8 Protection from Power System disturbances
- S5.2.5.9 Protection systems that impact on Power system security
- S5.2.5.10 Detection and response to unstable operation
- S5.2.5.11 Frequency control
- S5.2.5.14 Active power control

Clauses of NER, Schedule 5.2 for which the Indicative Technical Requirement is the Minimum Access Standard

- S5.2.5.6 Response to abnormal voltage quality

Clauses of NER, Schedule 5.2 where the Indicative Technical Requirement is proposed to, or may, deviate from the AAS

EnergyCo has identified three main clauses in NER, Schedule 5.2 for which the Indicative Technical Requirement is proposed to deviate from the AAS for that clause under the NER:

- S5.2.5.1 Reactive Power Capability
- S5.2.5.2 Quality of electricity generated
- S5.2.5.15 Short circuit ratio

S5.2.5.1 Reactive Power Capability

Current network planning studies undertaken by EnergyCo suggest that a reactive power capability of 30% of Pmax will be sufficient to support the operation of the New England REZ. This number may be updated as further studies are conducted.

¹ As per version 239 of the NER.

S5.2.5.2 Quality of electricity generated (harmonics)

The New England REZ is expected to host a significant amount of inverter-based resources which can present challenges to the stable operation of the network.

To manage this, EnergyCo is currently considering the installation of 330kV and/or 500kV harmonic filters to support the harmonic environment within the New England REZ.

Generators will need to assess the operation of their plant and ensure that it meets emission levels at their connection point to the New England REZ network, and EnergyCo is considering pathways to allow generators to optimise their plant design with the 330kV and/or 500kV filters that may be installed on the network.

EnergyCo is considering options so that the Network Operator and Transgrid use a common approach to the management of the harmonic performance within the REZ and the wider transmission network.

The proposed approach is intended to allow for an optimised approach to managing harmonics in the New England REZ network and minimise the cost passed on to consumers.

Generators should assume that they will be required to meet at least the same obligations for harmonics as they would under the NER and will be provided with further information in the draft REZ Access Standards when more studies are undertaken and the network design is further progressed.

S5.2.5.15 Short circuit ratio (system strength)

As outlined in the Consultation Paper, EnergyCo is considering a framework to coordinate the efficient delivery of system strength across both new and existing networks in the New England REZ. This framework is designed to align as closely as possible to the current NER framework while making changes that allow for greater certainty of the required quantity of system strength to be provided, and greater coordination between network operators.

The Indicative Technical Requirement for withstand short circuit ratio is the indicative requirement to be met by all generation and storage projects at the connection point. Under the proposed approach outlined in the Consultation Paper, projects must meet the short circuit ratio at the connection point specified in the REZ Access Standards and mitigate their system strength demand so that they meet, or are deemed to meet, a short circuit ratio of 1.2.

The Consultation Paper outlines the proposed options that generation and storage projects will have to meet this requirement.

Please refer to the Appendix and the Consultation Paper for more information on the proposed approach to managing system strength in the New England REZ.

Indicative Technical Requirements where detailed power system modelling is required

EnergyCo has identified three clauses in NER, Schedule 5.2 that require detailed power system modelling to determine an appropriate level of performance. As such, EnergyCo has not proposed Indicative Technical Requirements for these clauses as these studies have not yet been undertaken.

- S5.2.5.5 Disturbance ride-through capability
- S5.2.5.5.A Responses to disturbances following contingency events
- S5.2.5.12 Impact on network capability
- S5.2.5.13 Voltage and reactive power control

More details on these clauses will be presented in the draft REZ Access Standards once more detailed studies have been undertaken.

Next steps

EnergyCo welcomes feedback on these Indicative Technical Requirements, particularly from generation, storage and hybrid projects and network proponents participating in the New England REZ network operator procurement process.

