Connection Guideline

Battery Energy Storage System (BESS) ≥ 5MW

Endeavour Energy

POWER together

Contents

Abbreviations

Term	Definition
AAS	Automatic Access Standard
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AGC	Automatic Generation Control System
ASP	Accredited Service Provider (Level 1: construct; Level 3: design)
AVR	Automatic Voltage Regulator
BCDA	Battery Connection Development Agreement
BCSA	Battery Connection Services Agreement
BESS	Battery Energy Storage System
DER	Distributed Energy Resource
DMAT	Dynamic Model Acceptance Test
DNSP	Distribution Network Service Provider
ECM	Energy Conversion Model
EMT	Electromagnetic Transient
FAT	Factory Acceptance Testing
FCAS	Frequency Control Ancillary Services
FIA	Full Impact Assessment
GPS	Generator Performance Standards
HP	Hold Point
IBR	Inverter-Based Resource

Term	Definition
IRP	Integrated Resource Provider
MAS	Minimum Access Standard
NAS	Negotiated Access Standard
NEL	National Electricity Law
NEM	National Electricity Market
NER	National Electricity Rules
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
OLTC	On-Load Tap Changer
PCSA	Preliminary Connection Services Agreement (Endeavour Energy)
PIA	Preliminary Impact Assessment
PoC	Point of Connection
PSCAD	Power Systems Computer Aided Design (EMT modelling tool)
PSMG	Power System Model Guidelines
PSS/E	Power Systems Simulator for Engineering (RMS/phasor modelling tool)
R0	Preliminary Power System Model Package
R1	Detailed Design Power System Model Package
R2	Site-validated Power System Model Package
REZ	Renewable Energy Zone
RIT-D	Regulatory Investment Test for Distribution
ROCOF	Rate of Change of Frequency
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SCR	Short Circuit Ratio

Term	Definition
SOC	State of Charge
SSC	System Strength Charge
SSCW	System Strength Connection Works
SSIAG	System Strength Impact Assessment Guideline
SSLF	System Strength Locational Factor
SSQ	System Strength Quantity
SSRS	System Strength Remediation Scheme
SSSP	System Strength Services Provider (Transgrid in NSW)
TNSP	Transmission Network Service Provider
TOV	Temporary Overvoltage
WAN	Wide Area Network

1 Introduction

1.1 Scope

This document details the process for connecting a Battery Energy Storage System (BESS) with a nameplate capacity of 5 MW or greater to the Endeavour Energy distribution network under Chapter 5 of the National Electricity Rules (NER). It is a practical reference for proponents, their technical consultants, and legal advisers at every stage of the connection process, from first contact through to ongoing operation. Endeavour Energy reserves the right to amend the specified process without prior notice.

Connection under Chapter 5 may be a multi-year and a multi-party process that runs across technical assessment, commercial negotiation, and AEMO registration workstreams simultaneously. The goal of this document is to make those workstreams transparent, so that proponents can plan effectively, prepare high-quality submissions and anticipate the decisions they will need to make during the connection process.

This guideline, together with the documents referenced herein, satisfies Endeavour Energy's obligation to publish an information pack under NER clause 5.3A.3.

1.2 Structure

This guideline is structured based on the following five connection stages:

a) Preliminary Enquiry
b) Detailed Enquiry
c) Application Stage (Network Connection & Generator Connection – R0)
d) Registration (R1)
e) Commissioning (R2)

Processing of the application based on the NER Chapter 5 requirements for each stage are detailed in this guideline. Each stage is described with:

- What the proponent must prepare and submit
- What Endeavour Energy will assess and deliver,
- What AEMO and Transgrid are doing in parallel
- What decisions must be made before the next stage can commence

Key NER clause references are provided in-line throughout. Proponents and their consultants must read these provisions directly in conjunction with this guideline. The authoritative source is the NER as published on the AEMC Rules Register.

1.3 Endeavour Energy

Endeavour Energy is a licensed Distribution Network Service Provider (DNSP) under the National Electricity Law (NEL), serving more than one million customer connections across Western Greater Sydney, the Blue Mountains, Southern Highlands, Illawarra, and the South Coast of New South Wales, an area spanning approximately 25,000 square kilometres with a population of around 2.4 million people.

Endeavour Energy takes electricity supply from Transgrid as the NSW Transmission Network Service Provider (TNSP) at 12 bulk supply points (132 / 330 kV). The network operates at both sub-transmission (i.e., 132kV, 66 kV, 33 kV) and distribution (22kV, 11kV) voltages, encompassing 23 transmission substations and 183 zone substations. This network architecture provides applicants with a range of connection voltage options, selected based on the capacity, location, and technical characteristics of the proposed facility.

The Endeavour Energy network is experiencing a significant transition. Originally designed as a radially operated load-serving network, it is increasingly becoming a bidirectional system with substantial embedded generation and storage capacity. The NSW Government's Electricity Infrastructure Roadmap has designated the Illawarra Renewable Energy Zone (REZ) within Endeavour Energy's service area, signalling significant future renewable and storage investment. Proponents should familiarise themselves with the network context relevant to their proposed connection point.

1.4 Connections in the National Electricity Market

Proponents wishing to connect generation to a distribution or transmission network in the National Electricity Market (NEM) must follow the processes defined in the National Electricity Rules (NER). The Network Service Provider (NSP) responsible for the network at the proposed connection point manages the connection process and is the primary point of contact.

The applicable NER process depends on the registration status and capacity of the proposed connection. By default, all generation must be registered with AEMO unless a standing exemption applies. Table 1 below illustrates how the correct pathway is determined. This guideline specifically applies to generation and storage system participating in the Chapter 5 process.

Table 1: NER Connection Process Pathways

Generating System	Registration Status	NER Pathway
< 5 MW	Default standing exemption from AEMO registration.	Chapter 5A (may elect Chapter 5)
5 – 30 MW	Exemption possible if criteria are met Specific criteria: - Export less than 20GWh in any 12-month period - Generation is purchased in its entirety by a market participant	Chapter 5
> 30 MW	Default registered. No exemption available.	Chapter 5

1.5 Technical Standards and References

A selection of key technical references, documents and standards are listed below in Table 2 & 3. These form the foundational basis of this guideline and aid to support the proponent through the connection process. This list is not exhaustive; proponents must obtain and review all applicable documents before submitting a connection enquiry or application.

Table 2: Endeavour Energy Technical Standards and References

Technical Standards & Process Information
• Comply with all Endeavour Energy technical requirements and network standards available on the Endeavour Energy Website (Standards | Endeavour Energy) • Endeavour Energy Connection Policy • Contestable Work Guidelines
Legal Framework
• Preliminary Connection Services Agreement (PCSA) • Battery Connection Development Agreement (BCDA) • Battery Connection Services Agreement (BCSA)

Table 3: Other Relevant Parties Technical Standards and References

AEMO Documentation
• Generator Connection Application Checklist • Generator Performance Standards (GPS) • Power System Model Guidelines (PSMG) • System Strength Impact Assessment Guideline (SSIAG) • Generator Connection R1 Submission Checklist • Power System Stability Guidelines • GPS Compliance Assessment and R2 Model Validation Test Plan Template • Guidelines for Assessment of Generator Performance Standards • AEMO DER Technical Requirements Guidelines • AEMO Market Registration Guide
Other References
• National Electricity Rules • NSW ASP Scheme and Contestable Works • AEMC ERC0393 • NSW Electricity Infrastructure Roadmap (NSW DCCEEW)

References provided are indicative only and not exhaustive. Information may change, and proponents are responsible for identifying and complying with all applicable, current standards, guidelines, and regulatory requirements. This guideline does not constitute legal or technical advice. Applicants must comply with all Australian standards and Endeavour Energy technical requirements.

2 Grid Connection Process

2.1 Process Overview

The Chapter 5 connection process begins at the preliminary enquiry stage and concludes following commissioning of the facility, including approval of the R2 model report and resolution of all outstanding issues. An overview of each stage, including its key inputs, processes, and outputs, is presented in tabular form below and graphically in Appendix D: Connection Process Overview. A more detailed, step-by-step representation of the process is provided in Appendix E: Connection Process Detailed.

Table 4: High Level Grid Connection Process Overview

Stage	Summary	Inputs	Process	Output
Preliminary Enquiry	Endeavour Energy provides high-level network information to allow proponent to assess connection feasibility and options before committing to a Detailed Enquiry with fees. This stage is free of charge and no formal commitment from the proponent is required.	• Compliant Endeavour Energy Technical Enquiry Application submitted (Preliminary Enquiry) via Portal • Proposed load & export capacity, project timeframes and staging (if any), operational, reliability and redundancy requirements, proposed connection voltage	• Endeavour Energy acknowledges receipt and reviews enquiry information • Endeavour Energy performs a preliminary high level desktop assessment for a preliminary response • May consult internal stakeholders based on the complexity of the proposal	• Preliminary Enquiry response contains proposed supply connection method, supply constraints, potential known network augmentation work, protection, SCADA, metering, operational requirements, and information for progression to further connection stages
Detailed Enquiry	Proponent submits a detailed enquiry providing additional technical and project-specific information. Endeavour Energy undertakes a System Strength Preliminary Assessment (PIA) and issues a Detailed Enquiry Response setting out the connection requirements, indicative costs, application requirements, and other outcomes needed for progression to a formal connection application.	• Compliant Endeavour Energy Technical Enquiry Application (Detailed Enquiry) via Portal • Facility technical data • Preliminary power system model data • Payment of Detailed Enquiry fees • Executes Preliminary Connection Services Agreement (PCSA)	• Endeavour Energy reviews enquiry information, acknowledges receipt and may request applicant for further information • Endeavour Energy undertakes a PIA • Endeavour Energy commences joint-planning engagement with other asset owners / NSPs as required	• Detailed Enquiry response defines technical requirements for plant connection, including augmentation and headworks, power transfer capability, protection, SCADA, communications, fault levels, and power quality • PIA includes the System Strength Charges payable • Scoping for contestable design and non-contestable estimate

