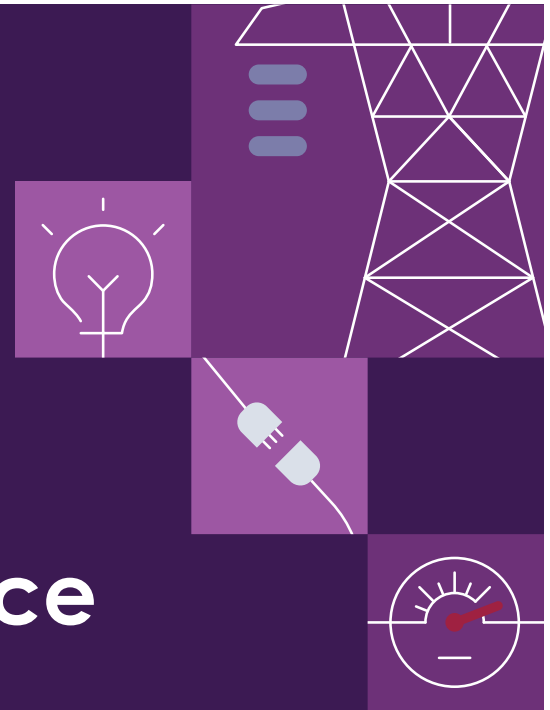




System Restart Service Specification (2026)

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Prepared by: AEMO WA System Engineering

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Version release history

Version	Effective Date	Summary of Changes
1.0	17 August 2026	Initial release for North Metro Electrical Sub-Network Tender 2026

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1. Introduction

1.1. Purpose and scope

- 1.1.1. AEMO has prepared this System Restart Service Specification in accordance with clause 3.7.27 of the Electricity System and Market Rules (**ESM Rules**). This System Restart Service Specification includes:
- (a) the procurement objectives;
 - (b) the location of the electrical sub-networks;
 - (c) a description of the technical requirements;
 - (d) the capacity requirements;
 - (e) individual reliability requirements;
 - (f) testing requirements; and
 - (g) additional information where AEMO considers it necessary to meet the System Restart Standard.

1.2. Definitions

Terms defined in the *Electricity Industry Act 2004* (WA), the ESM Regulations and the ESM Rules have the same meanings in this System Restart Service Specification unless the context requires otherwise.

- 1.2.1. The following definitions apply in this System Restart Service Specification unless the context requires otherwise.

Table 1 Definitions

Term	Meaning
BSU	A black start unit.
Service Equipment	The service equipment specified in the System Restart Service Contract (including the SRS Facility) that is used to provide the System Restart Service.
Service Provider	A Market Participant with whom AEMO enters into a System Restart Service Contract.
SRS Facility	A Registered Facility (or multiple Registered Facilities) registered to the Service Provider that is used to provide the System Restart Service.
TTHLU	A trip to house load unit, being an electrical islanding scheme using generating units that can disconnect from the Network following a major supply disruption and continue to supply their own auxiliaries on an isolated segment of system load.

1.3. Interpretation

- 1.3.1. The following principles of interpretation apply in this document unless the context requires otherwise.
- (a) References to time are references to Australian Western Standard Time.
 - (b) Terms that are capitalised, but not defined in this document, have the meaning given in the ESM Rules.
 - (c) A reference to a clause refers to a clause or section of the ESM Rules.

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1.4. Related documents

Table 2 Title and location of related documents

Title	Location
WEM Procedure: System Restart	Document link System Restart WEM Procedure Webpage link AEMO WEM Procedures
WEM System Restart Standard	Document link System Restart Standard Webpage link AEMO System Restart

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2. Procurement objectives

2.1.1. This System Restart Service Specification, seeks to achieve the following procurement objectives:

- (a) enable AEMO to procure a System Restart Service to meet the System Restart Standard for the purposes of clause 3.7.25 of the ESM Rules; and
- (b) ensure that the System Restart Service:
 - (i) provides technical capability to restart the SWIS;
 - (ii) provides a high level of availability and reliability;
 - (iii) is provided to a delivery point that is connected at a suitable network location; and
 - (iv) is provided at an efficient cost to the Wholesale Electricity Market.

3. System Restart Service details

3.1. Contract term

3.1.1. The commencement date for the System Restart Service is **8:00 am on 1 April 2027**.

3.1.2. The proposed end date is 8:00 am on 1 April 2032 (a 5-year contract term). A tender submission may request a shorter contract term.