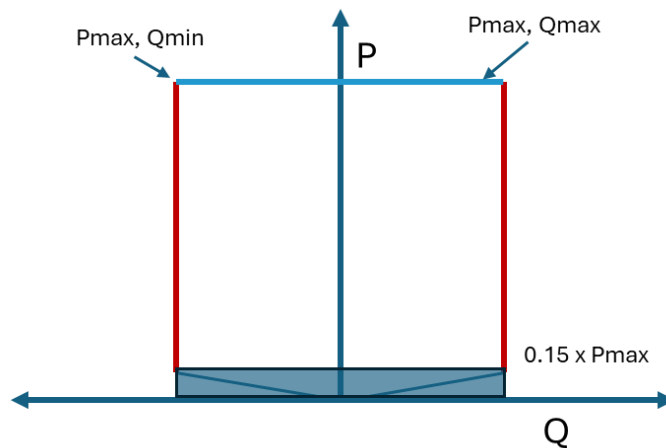
Feedback is open until 6 February 2026 and can be emailed to nerez.generators@energyco.nsw.gov.au

Appendix – Indicative Technical Requirements

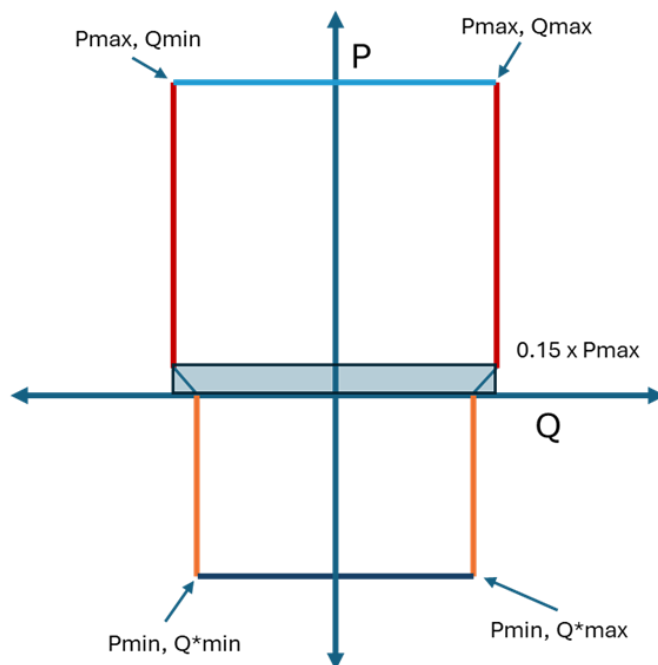
| National Electricity Rules Clause | Indicative Technical Requirement | | | | | | | | | | | | | | | |
|--|--|---------------------------|--------------------|--------------------|------|------------|--------------|-------------|------------|--------------|---------------|---------------------------|---------------------------|-----------------------|------------|-------------|
| <p>S5.2.5.1 Reactive power capability</p> | <p>The network planning studies undertaken by EnergyCo will inform the requirement for the reactive power from generator/IRS. 30% of the Pmax is used as a place holder only in this document.</p> <p>For generators, the reactive power requirement below 15% of Pmax, is to allow it to linearly reduce to zero from 15% active power to 0 active power.</p> <p>For IRS, in addition to the above, the BESS component will be required to provide reactive power equal to 30% of the Pmin, when active power is between zero and Pmin².</p> <p>Reactive power capability at the connection point:</p> <table border="1" data-bbox="467 1010 1469 1379"> <thead> <tr> <th>Active Power</th> <th>Max Reactive Power</th> <th>Min Reactive Power</th> </tr> </thead> <tbody> <tr> <td>Pmax</td> <td>0.3 x Pmax</td> <td>- 0.3 x Pmax</td> </tr> <tr> <td>0.15 x Pmax</td> <td>0.3 x Pmax</td> <td>- 0.3 x Pmax</td> </tr> <tr> <td>< 0.15 x Pmax</td> <td>linearly reducing to zero</td> <td>linearly reducing to zero</td> </tr> <tr> <td>For IRS 0MW – Pmin</td> <td>0.3 x Pmin</td> <td>-0.3 x Pmin</td> </tr> </tbody> </table> | Active Power | Max Reactive Power | Min Reactive Power | Pmax | 0.3 x Pmax | - 0.3 x Pmax | 0.15 x Pmax | 0.3 x Pmax | - 0.3 x Pmax | < 0.15 x Pmax | linearly reducing to zero | linearly reducing to zero | For IRS 0MW – Pmin | 0.3 x Pmin | -0.3 x Pmin |
| Active Power | Max Reactive Power | Min Reactive Power | | | | | | | | | | | | | | |
| Pmax | 0.3 x Pmax | - 0.3 x Pmax | | | | | | | | | | | | | | |
| 0.15 x Pmax | 0.3 x Pmax | - 0.3 x Pmax | | | | | | | | | | | | | | |
| < 0.15 x Pmax | linearly reducing to zero | linearly reducing to zero | | | | | | | | | | | | | | |
| For IRS 0MW – Pmin | 0.3 x Pmin | -0.3 x Pmin | | | | | | | | | | | | | | |