Stage	Summary	Inputs	Process	Output
Application Stage	Parallel applications: Network Connection Application & Generator Application. The former covers primary and secondary design and ASP involvement for the physical network connection. The latter involves the proponent submitting the R0 package, proposed GPS, and a System Strength Remediation Election. Endeavour Energy and AEMO perform joint assessment of the ability to meet the proposed GPS based on NER and AEMO guidelines. Endeavour Energy and Transgrid conduct joint assessments to assess technical feasibility and network impact of the connection.	• Compliant Endeavour Energy Applications: Network Connection (processed as per current standards) & GPS Assessment • Power system model package (R0), Proposed Generator Performance Standards, connection studies, system strength remediation election, models & data • Negotiation and execution of Battery Connection Development Agreement (BCDA)	• Endeavour Energy and AEMO conducts technical assessment, reviews and negotiates Generator Performance Standards • Endeavour Energy conducts System Strength Full Assessment (FIA) or Stability Assessment based on proponent's System Strength election form submission. • Endeavour Energy engages Transgrid for joint assessments required • Endeavour Energy and AEMO review R0 package and checklist then provide comments / issue tracker to proponent • Proponent to revise and resubmit until parties satisfied • Negotiation on Connection Agreement terms	• Endeavour Energy issues a connection offer • Agreed GPS • Issuing of 5.3.4A and 5.3.4B letters (with conditional statements if required) to proponent once identified issues in the submitted GPS are resolved • Pre-registration activities 5.3.7(g) including letter and notification • Finalise legal agreements • Commencement of contestable and non-contestable work processes for Network Connection

Stage	Summary	Inputs	Process	Output
Registration (R1)	Proponent submits a complete and comprehensive R1 package to Endeavour Energy and AEMO for assessment and endorsement, supporting final market registration. The applicant must demonstrate that the proposed system is capable of meeting its agreed GPS. The R1 package includes detailed, validated simulation models derived from plant manufacturer data.	• R1 Power System Model Package • AEMO Generator connection R1 submission checklist • R1 Capability form • Commissioning Plan • AEMO Registration Application submitted and SCADA testing commenced • Negotiation and execution of Battery Connection Services Agreement (BCSA)	• Endeavour Energy and AEMO to acknowledge R1 package submission and undertake R1 Capability Assessment • Endeavour Energy and AEMO review R1 package and checklist then provide comments / issue tracker to proponent • Proponent to revise and resubmit until parties satisfied	• Endorsed R1 package • Proponent achieves registration and becomes a Registered Participant in the NEM • Commissioning plan, commsfail and operating protocol agreed by Endeavour Energy and AEMO
Commissioning (R2)	Stage focuses on GPS validation and on-site testing. The objective is to confirm that the commissioned system performs in accordance with the models and standards established in the R1 stage. Testing is conducted across the agreed hold points (typically from HP0 – HP3) from the approved R2 Test Plan. Endeavour Energy and AEMO jointly review and approve results at each stage before progression to higher output levels. An updated R2 model validation package must be submitted within three months of commissioning completion.	• Construction and pre-commissioning test complete • AEMO market registration confirmed • Commissioning Program agreed with Endeavour Energy and AEMO	• HP testing with Endeavour Energy and AEMO joint review at each stage • Repeat testing, review, and amendment until 100% HP level is reached • R2 model package review and validation	• HP stage releases from AEMO • Approval for commercial operation • Approved R2 Power System Model Package

2.2 Preliminary Enquiry

Submitting a Preliminary Enquiry Application to Endeavour Energy is the first stage of the connection process. Endeavour Energy's response to the enquiry provides the proponents with high level network information before committing to the cost of a Detailed Enquiry. The response to the Preliminary Enquiry is a free service. Endeavour Energy requires proponents to submit a Preliminary Enquiry to enable an initial assessment of the proposal and to confirm that the application is sufficiently developed and genuine. This approach ensures that network resources are applied efficiently and that proponents receive early guidance, reducing the risk of unnecessary time and effort being invested at the Detailed Enquiry stage.

The response will typically specify the relevant high level desktop assessment, approximate connection point, connecting voltage, indicative fault level, any known network augmentation requirements, SCADA, operational and protection requirements (by reference to Endeavour Energy standards). Once the Preliminary Enquiry Response is issued the proponent will be in a position to conduct their own high level feasibility assessment for the project and to decide on whether the project proceeds to the next stage. Any additional information requests made after the Preliminary Enquiry Response is issued, may incur fees.

The overall Preliminary Enquiry Process, as it sits within the broader Grid Connection Process (Chapter 5), is illustrated in Figure 1 below.

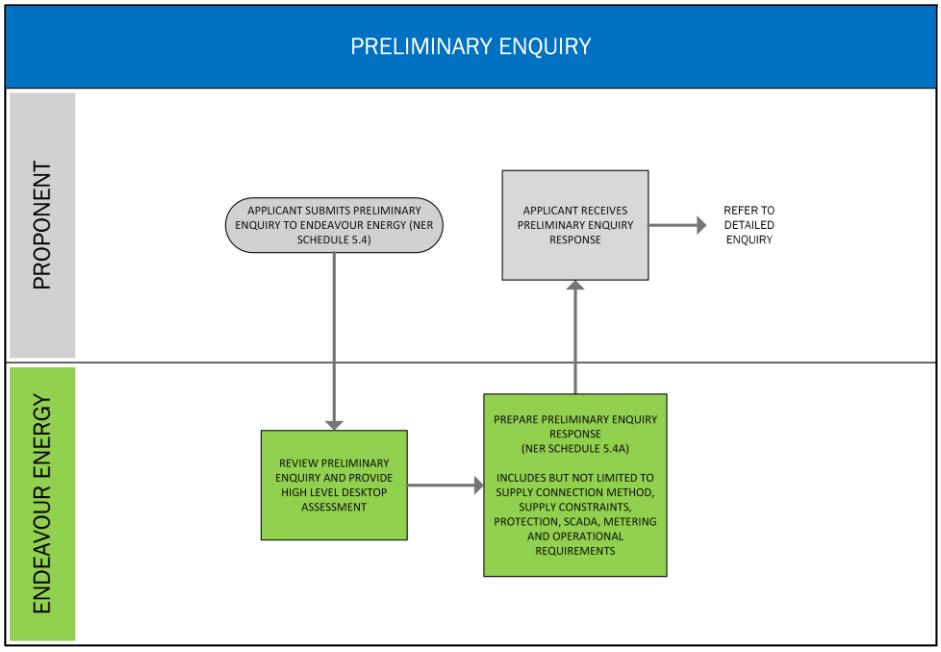


Figure 1: Preliminary Enquiry Process Flow

To initiate the Preliminary Enquiry, the proponent must submit a Preliminary Enquiry Application via Endeavour Energy's Connections Portal, providing all the information required under NER Schedule 5.4, along with any additional information requested via the Connections Portal.

Upon receipt, Endeavour Energy will acknowledge the enquiry in writing within 5 business days (NER 5.3A.5(d)). If the enquiry is found to be materially incomplete, Endeavour Energy will advise the proponent of the deficiency, and the proponent will be required to provide the missing information or rectify the form before the process can continue.

Once a complete enquiry has been received, Endeavour Energy will issue a Preliminary Enquiry Response. The response will include the information required under NER Schedule 5.4A, providing the indicative connection method, supply constraints, potential network augmentation, protection, SCADA, metering, and operational requirements. The Preliminary Enquiry stage is provided free of charge to the proponent. Endeavour Energy typically does not consult AEMO and Transgrid at this stage.

2.3 Detailed Enquiry

Once the proponent has reviewed the preliminary enquiry response that Endeavour Energy has provided and decides to progress their application to the Detailed Enquiry stage a Detailed Enquiry Application must be submitted to Endeavour Energy via the Connections Portal. The Detailed Enquiry Response provides a detailed analysis of the requirements and constraints for connecting the proposed facility and establishes information that will assist the proponent to make an informed decision on whether the project is technically and financially feasible to proceed to the next stage of the process. Proponents must carefully review Appendix C: Key Technical Requirements when preparing their Detailed Enquiry submission. Note that the project is not considered to be fully committed until a formal application is received by Endeavour Energy as outlined in the Application Stage section of this guideline.

The overall Detailed Enquiry Process, as it sits within the broader Grid Connection Process (Chapter 5), is illustrated in Figure 2 below.

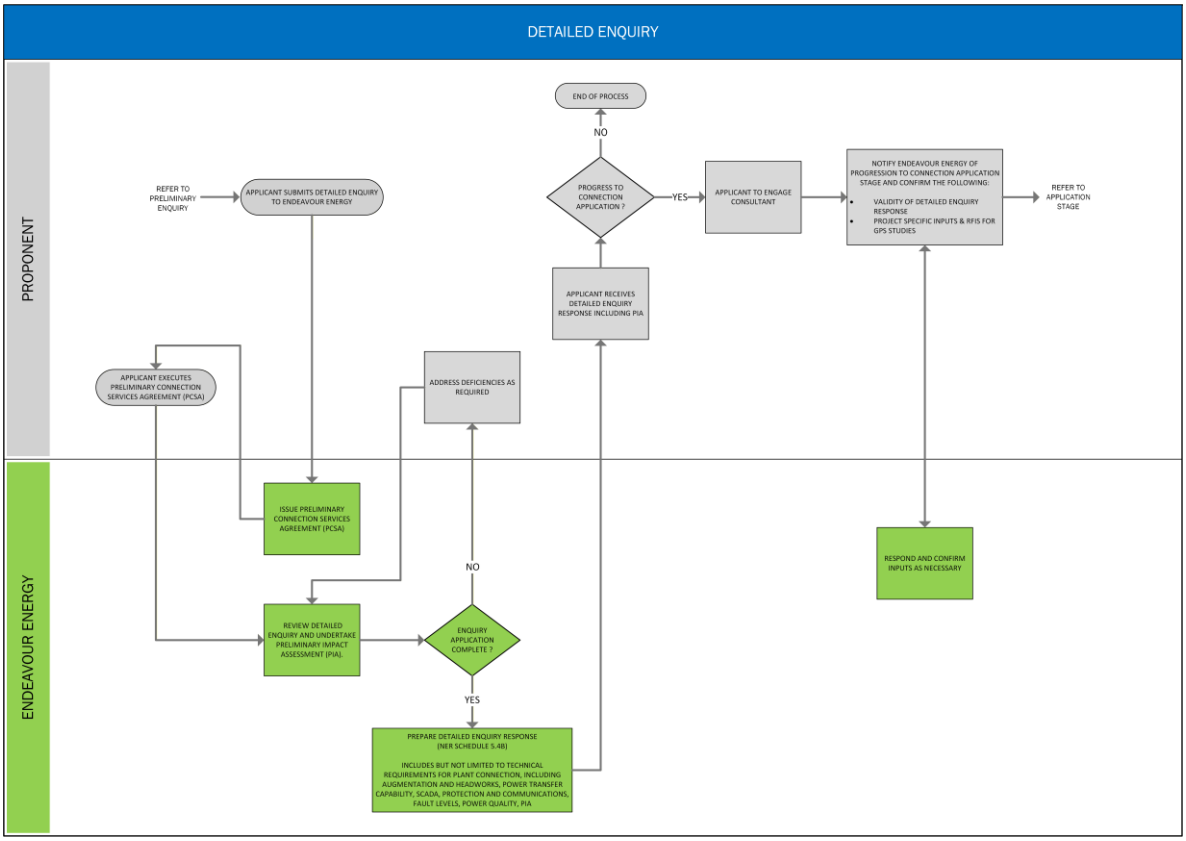


Figure 2: Detailed Enquiry Process Flow

Before the Detailed Enquiry can commence, proponents must execute the Preliminary Connection Services Agreement (PCSA). The PCSA is Endeavour Energy's legally binding agreement covering all Design Related Services from Detailed Enquiry until the Battery Connection Development Agreement (BCDA) is executed at the application stage. It sets out the scope of work, fee estimate and cost recovery mechanism for each stage of Endeavour Energy's generator connection assessment process and Network Connection work.

