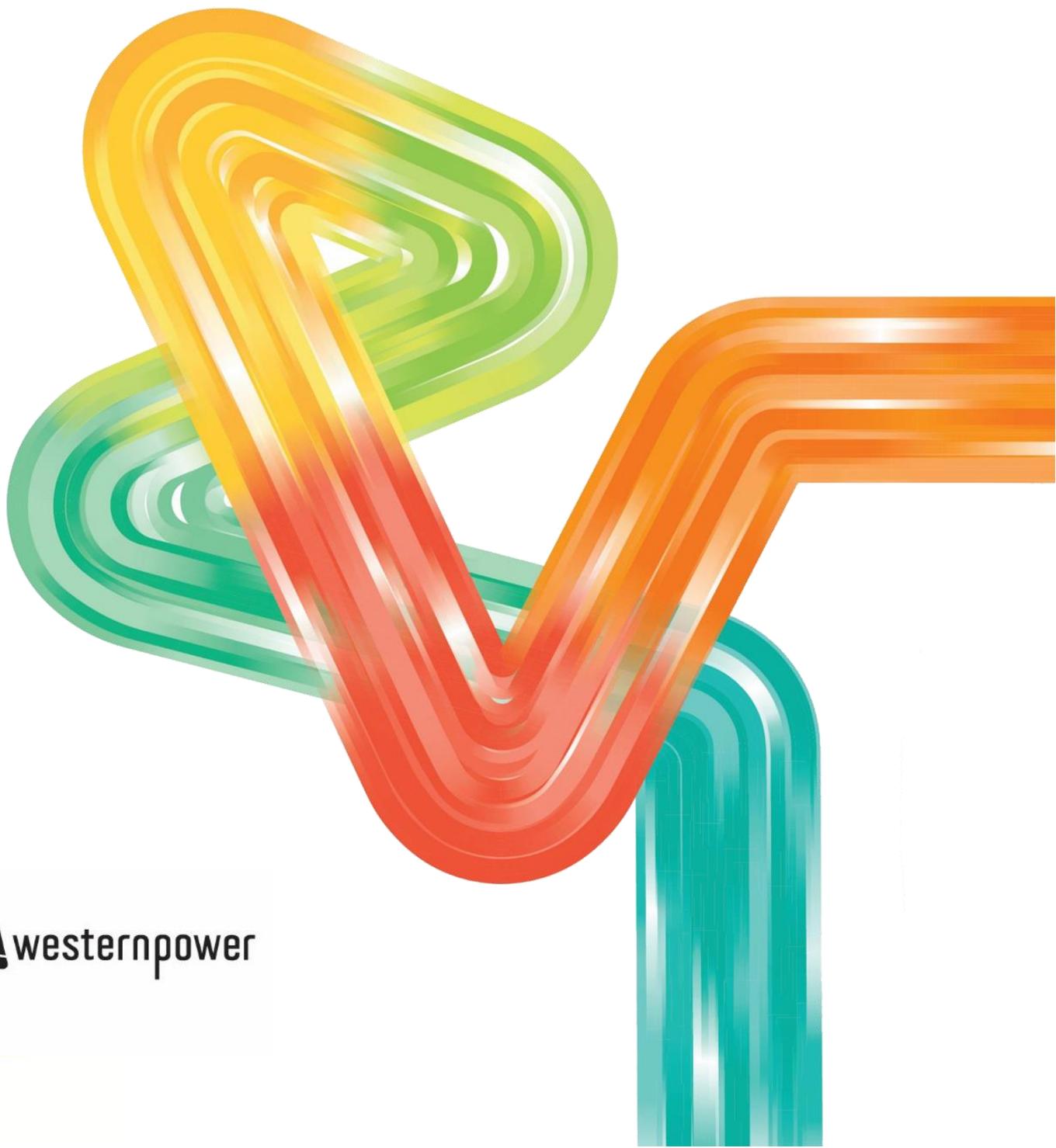


# Distributed Energy Resources Management

## Validation Principles

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**WesternPower**

363 Wellington Street  
Perth WA 6000  
GPO Box L921 Perth WA 6842

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	<b>Title</b>	<b>Name</b>	<b>Date</b>
<b>Owner</b>	Senior Standards and Technology Engineer	Nigel Wilmot	14/10/21
<b>Reviewer</b>	Principal Engineer	Behnam Taherian	18/10/2021
<b>Endorser</b>	Distribution Grid Strategy & Planning Manager	Janica Lukas	05/11/2021
<b>Approver:</b>	Head of Grid Transformation	Ben Bristow	01/12/2021