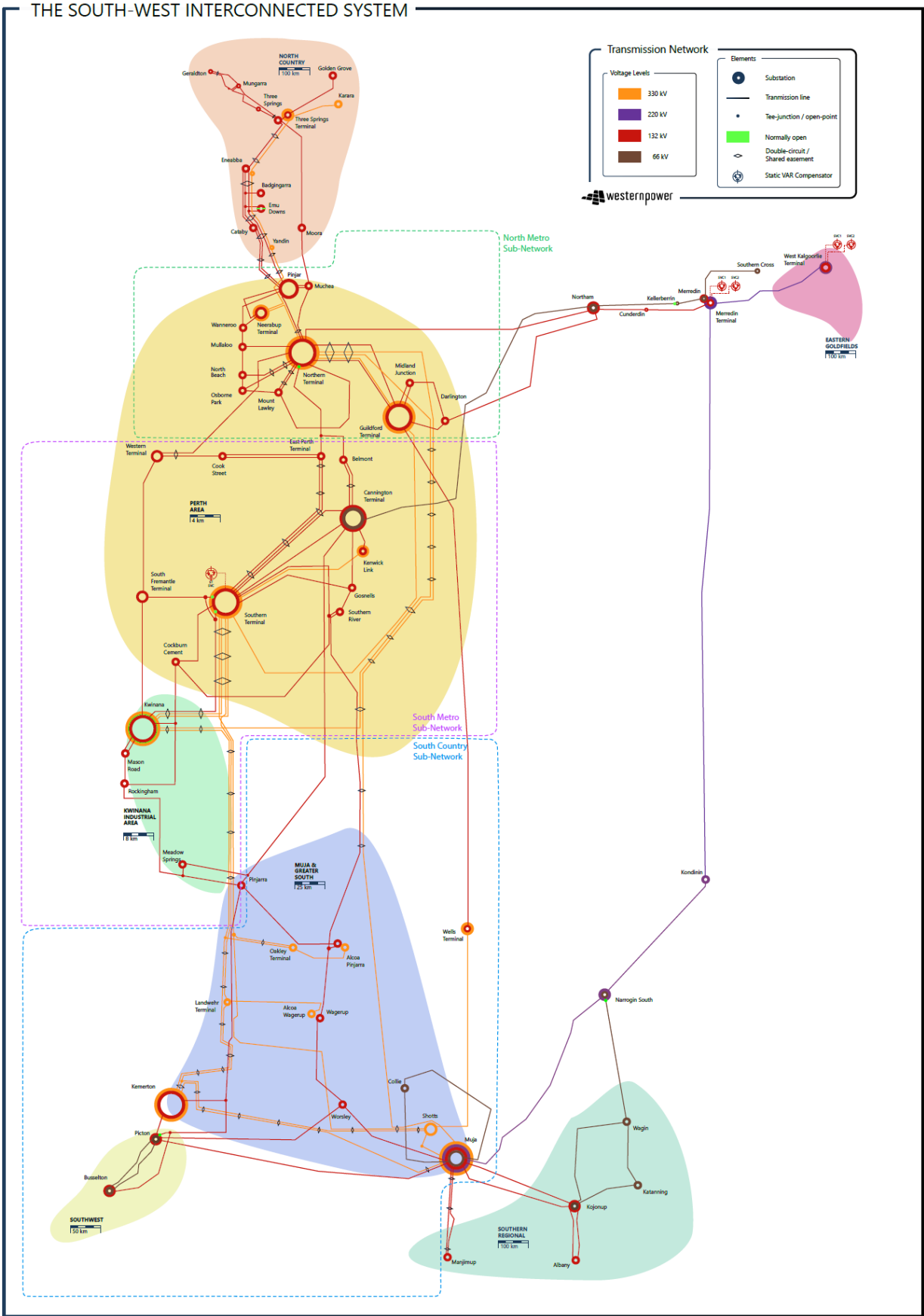
3.2. Location

3.2.1. The System Restart Service must be provided for the North Metro sub-network area. Figure 1 from the System Restart Standard is reproduced below for reference.

3.2.2. The North Metro sub-network contains several generators connected to the 132 kV and 330 kV transmission system and is meshed strongly with the rest of the network. These attributes make this sub-network suitable for restarting the SWIS in the event of a system shutdown or major supply disruption.