The Detailed Enquiry application must include all required information as per NER Schedule 5.4A(o). Incomplete submissions will not be processed in a timely manner and may incur additional costs. Upon receipt of the additional information, Endeavour Energy will acknowledge receipt in writing within 5 business days (NER 5.3A.8(a)). If the submission is found to be materially incomplete, Endeavour Energy will advise the proponent of the deficiency. The proponent will be required to provide the required information before the Detailed Enquiry Application is processed. Where the proposed non-contestable Endeavour Energy funded

network augmentation work is required to facilitate the connection is expected to exceed $7 million, a Regulatory Investment Test for Distribution (RIT-D) may be required under NER clause 5.3A.8(c)(2). Proponents should discuss this with Endeavour Energy at the Detailed Enquiry stage, as there will be additional risks for the project to proceed, potential impact on the project timeline and process.

Once a complete submission has been received and the required fee is paid Endeavour Energy will undertake a System Strength Preliminary Impact Assessment (PIA), which constitutes the first formal network-side technical assessment of the proposed connection. The PIA is conducted to determine whether the proposed connection will cause a *general system strength impact* per System Strength Impact Assessment Guideline (SSIAG) definitions. As part of this process, Endeavour Energy will calculate the system strength locational factor (SSLF) and system strength charges (SSC), in accordance with NER 5.3.4B(a2) (1)-(2), 5.3.4B(a3) and SSIAG.

Following completion of the PIA and other relevant investigations, Endeavour Energy will issue the Detailed Enquiry Response. The response will include the information required under NER Schedule 5.4B, providing detailed technical requirements for plant connection, including augmentation and headworks, power transfer capability, SCADA, protection and communications, fault levels, power quality and the PIA outcomes, as well as an Ancillary Network Service fee estimate to prepare an offer to connect.

Upon receipt of the Detailed Enquiry Response, the proponent must decide whether to progress to the Connection Application stage. If the proponent elects to proceed, they will be required to engage a suitably qualified consultant to prepare the Connection Application, as outlined in the following section.

Note: If the proposed connection point is near an interconnecting DNSP boundary (e.g., Ausgrid, Essential Energy), a joint DNSP examination under NER cl. 5.3A.5(e) may be required, and a separate process will apply.

2.4 Application Stage

Submitting an application initiates the most technically intensive phase of the BESS connection process. The applicant must submit a full Connection Application package including proposed Generator Performance Standards (GPS), power system models (meeting PSMG requirements), and connection studies as per NER Clause 5.3.4. Endeavour Energy, AEMO and Transgrid (where required) jointly assess the application to determine the suitability of the generator to connect to the electrical network.

Projects connecting to the Endeavour Energy's network require two separate applications to be submitted, Network Connection Application and Generator Application (GPS Assessment) which will be processed concurrently. Further details provided on these streams are provided below.

2.4.1 Network Connection Application

This application is for design, construction and commissioning work associated with connecting the customer's electrical installation to Endeavour Energy's network. This relates to primary and secondary design as well as contestable work relating to physical infrastructure construction and commissioning. Specifically, the L1 and L3 ASP works detailing the design and construction of the overhead lines, underground cables and associated civil and electrical infrastructure from Endeavour Energy-specified connection point to the customer's electrical installation. This also includes any non-contestable headworks (customer funded as well as Endeavour Energy funded) that requires to be designed, constructed & commissioned to provide the required connection point to the network. Processing of this application follows the standard Endeavour Energy network connection application process shown below in Figure 3. AER approved ancillary fees are payable for processing the network connection application. Refer to current Endeavour Energy documentation for further information on this parallel stream.

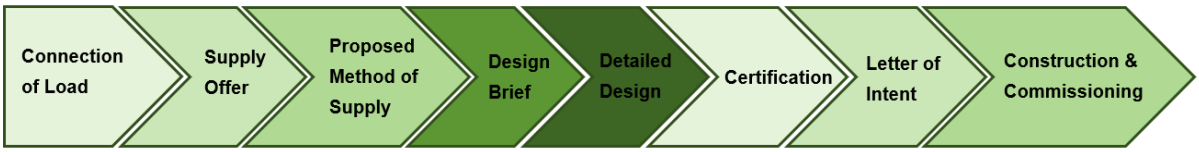


Figure 3: Network Connection Application Process

2.4.2 Generator Connection Application (R0)

The Generator Connection Application (R0) stage typically involves concept or preliminary design, involving the initial submission of the generator models and data to Endeavour Energy. Endeavour Energy will share all relevant information with AEMO. This stage is critical for an early assessment of the project's technical feasibility and its ability to meet the required generator performance standards. Both the proponent and Endeavour Energy models the network and the generator (based on data provided by proponent) to ensure the proposed generator meets NER and Endeavour Energy/AEMO performance standard requirements.

To initiate the GPS Assessment, the proponent must prepare and submit a Generator Connection Application to Endeavour Energy containing the information specified in the Detailed Enquiry Response, in accordance with NER 5.3A.9, 5.3.4A and 5.3.4B(g) and (m). Endeavour Energy's preference is for the proposed generating system to demonstrate compliance with the applicable Automatic Access Standards (AAS) wherever practicable. Where an AAS cannot be met, the application must clearly identify the relevant performance parameter, provide technical justification for the proposed Negotiated Access Standard (NAS), and demonstrate that the proposed NAS is no less onerous than the corresponding Minimum Access Standard (MAS). The application must include the proposed GPS, including any proposed NAS, and a submission of the System Strength election form where a general system strength impact has been identified, electing to either:

- Elect payment of the system strength charge and undergo a Stability Assessment
- Self-remediate and undergo a System Strength Full Assessment (FIA)

Upon receipt, Endeavour Energy will assess whether the application is materially complete and in the approved form (NER 5.3A.9(d)). If the application is found to be deficient, Endeavour Energy will advise the proponent of the deficiencies. The proponent will be required to provide the missing information before the assessment can proceed.

Once a complete application is accepted and all required fees are paid, Endeavour Energy will undertake a detailed assessment of the Generator Connection Application, including but not limited to:

- Desktop review of the technical package
- Power system studies (PSS/E and PSCAD)
- Review of GPS and proposed NAS (if applicable)
- Harmonic analysis
- Dynamic Model Acceptance Test (DMAT)
- Consultation with impacted counterparties

Endeavour Energy will consult with AEMO from the time the Generator application is received and throughout the connection process until approval is granted to the Generator to participate in the NEM. All costs associated with AEMO's work in processing the application throughout the R0, R1 & R2 stages will be passed onto the proponent for payment. Endeavour Energy will invoice the proponent on a regular basis to recover Endeavour Energy, AEMO, Transgrid and any other third party incurred costs in relation to processing the Generator Connection Application throughout the numerous stages of the process.
As part of the GPS assessment, Endeavour Energy will create and maintain an issues register shared with AEMO and the proponent. All items on the register will be iteratively reviewed until satisfactorily closed out

by Endeavour Energy and AEMO. Where the proposed connection involves generating units with a nameplate rating of 30 MW or greater, Endeavour Energy is required to consult with Transgrid regarding network impacts (NER 5.3A.10(c)–(e)), with the costs of Transgrid's assessment passed onto the proponent and included in the connection offer.

The technical assessment process runs concurrently with two formal negotiation streams, the NER 5.3.4A process for agreeing on the NAS and GPS, and the NER 5.3.4B process for agreeing on the system strength remediation measures or any applicable system strength charges. Both are described in further detail below. Once all technical and commercial matters are agreed and the relevant AEMO letters have been issued, Endeavour Energy will pass these onto the proponent concluding the application stage. Endeavour Energy will complete pre-registration activities as per NER 5.3.7(g) and issue a 5.3.7 Letter notifying AEMO of the execution of a connection agreement with the connection applicant.

Proponents must commence executing the Battery Connection Development Agreement (BCDA) during the Application Stage. The BCDA is Endeavour Energy's formal legal agreement for providing connection-related services for a Battery Energy Storage System (BESS), covering the process from Detailed Enquiry through to Connection Application assessment. It sets the framework for design, technical review, and assessment activities, and outlines the scope of services, indicative fees, and cost-recovery arrangements across the project lifecycle, including GPS assessment, construction, and commissioning. The BCDA also defines the roles and responsibilities of both the Customer and Endeavour Energy and establishes the contractual basis for coordinating Customer Works and Endeavour Energy provided works required to assess and connect the battery system to the distribution network in accordance with the National Electricity Rules. It is intended to be executed early in the application process to support timely project progression.

The overall Application Stage Process, as it sits within the broader Grid Connection Process (Chapter 5), is illustrated in Figure 4 below.