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## Glossary

Term	Definition
Authorised Agent	A User with an Electricity Transfer Access Contract with Western Power that is responsible for electricity supplied to another User and that have the permission to control the User's EG system for DER management. Note: A User in this context is as per the Technical Rules clause 1.3.(b) (3) (B)
Basic EG systems	An embedded generator suitable for connection to Western Power standard connection services that meets requirements of the Basic EG Connection Technical Requirements
battery energy storage system	As defined in AS/NZS5139 2019
connection agreement	An agreement or other arrangement between the Network Service Provider and a User, which may form part of or include an access contract that specifies the technical requirements that apply in relation to the connection of a User's equipment to the transmission or distribution system (refer Western Power Technical Rules <sup>1</sup> )
DER	Distributed Energy Resources are smaller-scale devices that can either use, generate or store electricity, and form a part of the local distribution system, serving homes and businesses. DER can include renewable embedded generation such as rooftop solar photovoltaic (PV) systems, energy storage, electric vehicles (EVs), and technology to manage demand at a premise
Disconnect/reconnect	The operation of disconnecting or reconnecting an inverter in an EG System from the grid for the purposes of DER management
EG System	An embedded generator system connected at any part of the Western Power grid (irrespective of size or connection type). It is a type of DER
Event day	A day where the DER management response is forecasted to be required or a day where the DER management response is initiated
inverter energy system	As defined in AS/NZS4777.1 2016
MDT	Minimum Demand Threshold
System capacity	The rated capacity of the inverter's energy system/s that are used in the Basic EG system
User	For the purpose of this document, a person with an existing or new connection point who seeks access to spare capacity or new capacity on the network involving an Embedded Generator (the relevant owner, operator or controller of the Embedded Generator (or their agent))

<sup>1</sup> <https://www.erawa.com.au/electricity/electricity-access/western-power-network/technical-rules/approved-technical-rules>

# 1. Introduction

Distributed Energy Resources (DER) management is the ability to remotely curtail generated power of, or remotely disconnect/reconnect, embedded generation (EG) systems.

This DER Management Validation Principles is specifically for the purposes of DER management and outlines how the basic functional requirements for the remote disconnection and reconnection of EG systems will be verified and monitored. This document is for the use of Authorised Agents to confirm requirements for DER management and compliance with those requirements.

The DER Management Functional Requirements are detailed in the appropriate EG Connection Technical Requirements documents that Users can refer to regarding design and installation of new EG system connections. The EG Connection Technical Requirements also include corresponding obligations on the User where necessary to enable Authorised Agents to perform DER management activities in accordance with the validation principles.

In addition to the functional requirement for remote disconnect and reconnect, Commercial and industrial customers with no off-take/export agreement with their Authorised Agent will have a near 0 kW export limit. This will be implemented through the relevant EG Connection Technical Requirements and Western Power application and compliance processes.

These DER Management Validation Principles will guide the development of detailed procedures that will be developed in consultation with Authorised Agents and tailored to the specific DER management technologies to be used by them.

## 1.1 Authorisation framework

The Technical Rules<sup>2</sup> clauses 5.3.3 (c) and (d) allow Western Power and AEMO to direct Users to operate in accordance with their instructions. In addition, other clauses (e.g. 5.9.1) of the Technical Rules require that the User complies with their connection agreement. The relevant EG Connection Technical Requirement documents form part of their connection agreement.

The Authorised Agent is a User that has an Electricity Transfer Access Contract (ETAC) with Western Power and that is responsible for electricity supplied to a User and that have the permission to control the User EG system for DER management. Energy Policy WA (EPWA) will provide guidance on the eligibility of a User to become an Authorised Agent in the Wholesale Electricity Market (WEM).

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<sup>2</sup> <https://www.erawa.com.au/electricity/electricity-access/western-power-network/technical-rules/approved-technical-rules>

## 2. DER management functional methods

An Authorised Agent will facilitate the control of a User EG system via functional methods as described in the relevant EG Connection Technical Requirements. The permitted functional methods (listed below) and obligations for a User with an EG system are included in the relevant EG Connection Technical Requirements.