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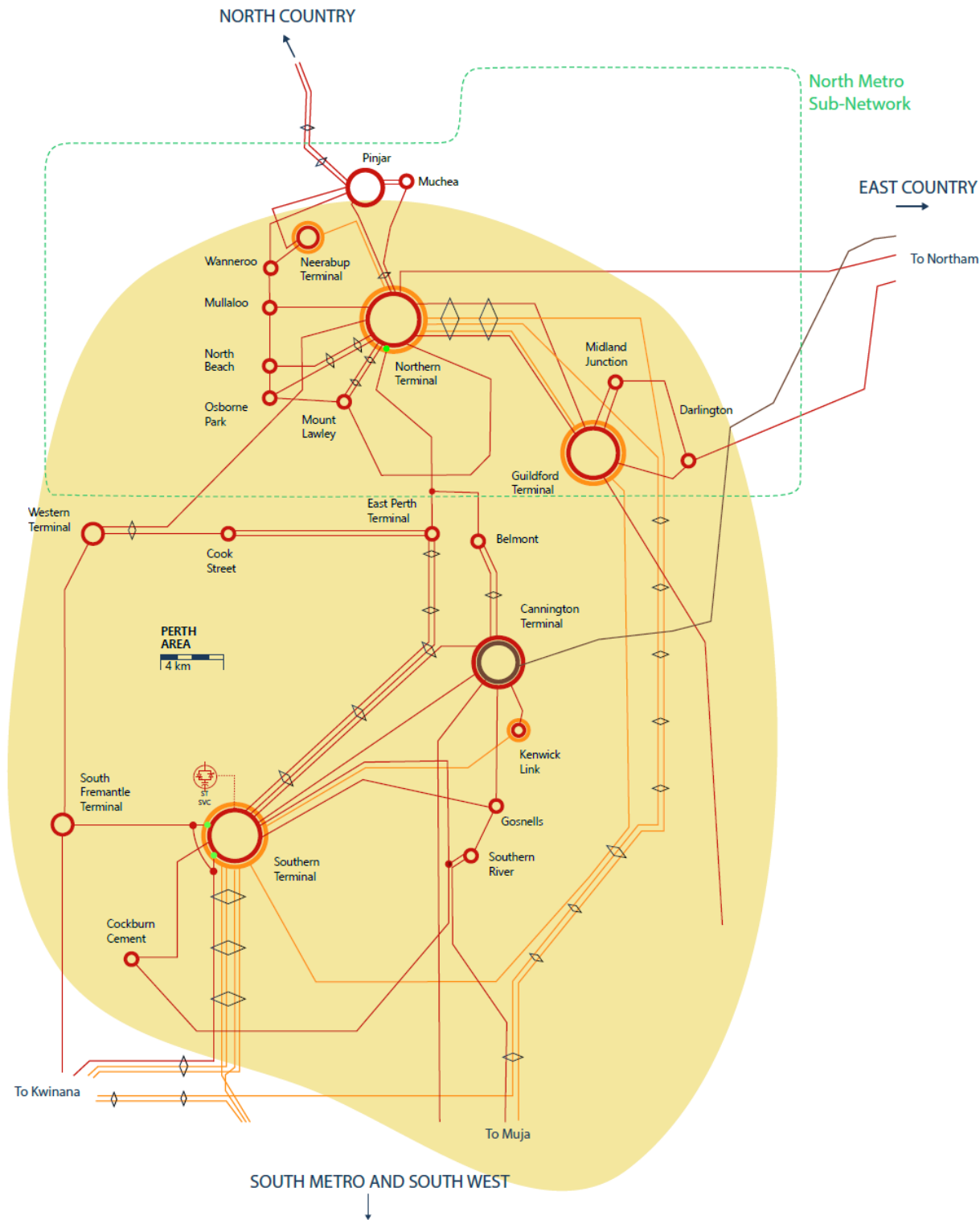
Figure 1 SWIS – Sub-Network Map



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Figure 2 SWIS –Sub-Network Map (North Metro)



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3.3. Technical Requirements

3.3.1. The technical requirements specified in paragraphs 3.3.2, 0, and 3.3.4 of this System Restart Service Specification are based on section 6 of the System Restart Standard and outline generation requirements, and requirements for both a Black Start Unit (BSU) and a Trip to House Load Unit (TTHLU), which are as described in section 6.1 of the WEM System Restart Standard.