² Plant may be required to exceed some of the clauses under Minimum Technical Requirements or REZ Access Standards to meet other clauses

For Generator



For IRS

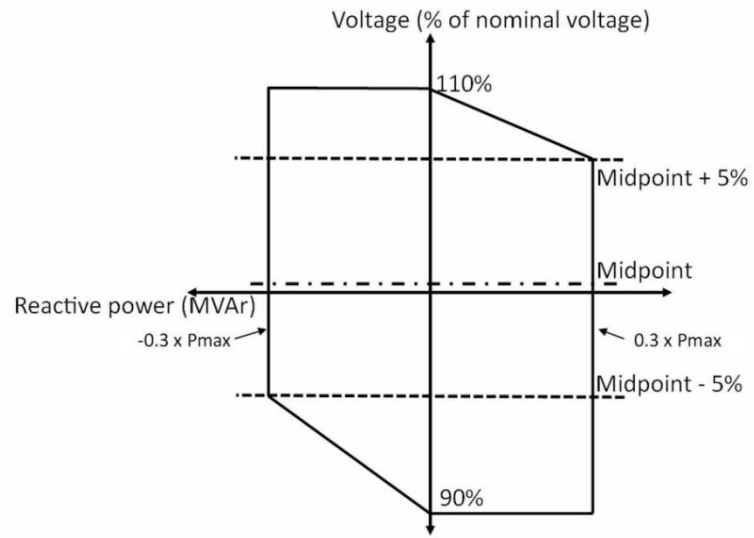


These reactive power requirements apply to a 10% voltage band centred around the mid-point voltage, where the mid-point voltage will be specified by the Network Operator, within the range of 100% to 104% of nominal voltage at the connection point.

- For voltages within the 10% voltage band, require at least $0.3 \times P_{max}$ reactive injection and absorption.
- For voltages below the 10% voltage band down to 90%, require at least $0.3 \times P_{max}$ reactive injection.
- For voltages above the 10% voltage band down to 110%, require at least $0.3 \times P_{max}$ reactive absorption.

| National Electricity Rules Clause | Indicative Technical Requirement |
|-----------------------------------|----------------------------------|
|-----------------------------------|----------------------------------|

- For voltage from the lower limit of the 10% voltage band to 90%, the requirement for reactive absorption decreases linearly with decrease in voltage from $-0.3 \times P_{max}$ to 0 MVar.
- For voltages above the 10% voltage band up to 110%, the requirement for reactive injection reduces linearly from $0.3 \times P_{max}$ to 0 MVar.



| | | |
|------------------|--|--|
| S5.2.5.2 | Quality of electricity generated | Generators can assume to meet at least the same obligations in the NER and will be provided with further information in the draft REZ Access Standards when more studies are undertaken and the network design is further progressed. |
| S5.2.5.3 | Response to frequency disturbances | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.3 as per the NER. |
| S5.2.5.4 | Response to voltage disturbances | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.4 as per the NER. |
| S5.2.5.5 | Disturbance ride-through capability | <p>Power system studies to be performed to inform the requirements for this clause.</p> <p>It is expected that requirements will not be more onerous than automatic access standard defined under S5.2.5.5 of the NER.</p> |
| S5.2.5.5A | Responses to disturbances following contingency events | <p>Power system studies to be performed to inform the requirements for this clause.</p> <p>It is expected that requirements will not be more onerous than automatic access standard defined under S5.2.5.5A of the National Electricity Rules.</p> |