A User shall have and maintain a system that provides the capability to be remotely disconnected from, and reconnected to, Western Power's distribution grid.

The basic functional requirements include the remote disconnection and reconnection of EG systems. In addition to this basic functionality, it is permitted that DER management may be used to curtail exported generation through a connection point for systems that have the ability to monitor and control exported active power.

For an EG system with a Battery Energy Storage System (BESS) the functional requirement is for curtailment of export from any generation source.

For all acceptable methods, the remote reconnect signal is a permissive signal that will allow the User EG system to reconnect in conformance to AS/NZS4777.2 reconnection requirements.

The following descriptions<sup>3</sup> provide minimal functional requirements for acceptable methods that may be allowed:

- a. A Western Power meter configured and wired such that on receipt of a signal the electricity meter can disconnect or reconnect the Basic EG system only from the distribution grid.
- b. A communication channel to an Inverter system, such that the inverter can receive a signal from an Authorised Agent that shall initiate a disconnect and initiate a reconnect. In addition, the inverter may receive a signal from an Authorised Agent that may cause export of energy to the grid to cease or to resume.
- c. A communication channel to a device, such that the device can receive a signal from an Authorised Agent that shall initiate a disconnect and initiate a reconnect of the basic EG system. In addition, the basic EG system may receive a signal from an Authorised Agent that may cause export of energy to the grid to cease or to resume.
- d. A device connected to the Demand Response Mode (**DRM**) port of an inverter, which on receipt of a signal from an Authorised Agent - asserts a DRM0 signal to the inverter – causing the inverter to operate its disconnection device. When the signal is no longer asserted the inverter reconnects.
- e. A device connected to the DRM port of an inverter, which on receipt of a signal from an Authorised Agent – asserts a DRM5 signal to the inverter – causing the inverter to cease to generate. When the signal is no longer asserted the inverter resumes generation.
- f. SCADA based solution whereby the User EG system receives signals from the WP control centre that shall initiate a disconnect and initiate a reconnect. In addition, the User EG system may receive a signal from the WP control centre that may cause export of energy to the grid to cease or to resume. The User shall install and maintain a continuous communication link between the local substation and the User facility with either of the telemetry options:

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<sup>3</sup> These are the same descriptions as used in the relevant EG Connection Technical Requirements

- (i) Interface provided at local substation. Signals sent directly from the local substation to User EG system through communication link via protocol; or
- (ii) Interface provided at the User facility. Signals sent from local substation to WP device (RTU) installed at User facility through communication link via protocol and then subsequently from WP device (RTU) to User EG system via protocol or hardwired.

The above methods are provided such that if utilised by a User and the Authorised Agent they are considered to conform to the requirements for this capability. Users and Authorised Agents that may have a methodology that is not listed may propose these to Western Power for consideration and approval prior to the application for a basic EG system connection.

A User shall commission a DER management method and confirm all requirements of the connection approval have been met with the Authorised Agent.

A User shall confirm with the Authorised Agent that all of the conditions of connection approval have been met including:

- (i) System is same as approved;
- (ii) System capacity information (including maximum permitted export);
- (iii) Confirmation of correct configuration, settings and compliance with Western Power conditions of approval; and
- (iv) DER management installed and commissioned.

## 3. System Commissioning

### 3.1 Technology Nomination

The Authorised Agent must nominate the specific technologies and capabilities used for each system to Western Power that will be used to remotely manage the EG System generated power. Western Power must also be informed by the Authorised Agent if the model of technology used to remotely manage is modified at a later date.

The capabilities to be nominated may include but not limited to:

- (i) Disconnect/reconnect
- (ii) Curtail export
- (iii) Loss of communications/connectivity action
- (iv) Generation monitoring and/or export monitoring

### 3.2 Registration Information

All Western Power approved EG systems will require confirmation from the Authorised Agent that the conditions of approval have been met and the functional method for DER management chosen. A list of the information required will be submitted as part of the commissioning checklist.

This shall be done by the Authorised Agent supplying information that includes but not limited to:

- a. System capacity information (including maximum permitted export);
- b. Confirmation of correct configuration, settings and compliance with Western Power condition of approval;
- c. Functional method of DER management;
- d. Capability for export curtailment; and
- e. User EG details – namely sector/type (residential or commercial/exporting or non-exporting).