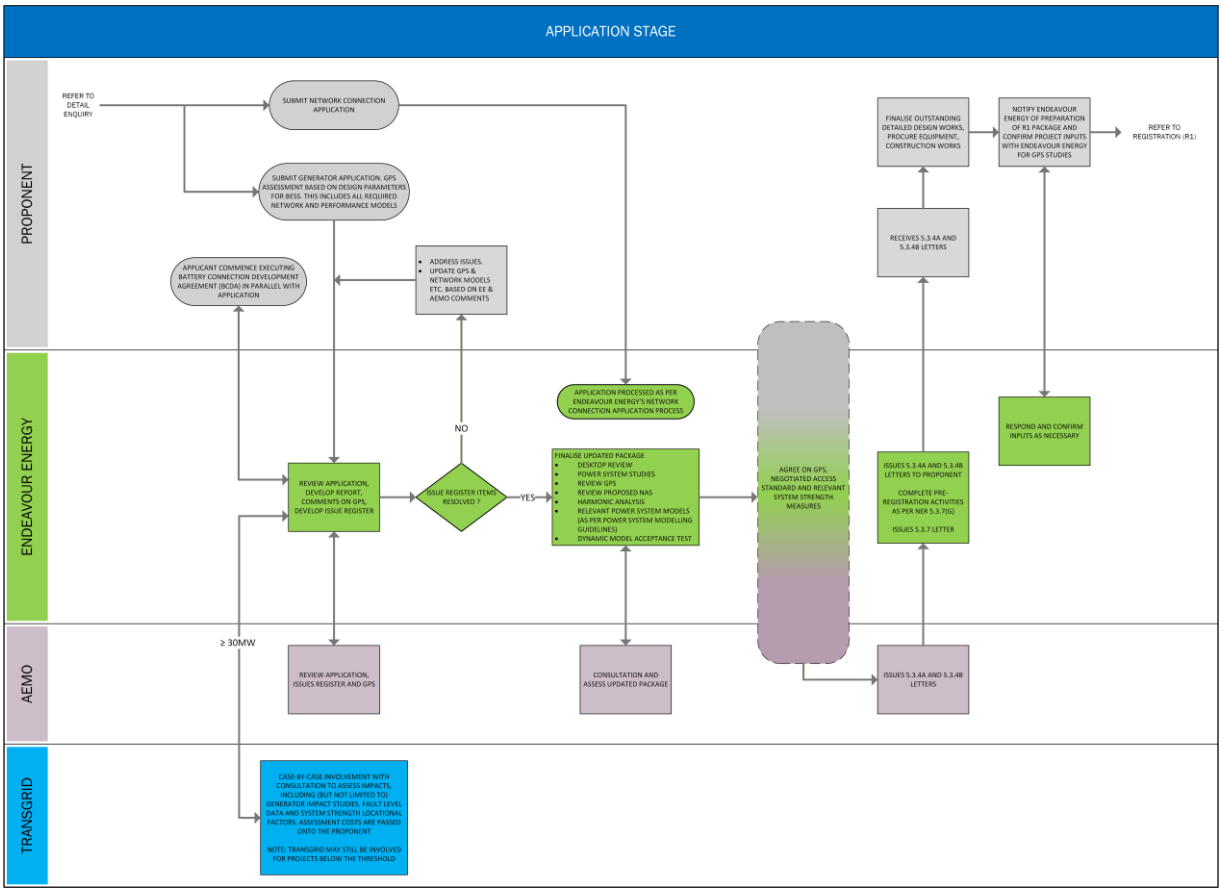


Figure 4: Application Stage Process Flow

2.4.2.1 Acceptance of Proposed Performance Standards (5.3.4A Letter)

The proposed performance standards must be consistent with the access standards in NER Schedule 5.2, as updated by ERC0393. Where a proposed Negotiated Access Standard requires AEMO advisory input, the process is inherently iterative. Once performance standards are agreed between the proponent, Endeavour Energy and AEMO, a 5.3.4A Letter is issued. This letter is a mandatory prerequisite for Endeavour Energy to progress the applicant further in the connection process.

Where a system cannot meet the Automatic Access Standard (AAS) for a given performance parameter and the proponent provides sufficient justification, a Negotiated Access Standard may be proposed. A NAS must be no less onerous than the corresponding Minimum Access Standard (MAS). Refer to Appendix A for the full access standards table as updated for ERC0393.

2.4.2.2 Acceptance of System Strength Remediation (5.3.4B Letter)

Following completion of a Preliminary Impact Assessment by Endeavour Energy, undertaken in accordance with the System Strength Impact Assessment Guidelines (SSIAG), the results will be provided to the applicant and will identify whether the proposed projects give rise to a general system strength impact.

Where the PIA indicates a general system strength impact that exceeds the applicable materiality threshold, the applicant must elect one of the following options:

- Pay the System Strength Charge (SSC): Transgrid, as the System Strength Service Provider in NSW, is responsible for providing system strength services. This pathway triggers a stability assessment, with the 5.3.4B process completed when the relevant parties are satisfied.

- Implement a System Strength Remediation Scheme (SSRS): Works behind the connection point and triggers a Full Impact Assessment (FIA). The project may also require System Strength Connection Works (SSCW), where required. A 5.3.4B letter is issued upon completion and when all parties are satisfied the SSRS adequately remediates the impact

The 5.3.4B Letter is a mandatory prerequisite for Endeavour Energy to progress the applicant to further stages of the connection process

2.5 Registration (R1)

Following receipt of the 5.3.4A, 5.3.4B letters and completion of pre-registration activities the project can progress to the Registration (R1) stage. The R1 stage involves the submission of a finalised model package reflecting the detailed design of the plant, as distinct from the preliminary models submitted at R0. At this stage, the proponent must demonstrate to both Endeavour Energy and AEMO that the system is capable of meeting its agreed Generator Performance Standards based on detailed and verified simulation models using manufacturer provided specifications and data, having regard to material changes since the 5.3.4A/5.3.4B letters and execution of connection agreement

The overall Registration (R1) Stage process, as it sits within the broader Grid Connection Process (Chapter 5), is illustrated in Figure 5 below.

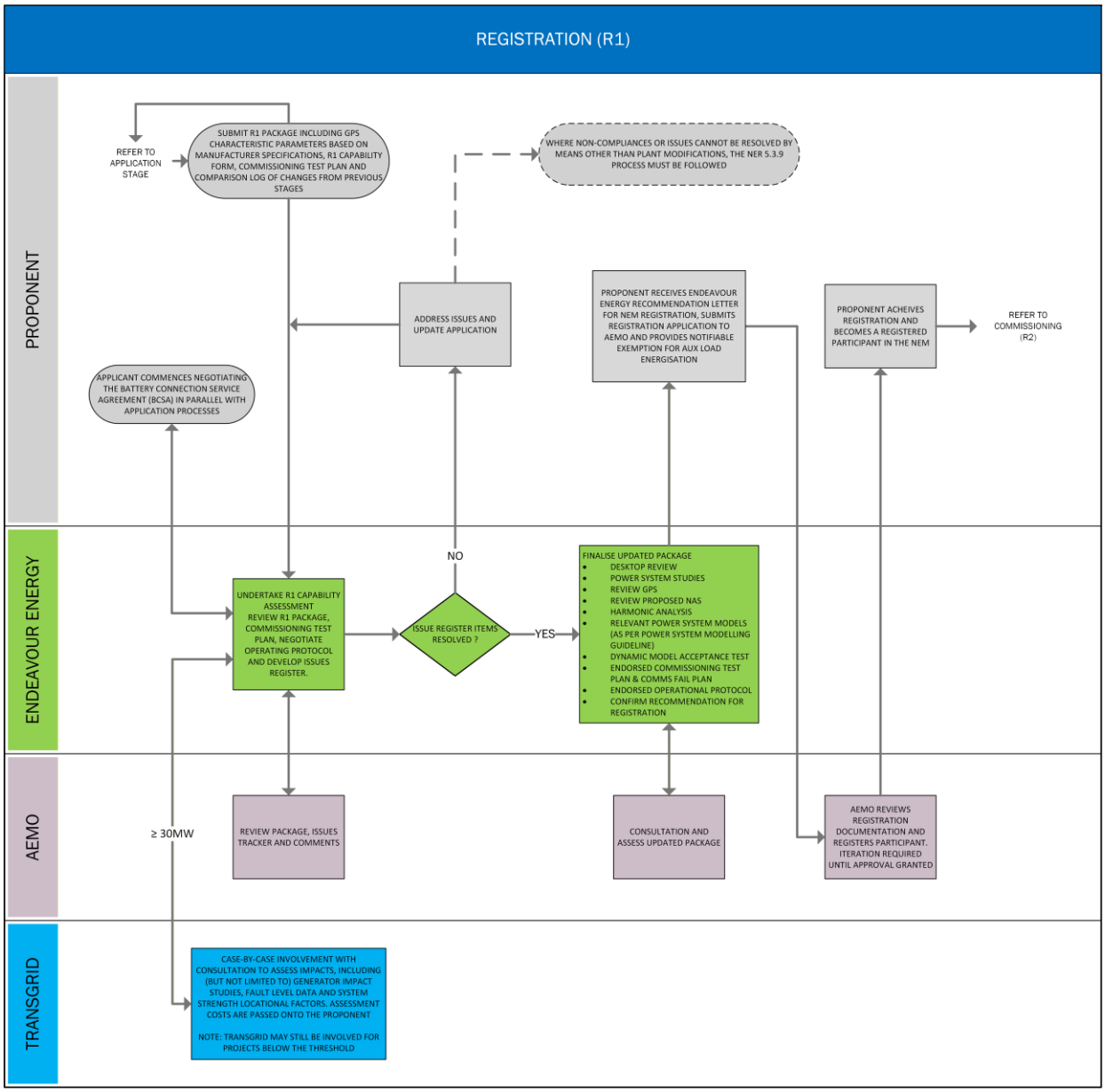


Figure 5: Registration (R1) Stage Process Flow

The proponent must prepare and submit a comprehensive R1 package to Endeavour Energy, accompanied by a completed AEMO Generator Connection R1 Submission Checklist and R1 Capability Assessment Request Form no less than three months before commissioning is due to commence. The R1 package must include the agreed or updated GPS, detailed design information, verified simulation models, relevant plant data, control, and protection settings, supporting studies demonstrating that the plant will meet or exceed the agreed GPS, proposed commissioning plan and communications failure arrangements.

Proponents should be aware that the R1 package forms a component of the broader AEMO Registration process, and that Hold Point testing cannot commence until the entire AEMO Registration process is complete. The AEMO Registration process involves multiple internal AEMO teams, including National Connections, System Performance, Grid Modelling, Registration, Metering and Operations and should be treated as a parallel workstream to construction and detailed design. Proponents are strongly encouraged to allow sufficient time for this process and to engage with AEMO early to avoid delays to the commissioning program.