3.3.2. General requirements for all SRS Facilities

The following requirements (as set out in the System Restart Standard) apply to all SRS Facilities:

- A SRS Facility must remain in stable operation for:
 - sudden changes in load of up to 10 MW (e.g. block loading a network feeder); and
 - the start-up of a generating unit auxiliary motor and its associated mechanical load of up to 5 MW.
- A SRS Facility must be able to operate in isochronous governor control mode to automatically regulate frequency.
- When not operating in isochronous mode, a SRS Facility must be capable of operating in droop governor control mode with governor response enabled, at a minimum response value of 4% droop, unless otherwise specified under the relevant Registered Generator Performance Standard.
- The control systems of a SRS Facility must be capable of setting generator output quantities at fixed MW values and setting generator terminal voltage to regulate at fixed voltage values.
- A SRS Facility must be capable of operating in a voltage range between 95% and 105% of its rated terminal voltage.
- A SRS Facility connected to the SWIS at 330 kV must be capable of energising a 330 kV line section and 330/132kV bus-tie transformer¹ to enable load connection. This may be achieved by allowing generator excitation to commence whilst the generator circuit breaker is closed (i.e. “soft start” energisation).
- A SRS Facility must be capable of absorbing reactive power from the SWIS while operating within the stable under excitation area of its generator capability curve (leading VARs).
- The ability of a SRS Facility to restart the SWIS must be determined through steady state and transient analysis engineering studies and is only acceptable at AEMO’s discretion².
- For a SRS Facility that is not manned 24/7, AEMO may require remote control (to start and to dispatch) in the event of a system shutdown or major supply disruption for the purpose of a System Restart Service.
- Depending on the specific characteristics of a SRS Facility, AEMO may require additional SCADA indications to support the operation of the System Restart Service.
- A SRS Facility must maintain an AEMO-approved emergency communication system.

¹ Typically 490 MVA but may vary by location.

² This may require a System Restart Service proponent to provide updated power system models to AEMO.

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- A SRS Facility must maintain an AEMO-approved emergency communications plan for mobilisation of its operating personnel to meet generator start-up time requirements as specified in paragraphs 3.3.3 and 3.3.4 of this System Restart Service Specification (as applicable to the relevant SRS Facility).
- A SRS Facility must submit a testing plan to demonstrate the ability to restart and energise part of the network and will require testing every 6 months.

The following requirements (in addition to those set out in the System Restart Standard) also apply to all SRS Facilities:

- material components of a SRS Facility (including but not limited to control systems, protection systems and associated software) must not adversely affect power system restoration when AEMO requires the System Restart Service to be provided.
- A SRS Facility must be able to operate in a stable manner and in accordance with good electricity industry practice while the Network Operator carries out Network switching (including line energisation, transformer energisation and inrush, and load pickup).
- A SRS Facility must maintain and provide AEMO with validated phasor domain transient (PDT) or root mean square (RMS) in DigSILENT PowerFactory Software format, and electromagnetic transient (EMT) models in PSCADTM/EMTDCTM software format that accurately represent their performance during energisation, load pickup, and isochronous or droop control operation. The models must include relevant protection systems.
- A SRS Facility must participate in periodic system restoration studies, at a frequency determined by AEMO, to confirm ongoing suitability for provision of SRS.

3.3.3. Specific requirements for a SRS Facility that is a BSU

The following requirements (as set out in the System Restart Standard) apply to each SRS Facility that is a BSU:

- A BSU should have a nominal sent-out power output of not less than 50 MW, except where AEMO studies indicate a smaller unit may be accommodated. The BSU will face a sudden reduction in load and must remain in stable operation upon synchronisation of the next large fast start machine.
- The ability to start and close its synchronising circuit breaker(s) onto a dead bus without energy being supplied to it from other generating units within 60 minutes.
- Sufficient on-site or local uninterruptible fuel reserve should be available to run each BSU at the nominal power output for a minimum of 14 hours following a system shut down or a major supply disruption.
- The ability to provide at least three sequential black starts, to allow for possible tripping of the transmission/distribution system(s) during the restart process and possible tripping of the BSU during the black start starting sequence itself.
- A mitigation plan is required for common mode failure in critical starting equipment that renders BSUs inoperable. For example, installation of an emergency connection for a mobile generator to replace a failed black start diesel generator, or for technical staff to support critical services.
- Permission from the environmental authority to waive any relevant air pollution restrictions for extended operation of a BSU at reduced load levels during a test or when restarting the SWIS.

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- Stable operation at full voltage and no-load (0 MW) and at low loads (<10 MW).