Note: For each User the functional method will be one of the technology types nominated by the Authorised Agents as per section 3.1

### 3.3 End to End Connectivity

Western Power must be advised by the Authorised Agent of the end-to-end connectivity to access and activate the remote DER management functionality. The Authorised Agent must inform Western Power if the technology used to activate the remote DER management functionality is changed at a later date.

This information should include matters such as:

- Any third party involved in the activation and their role/responsibilities
- The type of communications network(s) that will be utilised.
- Technical capability/quality of the systems used, including performance for availability, reliability and latency.

In selecting a communications network, the likelihood of the network being available when the disconnect and reconnect capability needs to be activated should be considered.

End to End connectivity for DER management shall be confirmed by the Authorised Agent before the User's EG system is approved to operate.

### **3.4 Cybersecurity**

The Authorised Agent shall verify that the associated processes and systems it uses to remotely disconnect and reconnect an EG system are secure. The Authorised Agent will be required to provide information on their cybersecurity protocols and processes to Western Power at the time of registration and upon request.

## 4. Validation requirements

The Authorised Agent must test their remote DER management capability and provide evidence of such testing to Western Power on request.

The Authorised Agent may also be requested by Western Power from time to time to complete a test of the activation of the remote DER management functionality. This will involve the receipt of a test instruction and activating a DER curtailment in accordance with that instruction.

The Authorised Agent shall confirm the continued availability of a User DER system. Where a User DER system is no longer available to be curtailed the Authorised Agent shall take action to restore the capability with the User. Where reasonable efforts have been taken and actions (or non-actions) by User are preventing restoration of the capability then the User no longer meets the condition of approval and the User EG system shall be disconnected by Western Power until restoration of remote DER management functionality is confirmed. Where a User DER system no longer meets these requirements, the Authorised Agent shall notify Western Power of such Users after 30 days and within 60 days.

The Authorised Agent shall take reasonable efforts to monitor availability of each Users EG System and maintain records of:

- a. Total registered DER management User EG systems (MW)
- b. Aggregated generation (MW)
- c. Aggregated curtailable export (MW)

Notes:

- (1) the aggregated generation and curtailable export may be best estimate based on forecasts and/or historic monitoring.
- (2) Aggregation to smaller sections of network areas to provide visibility and control may be required.

The information shall be shared with Western Power such that where an MDT event day is forecasted Western Power and AEMO are able make adequate preparations for maintaining demand on the MDT event day.

Western Power and the Authorised Agent will determine suitable indicators and required performance for maintaining the DER management capability.

Western Power will utilise metering equipment that conforms with the Electricity Industry (Metering) Code 2012 to audit the Users conformance to these DER management requirements whenever Western Power considers it necessary.

## 5. Authorised Agent Operational requirements

On an event day when the Authorised Agent is signalled/directed to activate DER management by Western Power there may be a range of factors that will affect the requirements on an event day. The operational response shall be planned and delivered according to direction and requirements of Western Power. Although planning activities will determine an expected operation, the conditions on an event day may require changes reflective of conditions on the event day.

The Authorised Agent, in response to a signal/direction from Western Power, in order of priority for acting, is to initiate:

- (i) Curtailment or disconnection of controllable commercial/industrial PV (embedded in Distribution network); and
- (ii) Curtailment or disconnection of residential and other PV.

The Authorised Agent shall enable the DER curtailment to deliver the required total response in a ramped manner or discrete smaller steps. The detailed curtailment will be determined as far as is possible in advance of an event between Western Power and the Authorised Agent.

After the end of the curtailment period, the Authorised Agent shall enable the reconnection of the curtailed DER in a ramped manner or discrete smaller steps. The reconnection methodology for curtailed DER should be determined as far as is possible in advance of an event between Western Power and the Authorised Agent.

Throughout the event day, the Authorised Agent shall coordinate and cooperate with Western Power to manage curtailment and reconnection of DER as well as exchange of relevant data.

After an event day, the Authorised Agent shall provide necessary data for post event auditing, reporting and confirmation of response from Users' EG systems.

Consideration of the distribution of curtailment across the DER Users such that fairness and equity are maintained across all DER managed Users shall be coordinated with Western Power.