In parallel with the R1 submission process, the proponent must commence negotiating the Battery Connection Services Agreement (BCSA), which governs the connection services relationship from this stage forward.

Upon receipt of the R1 package, Endeavour Energy and AEMO will review the submission for completeness and suitability to commence the Capability Assessment as per the R1 Capability Assessment Guidelines. AEMO may convene a kick-off/scoping meeting with the proponent and Endeavour Energy to confirm the assessment scope, information gaps, study expectations, and any matters requiring further clarification. Endeavour Energy will develop and maintain an issues register shared among the relevant parties. Transgrid involvement will be required on a case-by-case basis, with the costs of any Transgrid assessment passed onto the proponent

Where items on the issues register remain unresolved, the proponent will be required to address all outstanding issues and resubmit updated models/other relevant information before the process can progress. Once all issues are satisfactorily closed out, Endeavour Energy will accept the finalised R1 package, from undertaking the following assessments throughout the due diligence process:

- Desktop review of the technical package
- Power system studies (PSS/E and PSCAD)
- Review of GPS and proposed NAS (if applicable)
- Harmonic analysis
- Dynamic Model Acceptance Test (DMAT)
- Consultation with impacted counterparties
- Confirmation of recommendation for registration

Following completion of Endeavour Energy's assessment, AEMO will consult on and assess the updated package. Upon satisfactory completion, Endeavour Energy will issue the proponent with a recommendation letter for NEM registration. The proponent must submit a NEM registration application to AEMO, after which AEMO registers the participant in the NEM based on AEMO processes. The proponent is responsible for liaising directly with AEMO for registration and the proponent must pay all related fees directly to AEMO. Once registration is achieved, the proponent may proceed to the Commissioning (R2) stage.

2.6 Commissioning (R2)

The commissioning stage ensures the safe, controlled, and compliant integration of the generating or integrated resource system and associated connection assets into the Endeavour Energy network and the NEM. Testing demonstrates that the generation system performs in accordance with the agreed GPS.

The commissioning of the proponent’s plant to Endeavour Energy’s network (contestable work) must be completed prior to the initiation of the R2 Testing and Model Validation phase. Testing is conducted in three categories:

1. Compliance testing: demonstrates that the facility, connection assets, and any associated network augmentation comply with Endeavour Energy’s Network Standards and other relevant technical requirements.
2. Pre-connection off-line testing demonstrates the generation system is ready for connection to the live network.
3. Post-connection on-line testing (Hold Point Testing): demonstrates the generation system performs in accordance with the agreed GPS and reflects behaviour of R1 models.

The overall Commissioning (R2) Stage process, as it sits within the broader Grid Connection Process (Chapter 5), is illustrated in Figure 6 below.

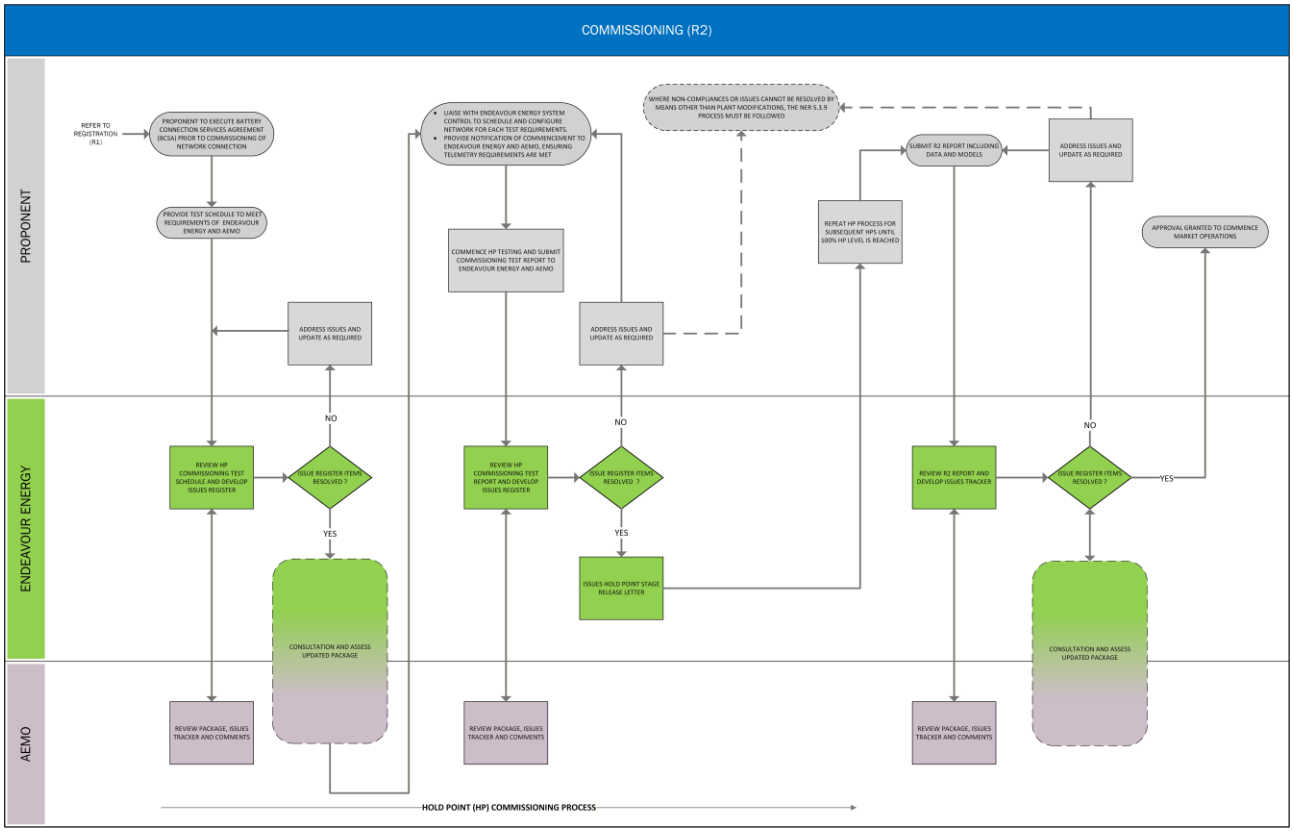


Figure 6: Commissioning (R2) Stage Process Flow

2.6.1 Commissioning Program

A Commissioning Program including schedule and test procedure must be agreed with Endeavour Energy and AEMO at least two months (or as required by Endeavour Energy's System Control & AEMO) before commissioning commences for distribution-connected facilities. The Commissioning Program must be consistent with the AEMO GPS Compliance Assessment and R2 Model Validation Test Plan Template and must be agreed with Endeavour Energy and AEMO on the number of Hold Points and respective generating levels (typically consists of four hold points from HP0 – HP3).

2.6.2 Energisation Commissioning

On-site testing must be conducted to demonstrate that the new or modified plant meets all the relevant technical requirements before it can be connected to Endeavour Energy's network and energised. This includes:

- Compliance testing to demonstrate the facility, connection assets and any associated network augmentation or extensions complies with Endeavour Energy's network standards and other relevant technical requirements
- Pre-connection off-line testing will be required of the customer to demonstrate the generation system is safe for connection to the network.

The above and other associated works must be agreed to upon with Endeavour Energy. At any stage of this process Endeavour Energy may elect to witness various test stages, review, and satisfy themselves that the plant is fit for energisation and further commissioning.

2.6.3 Hold Point Testing

Perform Hold Point (HP) testing for the generator as per the agreed R2 Test Plan and HP load profiles to demonstrate compliance with its GPS and to validate the R1 models of the plant.

Endeavour Energy prepares an issues tracker for each Hold Point Test Report and shares it with AEMO. Both Endeavour Energy and AEMO must approve each Hold Point Test Report and satisfaction of closure of critical issues identified before the facility can progress to the next HP level.

2.6.4 Operation & Ongoing Obligations

Once the generating facility transitions from commissioning to commercial operation, proponents must meet their ongoing obligations under the Connection Agreement and the NER. Ongoing obligations include, but are not limited to:

- Operations and maintenance obligations as defined in the Connection Contract, including making required notifications to Endeavour Energy and AEMO.
- Continuous GPS compliance: proponents must routinely assess that generator performance remains consistent with agreed GPS and notify Endeavour Energy and AEMO immediately if a non-compliance is observed.
- Compliance Monitoring Program: a formal program must be developed, implemented, and maintained by the proponent.
- Availability notifications: current availability status must be maintained with AEMO.
- Business and operational contact information: must be always kept current with Endeavour Energy and AEMO.
- Periodic model review: if plant settings or controls change post-commissioning, R2 model validation may need to be repeated and an updated R2 package submitted.
- Operating protocol: agreed operating requirements at the connection point, with amendment required for site connection reconfiguration and contact changes.

Non-Compliance Obligations
If the proponent identifies any non-compliance with their agreed GPS, they must notify Endeavour Energy and AEMO promptly.

3 Additional Considerations

3.1 Third Party Interactions

The Generator connection process involves multiple stakeholders beyond Endeavour Energy and the proponent. For connections to the Endeavour Energy network, these parties include:

- AEMO: advisory matters for GPS (5.3.4A), system strength (5.3.4B), PSCAD Wide Area Assessments, R1 Capability Assessment, Registration, commissioning stage releases and R2 approval.
- Transgrid (TNSP and SSSP): small signal stability studies (if required by Transgrid) and Grid Impact Studies for ≥30 MW connections; system strength services for NSW; joint review of FIA/Stability assessment and negotiation of system strength remediation works; 5.3A.10 endorsement for connection.
- Other DNSPs: if the proposed connection point is near the Endeavour Energy / other DNSP network boundary, a joint DNSP examination (NER cl. 5.3A.5(e)) will be required.
- Endeavour Energy Legal Frameworks: Proponents are required to execute key legal agreements throughout the application process, including the Preliminary Connection Services Agreement (PCSA), Battery Connection Development Agreement (BCDA), and Battery Connection Services Agreement (BCSA). These agreements vary in scope, duration, and complexity, and represent critical hold points in the connection process. Early engagement and timely execution of these frameworks is essential, as delays in finalisation can directly impact project timelines and progression through key milestones.

Additional costs will be incurred and delays in processing time will be experience based on the quality of information, completeness of submissions and requirement for third-party involvement. Proponents must factor this into their project timelines and budgets. Endeavour Energy will make proponents aware of third-party costs as soon as reasonably practicable.