3.3.4. Specific requirements for a SRS Facility that is a TTHLU

The following requirements (as set out in the System Restart Standard) apply to each SRS Facility that is a TTHLU:

- Permission from the environmental authority to waive any relevant air pollution restrictions for extended operation of the TTHLU at reduced load levels during a test or when restarting the SWIS following a system shut down or major supply disruption.
- The ability to close its synchronising circuit breaker(s) onto a dead bus without energy being supplied to it from other generating units within 30 minutes.
- Stable operation at 0 MW sent-out power (net of house load).
- Each TTHLU must have a nominal sent-out generation not less than 50 MW, except where AEMO studies indicate a smaller net generation may be accommodated.

3.4. Generation Capacity Requirements

- 3.4.1. As specified in section 6 of the System Restart Standard, both BSUs and TTHLUs should have a nominal sent-out power not less than 50 MW, except where AEMO studies have determined that a smaller BSU or TTHLU, as relevant, may be accommodated.
- 3.4.2. The success of a System Restart Service depends on the SRS Facility's ability to restore network, generation and load. The suitability of a SRS Facility is assessed based on those factors and also the Local Black Start Procedures of nearby Facilities (including Facilities registered to other Market Participants).

Explanatory Note

The suitability of a SRS Facility depends on the nearby network, generation and load profiles. Two examples are provided to demonstrate how the active power capability requirement for an area may be considered.

Example 1

A 50 MW BSU that meets all of the technical requirements is located near a 200 MW of generation. According to the Local Black Start Procedures of the nearby Facilities, all of the generation is available within 1 hour of receiving site power. The small BSU would be considered suitable for this area.

Example 2

A 50 MW BSU that meets all of the technical requirements is located near a 200 MW of generation that is either unavailable for 12 hours after receiving site power, or requires energising a bus-tie-transformer up from 132kV to 330kV to access. In this example, while the small BSU meets minimum requirements, a larger BSU would be preferred to improve System Restart Service outcomes.

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3.5. Maintenance and reliability

- 3.5.1. The Service Provider must maintain the Service Equipment in accordance with good electricity industry practice.
- 3.5.2. AEMO may require the Service Provider to provide the Service at any time during the contract term.
- 3.5.3. As specified in section 4.1 of the WEM System Restart Standard, the contract reliability requirement is 95%, as determined in accordance with the System Restart Service Contract.

3.6. Provision of information in tender submission

- 3.6.1. In addition to the information required to ability to meet the requirements in sections demonstrate 3.3, 3.4 and 3.5, the following information must be provided by the System Restart Service Provider:
 - (a) Maximum active power step while remaining stable (positive and negative);
 - (b) Maximum reactive power step while remaining stable (positive and negative);
 - (c) Maximum ramp-rate, including variations according to relevant conditions or operating points (positive and negative);
 - (d) Nominal or safe recovery time between load pickup steps; and
 - (e) Protection system information of the Equipment.

3.7. Service test requirements

Explanatory Note

A Service Test is a means to ensure reliability of the System Restart Service, as outlined in section 4.2 of the WEM System Restart Standard.

- 3.7.1. As specified in section 4.2 of the WEM System Restart Standard, a System Restart Service must be tested every six months or as otherwise required by AEMO under the System Restart Service Contract, to ensure confidence in service reliability.
- 3.7.2. Where a Service Test is unsuccessful, the System Restart Service will be regarded as unavailable until rectified.
- 3.7.3. The minimum testing requirements provided in section 3.7.1 are based on section 4.2 of the System Restart Standard, and are considered to be a typical minimum set of tests for a Service Provider:
 - (a) Isolate Service Equipment.
 - (b) For a BSU, start using the same procedure or process as would be used for a System Restart.
 - (c) For a TTHLU, trip Service Equipment from the power system and remain operational at house load.
 - (d) Run at zero export load for at least 30 minutes.
 - (e) Change Service Equipment output voltage above and below nominal voltage and hold each change for 5 minutes.

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- (f) Change Service Equipment output frequency above and below nominal voltage and hold each change for 5 minutes; or supply house loads or station auxiliaries with the Service Equipment on isochronous mode.
- (g) Demonstrate the ability to switch out of isochronous mode while remaining online and with a stable output.
- (h) Energise the transformer using the same procedure or process as would be used for a System Restart.
- (i) Service Equipment to close onto a de-energised busbar (or other de-energised electrical equipment as agreed by AEMO).

3.7.4. AEMO may, with reasonable prior notice, request access to each SRS Facility to witness any test.