| National Electricity Rules Clause | Indicative Technical Requirement |
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| S5.2.5.6 Response to abnormal voltage quality | Generators/IRS are expected to meet the Minimum Access Standard for clause S5.2.5.6 as per the NER. |
| S5.2.5.7 Partial load rejection for synchronous production units | N/A |
| S5.2.5.8 Protection from power system disturbances | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.8 as per the NER. |
| S5.2.5.9 Protection systems that impact on power system security | <p>Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.9 as per the NER.</p> <p>Energisation of any of the plant's HV transformers should not result in Connection Point voltage outside of range of 0.9pu – 1.1pu of the Normal Voltage.</p> <p>Fault location: 500kV bus and HV-MV transformers</p> <ul style="list-style-type: none"> • 'A' protection $\leq 80\text{ms}$ • 'A' protection CB fail $\leq 175\text{ms}$ • 'B' protection $\leq 80\text{ms}$ • 'B' protection CB fail $\leq 175\text{ms}$ <p>Fault location: 330kV bus and HV-MV transformers</p> <ul style="list-style-type: none"> • 'A' protection $\leq 100\text{ms}$ • 'A' protection CB fail $\leq 250\text{ms}$ • 'B' protection $\leq 100\text{ms}$ <p>'B' protection CB fail $\leq 250\text{ms}$</p> <p>Fault location: 132kV bus and HV-MV transformers</p> <p>'A' protection $\leq 120\text{ms}$</p> <p>'A' protection CB fail $\leq 430\text{ms}$</p> <p>'B' protection $\leq 120\text{ms}$</p> <p>'B' protection CB fail $\leq 430\text{ms}$</p> <p>Fault Location: 33kV Buses (if PoC is 330kV or higher)</p> <ul style="list-style-type: none"> • 'A' Protection: $\leq 120\text{ms}$ |

| National Electricity Rules Clause | Indicative Technical Requirement |
|---|--|
| | <ul style="list-style-type: none"> • 'A' Protection CB fail: ≤ 250ms • 'B' Protection: ≤ 120ms 'B' Protection CB fail: ≤ 250ms Fault Location: 33kV Buses (if PoC is 132kV) 'A' Protection: ≤ 220ms 'A' Protection CB fail: ≤ 430ms 'B' Protection: ≤ 220ms 'B' Protection CB fail: ≤ 430ms |
| S5.2.5.10 Detection and response to unstable operation | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.10 as per the NER. Generator/IRS should have a sub-synchronous oscillation instability protection system, which will promptly raise and send an alarm to the Generator, Network Service Provider (NSP) and AEMO control centres, and is capable of promptly disconnecting the generating system for conditions where current or voltage at the Connection Point becomes unstable as assessed in accordance with the guidelines for power system stability established under clause 4.3.4(h), with settings, functions and operation agreed with the NSP and AEMO. |
| S5.2.5.11 Frequency control | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.11 as per the NER. |
| S5.2.5.12 Impact on network capability | Power system studies to be performed to inform the requirements for this clause. It is expected that requirements will not be more onerous than Automatic Access Standard defined under S5.2.5.12 of the NER. |
| S5.2.5.13 Voltage and reactive power control | Power system studies to be performed to inform the requirements for this clause. It is expected that requirements will not be more onerous than Automatic Access Standard defined under S5.2.5.13 of the NER. |
| S5.2.5.14 Active power control | Generators/IRS are expected to meet the Automatic Access Standard for clause S5.2.5.14 as per the NER. |
| S5.2.5.15 Short circuit ratio | The value used for SCR for minimum technical requirement is a placeholder only at this stage. This value can be changed as a result of the outcome of the consultation. |

| National Electricity Rules Clause | Indicative Technical Requirement |
|-----------------------------------|--|
| | <p>Plant is expected to meet the technical requirements defined in future RAS at SCR = 1.8 and X/R =3 and 10 subject to following.</p> <ul style="list-style-type: none"> • Any limitation due to reactive power requirements in the RAS • Assessment is limited to the Single Machine Infinite Bus (SMIB) modelling only <p>Plant should have flexibility to adapt different settings as per the NO and AEMO direction as part of the connection process.</p> |