3.2 System Strength

System strength is a measure of the power system's ability to recover following a disturbance, characterised by the Short Circuit Ratio (SCR) at the Point of Connection (PoC). As synchronous generation is displaced by Inverter-Based Resources (IBR), system strength on distribution networks reduces, creating technical challenges for new IBR connections.

Asynchronous generators (all IBR, including solar PV, wind, and BESS) are assessed for their system strength impacts during the Detailed Enquiry (PIA) stage. Where the PIA indicates a general system strength impact that exceeds the applicable materiality threshold, the applicant must nominate their remediation approach in the connection application:

- Pay the System Strength Charge (SSC): Transgrid, as the System Strength Service Provider in NSW, is responsible for providing system strength services. This pathway triggers a stability assessment, with the 5.3.4B process completed when the relevant parties are satisfied.

- Implement a System Strength Remediation Scheme (SSRS): Works behind the connection point and triggers a Full Impact Assessment (FIA). The project may also require System Strength Connection Works (SSCW), where required. A 5.3.4B letter is issued upon completion and when all parties are satisfied the SSRS adequately remediates the impact

Note: Remediation costs may be applicable across multiple projects connecting to the same area of the network

3.3 Small Signal Stability Studies

NSPs are required to assess the effect of the proposed generating system on inter- and intra-area modes of electromechanical oscillation. Small signal models are part of the PSMG requirements and there is an upward trend for TNSP's to acquire these models.

The scope and extent of Transgrid's involvement depends on the size, technology type, and location of the connection. For connections ≥30 MW, Endeavour Energy will formally consult Transgrid. The connection applicant will be made aware of Transgrid costs as soon as reasonably practicable; these costs will be invoiced by Endeavour Energy to the proponent as a pass-through cost.

3.4 Wide Area Studies

Wide area studies assess the proponent's generation in combination with existing and committed generation projects in the relevant network area, to confirm that the proposed connection does not have adverse effects on the network and other network users. These studies include both static and dynamic assessments.

Changes to the network (Endeavour Energy or Transgrid augmentations) or additional generation becoming committed can invalidate prior wide area study results, requiring them to be repeated. Proponents must allow schedule contingency for potential re-study requirements.

3.5 Fault Level Management

Certain areas of the Endeavour Energy network, particularly in industrial corridors of Western Sydney and areas close to Transgrid bulk supply points, operate at or near maximum switchgear fault current breaking capacity. New connections must not cause existing switchgear ratings to be exceeded.

The Connection Agreement specifies the maximum design fault level and allocates the maximum permissible fault current contribution for the proponent. Proponents must design their protection systems and switchgear accordingly. In fault-current-restricted areas, Endeavour Energy may require fault level management strategies such as impedance insertion, neutral grounding, or fault level monitoring.

3.6 Generator Modelling Information

The model package and associated documentation must comply with AEMO's Power System Model Guidelines (PSMG). The model package evolves throughout the connection process through three defined stages:

- Connection Application (R0): based on preliminary/concept design data. Submitted with the Connection Application.
- Registration (R1): based on finalised detailed design data, incorporating FAT results. Submitted prior to commissioning (at least 3 months before).
- Testing and Model Validation (R2): based on site-validated data from commissioning tests. Submitted within 3 months of completing testing and commissioning.

Proponents are strongly advised to engage experienced power systems consultants to prepare, run and assess the models and their results. Endeavour Energy will assess and review proponent models for each connection process stage. Additional modelling or re-modelling may be required where questions or challenges arise, which can extend project timelines.

3.6.1 Connection Studies Report

A Connection Studies Report must be submitted with the Connection Application (R0) and Registration (R1) package, demonstrating compliance with the proposed/agreed access standards through modelling and network studies. For wide area network studies, the proponent must propose a set of network scenarios and contingencies for Endeavour Energy to review and agree and may propose additional contingencies.

3.6.1.1 Steady State Studies

Steady state studies assess the network at a fixed point in time to confirm the proposed system can be accommodated within network limits under normal and contingency conditions. These studies are typically undertaken using PowerFactory and PSS/E power flow software.

The assessment includes, but is not limited to:

- Thermal loading: confirm that network elements remain within continuous ratings under system normal conditions and within applicable emergency ratings under credible N-1 contingency conditions. This includes assessment of lines, cables, transformers, switchgear and other relevant network plant.
- Voltage step changes: assess voltage step changes resulting from changes in generator output, generator trip events, transformer tap movements, switching and relevant network element outages.
- Bus voltage limits: confirm bus voltages remain within applicable planning and operational limits, including the continuous uninterrupted operation operating range, generally 0.9 pu to 1.1 pu unless otherwise specified by Endeavour Energy, AEMO or the NER.
- Voltage profile: assess voltage profiles across relevant nodes in the Endeavour Energy network and, where applicable, adjacent transmission or distribution network nodes, for the agreed study scenarios.
- Reactive power margins: assess reactive power margins at relevant bulk supply points, transmission substations, zone substations and other key network locations to confirm sufficient voltage control capability and headroom.
- Fault level analysis: determine the impact of the proposed generating system on network fault levels. Maximum fault levels are assessed to confirm equipment ratings and switchgear interrupting capacities are not exceeded. Minimum fault levels are assessed to confirm there are no material adverse impacts on protection system operation, including protection relay sensitivity and grading.

3.6.1.2 Dynamic Studies

Dynamic studies assess the generating system's time-domain behaviour following disturbances and control-system changes. These studies are conducted using both RMS and EMT simulation platforms, PSS/E and PSCAD, as required by AEMO's Power System Model Guidelines. The assessment should demonstrate that the generating system remains stable, controlled and compliant with its proposed or agreed Generator Performance Standards.

The assessment includes, but is not limited to:

- Generator ride-through: assess generator response to relevant network disturbances, including three-phase and single-phase faults, voltage disturbances and frequency disturbances. The studies must demonstrate continuous uninterrupted operation and ride-through capability within the applicable access standard envelopes and relevant fault clearance times, including requirements under S5.2.5.4 and S5.2.5.5. Load rejection assessment should only be applied where relevant to the technology type; it is generally not applicable to asynchronous generation where the assessment relates to mechanical limitations of synchronous machines.
- Response to disturbances and reactive current injection: assess the generating system's response under S5.2.5.5A, including both balanced and unbalanced fault scenarios. Studies should demonstrate the timing, magnitude, recovery and stability of the delivered positive sequence and negative sequence reactive current response, including the speed of injection and the stability of the plant following the disturbance.

- Frequency ride-through: assess frequency ride-through capability under S5.2.5.3, including compliance with the applicable Frequency Operating Standard and continuous operation requirements.
- Active power/frequency response: Assess active power response to frequency deviations under S5.2.5.11, including active power/frequency response, droop performance and deadband requirements. Primary frequency response settings must comply with applicable NER and AEMO requirements. Where the BESS is seeking contingency FCAS registration, additional FCAS-specific droop and response requirements should be assessed in accordance with AEMO's BESS contingency FCAS registration guidance
- Voltage and reactive power control: assess voltage and reactive power control performance under S5.2.5.13, including coordination with Endeavour Energy's network voltage control philosophy and existing reactive power devices, such as generators, transformers, capacitor banks, reactors and other voltage control equipment. Assessment includes proposed Q control mode philosophy, voltage/reactive power/power factor set-point reference changes, and response to relevant disturbances.
- Active power control: assess active power control performance under S5.2.5.14, including ramp rate limits, curtailment response, dispatch and AGC interface behaviour.

Appendix A: Access Standards Consultation Requirements

The table below reflects NER Schedule 5.2 access standard requirements as updated by the AEMC ERC0393 Final Rule. Proponents whose projects are subject to transitional arrangements should confirm with Endeavour Energy which version of the access standards applies.

Technical Requirement	Automatic (AAS)	Minimum (MAS)	Negotiated (NAS)	AEMO Advisory & ERC0393 Notes
Reactive Power Capability	Per S5.2.5.1	Per S5.2.5.1	Per S5.2.5.1	AEMO advisory. ERC0393: midpoint voltage now nominated by Endeavour Energy on forward-looking basis. Removal of mandatory Q at 1.1 pu / 0.9 pu.
Quality of Electricity Generated	Per S5.2.5.2	Per S5.2.5.2	Per S5.2.5.2	Not advisory. Harmonic allocation limits set by Endeavour Energy
Frequency Response	Per S5.2.5.3	Per S5.2.5.3	Per S5.2.5.3	AEMO advisory. IBR must deliver primary frequency response.
Voltage Ride-Through (LVRT/HVRT)	Per S5.2.5.4	Per S5.2.5.4	Per S5.2.5.4	AEMO advisory. ERC0393: HVRT ">130%" changed to ">marginally exceeding 130%". Reference to nominal voltage. OLTC provisions updated.
Disturbance Ride-Through	Per S5.2.5.5	Per S5.2.5.5	Per S5.2.5.5	AEMO advisory. ERC0393: S5.2.5.5 now solely addresses ride-through capability. MRFT exemption below SCRmin.
Response to Disturbances	Per S5.2.5.5A	Per S5.2.5.5A	Per S5.2.5.5A	AEMO advisory. ERC0393 new clause. Reactive current commence time: AAS 10ms, MAS 40ms. Negative sequence reactive current injection. Balanced and unbalanced fault requirements.
Response to Abnormal Voltage Quality	N/A	Per S5.2.5.6	N/A	Not advisory.

Technical Requirement	Automatic (AAS)	Minimum (MAS)	Negotiated (NAS)	AEMO Advisory & ERC0393 Notes
Partial Load Rejection	Per S5.2.5.7	Per S5.2.5.7	Per S5.2.5.7	AEMO advisory. ERC0393: No longer applies to asynchronous (IBR) plant.
Protection from Disturbances	N/A	Per S5.2.5.8	N/A	AEMO advisory. ERC0393: phase-shift protection now mandatory. 50% AP reduction within 3s for over-frequency. Voltage protection must not disconnect within 20ms for TOV.
Protection - System Security	Per S5.2.5.9	Per S5.2.5.9	N/A	AEMO advisory.
Protection - Unstable Operation	Per S5.2.5.10	Per S5.2.5.10	Per S5.2.5.10	AEMO advisory. ERC0393: >100 MW plant requires PMUs capable of send/receive.
Frequency Control	Per S5.2.5.11	Per S5.2.5.11	Per S5.2.5.11	AEMO advisory.
Impact on Network Capability	Per S5.2.5.12	Per S5.2.5.12	Per S5.2.5.12	AEMO advisory.
Voltage and Reactive Power Control	Per S5.2.5.13	Per S5.2.5.13	Per S5.2.5.13	AEMO advisory. ERC0393: updated coordination with Endeavour Energy - nominated midpoint voltage.
Active Power Control	Per S5.2.5.14	Per S5.2.5.14	Per S5.2.5.14	AEMO advisory
Short Circuit Ratio	Per S5.2.5.15	Per S5.2.5.15	Per S5.2.5.15	AEMO advisory IBR with SCR<3 at PoC triggers system strength FIA.
Voltage Phase Angle Shift S5.2.5.16	N/A	N/A	N/A	ERC0393: Removed from the NER.
Remote Monitoring	Per S5.2.6.1	Per S5.2.6.1	N/A	AEMO advisory. SCADA interface to Endeavour Energy.
Communications Equipment	Per S5.2.6.2	Per S5.2.6.2	Per S5.2.6.2	AEMO advisory
Auxiliary Supplies	Per S5.2.7	Per S5.2.7	Per S5.2.7	AEMO advisory
Fault Current	Per S5.2.8	Per S5.2.8	Per S5.2.8	Not advisory

Technical Requirement	Automatic (AAS)	Minimum (MAS)	Negotiated (NAS)	AEMO Advisory & ERC0393 Notes
				Must not breach Endeavour Energy switchgear ratings

Appendix B: Connection Application Fees

Indicative costs below are based on AER-approved labour rates for Endeavour Energy (FY26). Actual costs will vary based on AER approved labour rates, quality of submissions by proponent, project complexity, scope, and third-party requirements.

Application Fees Summary	Pass Through	Total
Detailed Enquiry		$150,000.00
Project and Technical management – Assess, process and coordinate connection application and Generator Performance Standards in conjunction with AEMO and other stakeholders		
Connection Application technical due diligence – review of connection study reports, power system studies, and PSS/E and PSCAD model reviews, technical liaison with AEMO and other NSPs, Review and negotiation of generator performance standards to issuing 5.3.4A/B		$450,000.00
PSCAD WAN Assessment		
Review protection report, fault study, and discrimination analysis		
EE Planning and Operational Assessments		
EE assessment (including operational investigations) of the application as required by NER Chapter 5		
Review of proposed generator connection design, SCADA, communication, and AGC requirements		$80,000.00
Network or substation extension scope of works – Endeavour Energy Technical Brief		$125,000.00
Transgrid Fees • Independent Grid Impact Study Note: Costs are to be confirmed with Transgrid. The indicative fee for this item considers only the scope above. If	Expected minimum of $80,000.00	$80,000.00

Application Fees Summary	Pass Through	Total
additional works are triggered tor Transgrid to undertake as a result of this application, proponent will be advised of the fee accordingly		
AEMO Fees • R0 Connection Application Assessment Note: Costs are to be confirmed with AEMO	$400,000.00	$400,000.00
Connection Offer Services • Procure Connection Development Agreement for Endeavour network alterations Legal fees Network Development Agreement and/or Generator Connection Agreement	$400,000.00	$400,000.00
	Estimated Total	**$ 1,685,000.00**

Exclusions

- Ancillary Network Services fees associated with any capital works – such as alteration to substation primary and secondary system, protection, SCADA/communications, overhead mains, or EW/OPGW.

Endeavour Energy costs for R1 Registration and R2 Testing phase are excluded

Note:
The above estimates are indicative only based on Endeavour Energy's past experience in processing BESS applications under Chapter 5 NER requirements and are subject to vary significantly. The actual cost will be passed onto the proponent which can be much higher than specified above. If the assessment incurs additional costs, the Customer will be responsible for the associated costs.

The estimated provided above are high level indicators only to assist with the Customer's budgeting purposes. The estimate provided in the Connector Offer Services considers Part (a) of the scope services detailed above and legal services required. The estimate for Connection Offer Services, Generator Performance Standards Assessment Services, and Negotiation of Agreements may be revised at a later stage or with the development of the Battery Connection Development Agreement (BCDA). Estimate does not consider costs associated with design and construction of network augmentations to facilitate the connection. Some factors that can influence the above cost estimates are (but not limited to) the following:

- Poor quality/incomplete submissions by the proponent
- Rework as a result of project changes (i.e. plant alterations including change of OEM, BESS capacity, etc)
- Inefficiencies introduced by the proponent
- Increased meeting requests
- Deviation from Endeavour Energy established processes to support Customer requests
- Increases to Endeavour Energy AER rates and consultant costs
- Request for information received from the proponent
- Issues and complications identified during the processing of the end-to-end application, registration & commissioning of the BESS
- Delays & rework of legal documents during development
-

Costs relating to the services provided by AEMO and Transgrid will be passed through to the Customer as required

Appendix C: Key Technical Requirements

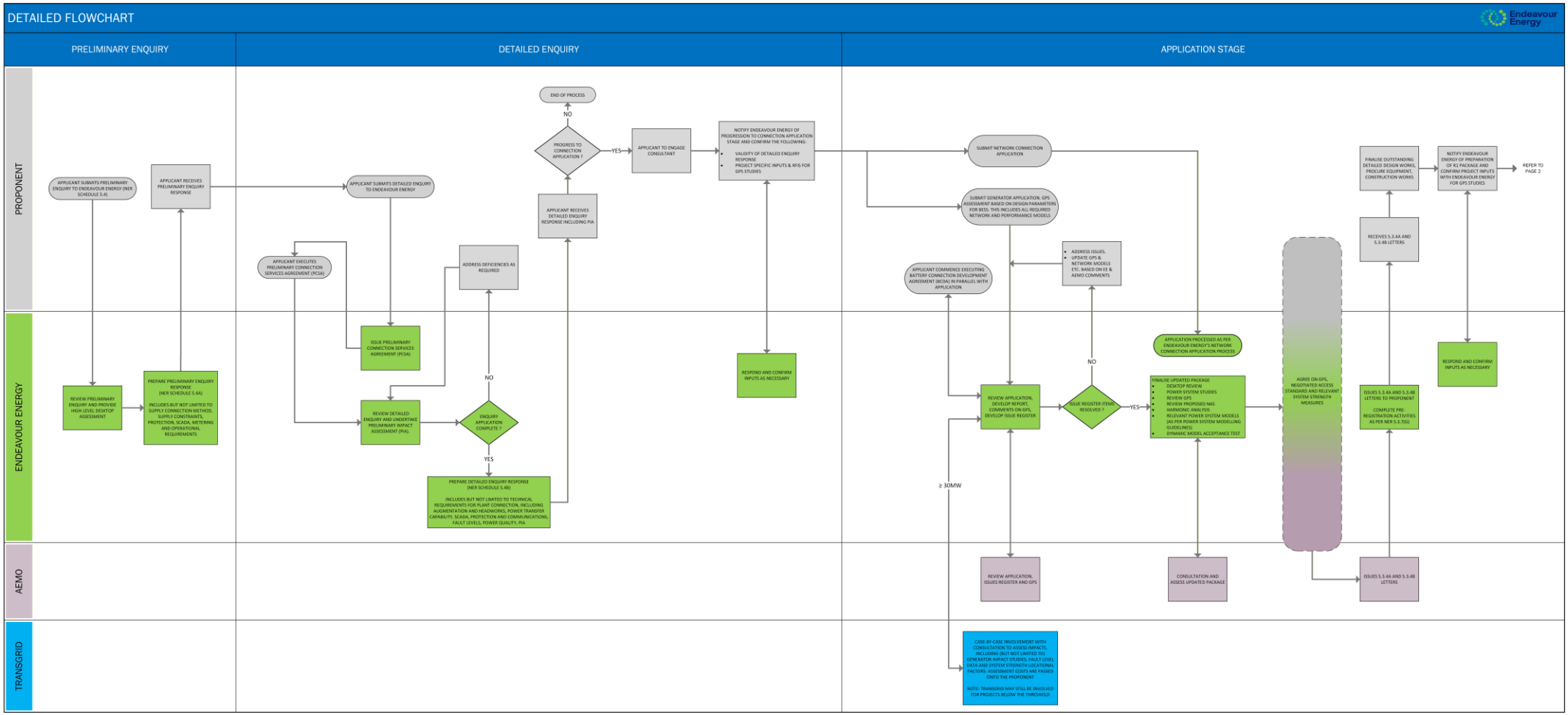
The table below summarises the key technical requirements for ≥5 MW BESS connections to the Endeavour Energy network, including relevant National Electricity Rules (NER) references governing design, performance, and compliance.

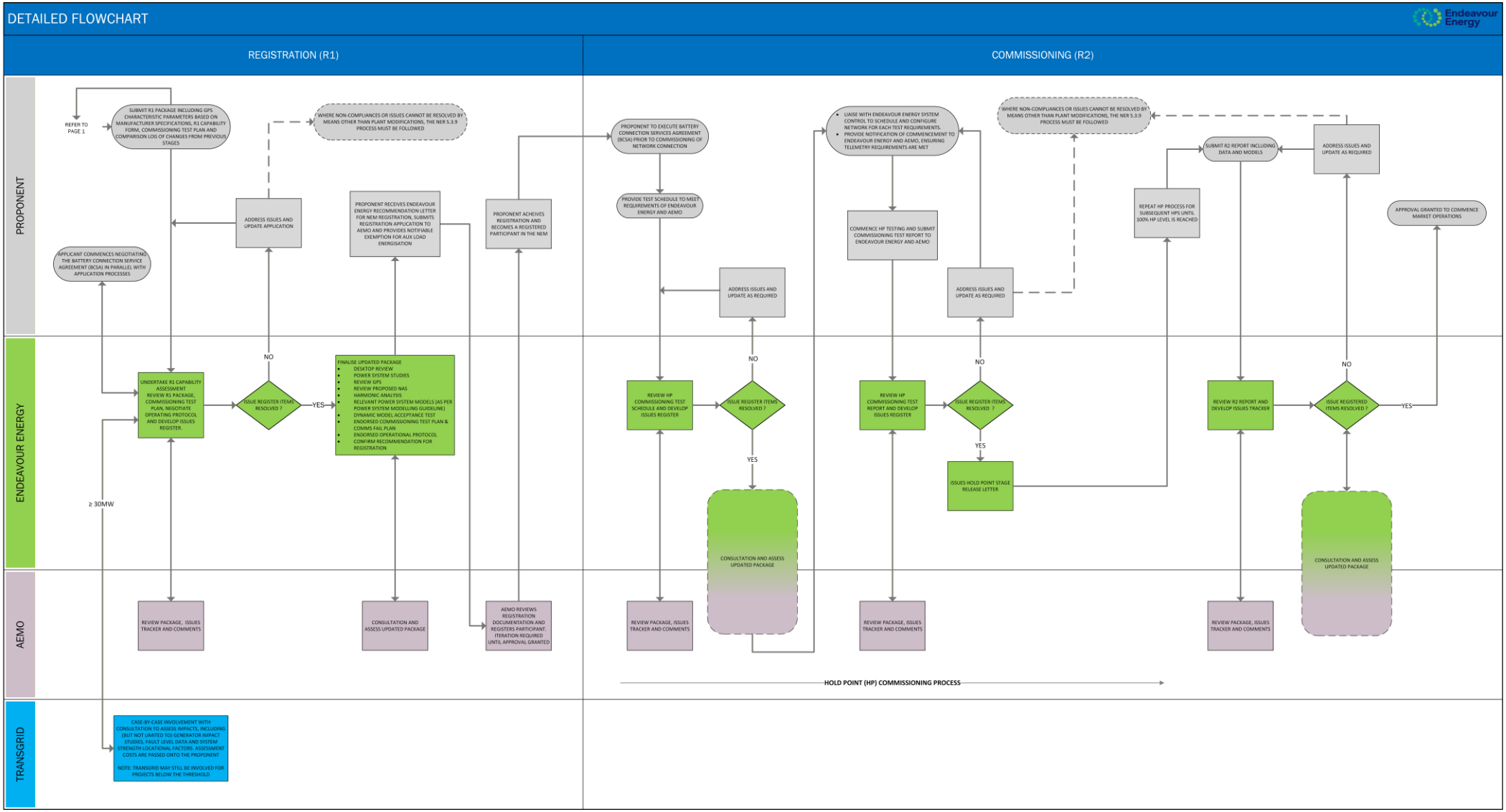
Technical Requirement	Reference
BESS / IRP — specific requirements (FCAS, ECM, SOC management, dispatch)	AEMO FCAS enablement agreements. Energy Conversion Model (ECM) for semi-scheduled IBR. State of Charge (SOC) management requirements per AEMO guidelines. Coordinate with Endeavour Energy on active power set-point response and ramp rate limits.
Circumstances where augmentation may be required (thermal, fault level, system strength, voltage)	As identified in the Detailed Enquiry Response and Application assessment. Costs funded by proponent.
Commissioning and GPS compliance testing	AEMO GPS Compliance Assessment and R2 Model Validation Test Plan Template. Typically consists of four hold points from HP0–HP3.
Fault level management (maximum fault contribution allocation, switchgear withstand, fault level monitoring)	Fault level allocation specified in application responses. Maximum permissible contribution allocated per project. Combined fault current from all sources must not exceed switchgear interrupting capacity.
Frequency and voltage ride-through (LVRT, HVRT, ROCOF)	NER Chapter 5 S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.5A (ERC0393). Phase-shift protection mandatory per S5.2.5.8 (ERC0393).
Oscillation Monitoring	NER Chapter 5 S5.2.5.10. For generating systems with an aggregate nameplate rating of 100 MW or greater, PMU capability may be required to support oscillation monitoring in accordance with AEMO requirements. Requirements should be confirmed with Endeavour Energy and AEMO during the application and R1 capability assessment process.
Power quality (harmonics, flicker, unbalance, DC injection)	Harmonic emission limits allocated by Endeavour Energy at the Detailed Enquiry stage. NER Chapter 5 S5.2.5.2.

Technical Requirement	Reference
Protection systems and protection schemes (overcurrent, earth fault, differential, distance, loss of mains, phase-shift)	NER S5.2.5.8 and S5.2.5.9. Protection settings must be agreed with Endeavour Energy prior to commissioning.
Reactive power capability (P-Q envelope)	NER Chapter 5 S5.2.5.1 (updated by ERC0393). Midpoint voltage nominated by Endeavour Energy. Coordinate Q envelope with Endeavour Energy's voltage management requirements.
SCADA and remote monitoring (data streams, protocols, RTU interface)	NER Chapter 5 S5.2.6.1 and S5.2.6.2. Protocols per Endeavour Energy specification.
Voltage control and AVR settings	NER Chapter 5 S5.2.5.13. Coordinate with Endeavour Energy network voltage control and main transformer OLTC settings.

Appendix D: Connection Process Overview

Appendix E: Connection Process Detailed




DETAILED FLOWCHART
Endeavour Energy
REGISTRATION (R1)
COMMISSIONING (R2)
PROPONENT
ENDEAVOUR ENERGY
AEMO
TRANSGRID
REFER TO PAGE 1
SUBMIT R1 PACKAGE INCLUDING GPS CHARACTERISTIC PARAMETERS BASED ON MANUFACTURER SPECIFICATIONS, R1 CAPABILITY FORM, COMMISSIONING TEST PLAN AND COMPARISON LOG OF CHANGES FROM PREVIOUS STAGES
WHERE NON-COMPLIANCES OR ISSUES CANNOT BE RESOLVED BY MEANS OTHER THAN PLANT MODIFICATIONS, THE NER 5.3.9 PROCESS MUST BE FOLLOWED
ADDRESS ISSUES AND UPDATE APPLICATION
PROPONENT RECEIVES ENDEAVOUR ENERGY RECOMMENDATION LETTER FOR NEM REGISTRATION, SUBMITS REGISTRATION APPLICATION TO AEMO AND PROVIDES NOTIFIABLE EXEMPTION FOR AUX LOAD ENERGISATION
PROPONENT ACHIEVES REGISTRATION AND BECOMES A REGISTERED PARTICIPANT IN THE NEM
APPLICANT COMMENCES NEGOTIATING THE BATTERY CONNECTION SERVICE AGREEMENT (BCSA) IN PARALLEL WITH APPLICATION PROCESSES
UNDERTAKE R1 CAPABILITY ASSESSMENT REVIEW R1 PACKAGE, COMMISSIONING TEST PLAN, NEGOTIATE OPERATING PROTOCOL AND DEVELOP ISSUES REGISTER.
ISSUE REGISTER ITEMS RESOLVED ?
NO
YES
FINALISE UPDATED PACKAGE
DESKTOP REVIEW
POWER SYSTEM STUDIES
REVIEW GPS
REVIEW PROPOSED NAS
HARMONIC ANALYSIS
RELEVANT POWER SYSTEM MODELS (AS PER POWER SYSTEM MODELLING GUIDELINE)
DYNAMIC MODEL ACCEPTANCE TEST
ENDORSED COMMISSIONING TEST PLAN & COMMS FAIL PLAN
ENDORSED OPERATIONAL PROTOCOL
CONFIRM RECOMMENDATION FOR REGISTRATION
≥ 30MW
REVIEW PACKAGE, ISSUES TRACKER AND COMMENTS
CONSULTATION AND ASSESS UPDATED PACKAGE
AEMO REVIEWS REGISTRATION DOCUMENTATION AND REGISTERS PARTICIPANT. ITERATION REQUIRED UNTIL APPROVAL GRANTED
CASE-BY-CASE INVOLVEMENT WITH CONSULTATION TO ASSESS IMPACTS, INCLUDING (BUT NOT LIMITED TO) GENERATOR IMPACT STUDIES, FAULT LEVEL DATA AND SYSTEM STRENGTH LOCATIONAL FACTORS, ASSESSMENT COSTS ARE PASSED ONTO THE PROPONENT
NOTE: TRANSGRID MAY STILL BE INVOLVED FOR PROJECTS BELOW THE THRESHOLD
PROPONENT TO EXECUTE BATTERY CONNECTION SERVICES AGREEMENT (BCSA) PRIOR TO COMMISSIONING OF NETWORK CONNECTION
PROVIDE TEST SCHEDULE TO MEET REQUIREMENTS OF ENDEAVOUR ENERGY AND AEMO
ADDRESS ISSUES AND UPDATE AS REQUIRED
REVIEW HP COMMISSIONING TEST SCHEDULE AND DEVELOP ISSUES REGISTER
ISSUE REGISTER ITEMS RESOLVED ?
NO
YES
CONSULTATION AND ASSESS UPDATED PACKAGE
REVIEW PACKAGE, ISSUES TRACKER AND COMMENTS
LIAISE WITH ENDEAVOUR ENERGY SYSTEM CONTROL TO SCHEDULE AND CONFIGURE NETWORK FOR EACH TEST REQUIREMENTS
PROVIDE NOTIFICATION OF COMMENCEMENT TO ENDEAVOUR ENERGY AND AEMO, ENSURING TELEMETRY REQUIREMENTS ARE MET
COMMENCE HP TESTING AND SUBMIT COMMISSIONING TEST REPORT TO ENDEAVOUR ENERGY AND AEMO
REVIEW HP COMMISSIONING TEST REPORT AND DEVELOP ISSUES REGISTER
ISSUE REGISTER ITEMS RESOLVED ?
NO
YES
ISSUES HOLD POINT STAGE RELEASE LETTER
ADDRESS ISSUES AND UPDATE AS REQUIRED
WHERE NON-COMPLIANCES OR ISSUES CANNOT BE RESOLVED BY MEANS OTHER THAN PLANT MODIFICATIONS, THE NER 5.3.9 PROCESS MUST BE FOLLOWED
REPEAT HP PROCESS FOR SUBSEQUENT HPS UNTIL 100% HP LEVEL IS REACHED
SUBMIT R2 REPORT INCLUDING DATA AND MODELS
REVIEW R2 REPORT AND DEVELOP ISSUES TRACKER
ISSUE REGISTERED ITEMS RESOLVED ?
NO
YES
ADDRESS ISSUES AND UPDATE AS REQUIRED
CONSULTATION AND ASSESS UPDATED PACKAGE
REVIEW PACKAGE, ISSUES TRACKER AND COMMENTS
APPROVAL GRANTED TO COMMENCE MARKET OPERATIONS
HOLD POINT (HP) COMMISSIONING PROCESS

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Endeavour Energy

POWER together