DER Register Release Schedule and Technical Specification – Apr 2020

1.01 April 2020

Pre-production: Wednesday 5 February 2020

Production: Thursday, 13 February 2020

Important Notice

PURPOSE & AUDIENCE

This document describes the technical changes required to participant's systems for the AEMO Release Schedule - System Month Year (Release). The Australian Energy Market Operator (AEMO) provides this information as a service targeting business analysts and IT staff in participant organisations. It provides guidance about the changes to their market systems under the National Gas or Electricity Rules (Rules), as at the date of publication.

HOW TO USE THIS DOCUMENT

- If you have questions about the business aspects of these changes, please see Consultations on AEMO's website.
- The references listed throughout this document are primary resources and take precedence over this document.
- Unless otherwise stated, you can find resources mentioned in this guide on AEMO's website.
- Text in this format is a link to related information.
- **Text in this format**, indicates a reference to a document on AEMO's website.
- Text in this format is an action to perform in the MSATS Web Portal.
- This document is written in plain language for easy reading. Where there is a discrepancy between the Rules and information or a term in this document, the Rules take precedence.
- Glossary Terms are capitalised and have the meanings listed against them in the **Glossary**.
- *Italicised terms* are defined in the Rules. Any rules terms not in this format still have the same meaning.

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VERSION HISTORY

0.01–0.03 See earlier versions.

0.04 Added information about Installer APIs, pre-submission validation rules and updated glossary

0.05 Updated field properties for APIs and renamed "properties" section to "data" for several APIs

0.06 Aligned API data validations to AS777 standards

0.07 Modified recordUpdatedDate to recordUpdateDate and jobnumber to jobNumber

0.08 Added a new section on DER process and data provision, updated CEC stage 2 validations and fixed defects

1.0 Moved DERR API information to Guide to DERR APIs, and updated information for Grant/Request Access

1.01 Added logout.

DOCUMENTS MADE OBSOLETE

The release of this document changes only the version of DER Register Release Schedule and Technical Specification - Oct 2019.

SUPPORT HUB

To contact AEMO's Support Hub use Contact Us on AEMO's website or Phone: 1300 AEMO 00 (1300 236 600) and follow the prompts.

Contents

1. **Introduction**

The DER Register project is part of the Distributed Energy Resources (DER) program. This Technical Specification describes the interfaces AEMO is creating to enable participants to access the system and provide information to the DER Register system via a web interface and the APIs.

1.1   Audience

AEMO provides this information to inform business analysts and IT staff in participant organisations.

- The primary audience is Network Service Providers.
- The secondary audience is AEMO Operations, Forecasting and Technology teams and Account-holders.

1.2   Rule and procedure changes

Type	Details
Rule	Under Rule 3.7E of the NER, AEMO is required to develop, maintain and publish guidelines that require Network Service Providers to provide DER generation information to AEMO.

1.3   Assumed reading and context

This Technical Specification assumes a working knowledge of the following documents that have been published in relation to the DER Register:

- DER Register Information Guidelines; and
- DER Register Final Report.

These documents, and other reference and background material, can be found on the AEMO website at https://aemo.com.au/Electricity/National-Electricity-Market-NEM/DER-program/DER-Register-Implementation

1.4   Schedule

Scheduled for implementation in:
- Pre-production: Wednesday 5 February 2020
- Production: Thursday, 13 February 2020

1.5   Proposed timeline

Milestone	Date	Description
Revised Technical Specification	12 February 2020	Amendments to clarify or correct items identified through the implementation.
Pre-production implementation (B2B)	5 February 2020	AEMO implements components of the Release to pre-production for NSP testing.
Pre-production implementation (B2C)	19 February 2020	AEMO implements components of the Release to pre-production for Account-holder testing.
IT implementation group meeting: pre-production review	13 February 2020	IT Implementation group meeting to review the implementation of this pre-production release.
Production implementation (B2B)	12 February 2020	AEMO implements the B2B release to production.
Production implementation (B2C)	26 February 2020	AEMO implements the B2C release to production.
Production systems available (B2B)	13 February 2020	B2B Production systems available to participants
Production systems available (B2C)	27 February 2020	B2C Production systems available to participants
IT implementation meeting	4 March 2020	IT Implementation group meeting to review the implementation of the production release
Stakeholder meeting	6 March 2020	Stakeholder engagement will ensure key stakeholders have an aligned view of the changes required

Note: The DER Register working group dates are available at the DER Register project page on the AEMO website.

2. DER Register

2.1 Overview

The Distributed Energy Resources (DER) Register project aims to create, maintain and update a DER register. As specified by the National Electricity Rule 3.7E, the DER register is required to contain standing data on:

- DER generation information, containing information on small generating units, which is submitted by NSPs.
- Demand Side Participation (DSP) information, containing existing information collected on active loads, embedded generation and energy storage, which is submitted by Registered Participants.

The DER register information will be integrated into AEMO load forecasts and power system modelling, as well as being accessible to NSPs, emergency services and the public, via a report on the AEMO website.

2.2 Create new DER records

NSPs can create a new DER record by submitting an NSP connection agreement via the web interface or API. They can submit data associated with an approved DER installation for an NMI and connection agreement job number to the DER register.

Note: Any data submitted by the NSPs that is related to the CEC is accepted to be non case sensitive. AEMO system will convert any submitted data to CEC specifications before storing this data.

Using the DER Register APIs and web interface, NSPs can:

- Add/remove multiple AC Connections and DER Devices.
- Perform inverter and device lookup from reference data set (web interface only)
- Perform pre-submission validations (web interface only). The system does not allow submissions unless pre-submission validations are completed.
  For data submitted via APIs, validation takes place as part of the submission.
- Assign DER Devices to relevant AC Connections.

Note: Fields marked as mandatory (M) must be filled and pass validation for the creation of a DER Record.

2.2.1 Creating DER records using APIs

NSPs and Account-holders can submit data associated with DER installations using RESTful APIs.

2.2.2 Creating DER records using DER Register web interface

NSPs and Account-holders can submit data using the DER Register web interface:

- Small or low-frequency NSPs using the Markets Portal as their primary interface.
- Large or high-frequency NSPs and Account-holders using the web interface as part of their business continuity planning processes when their primary systems are unavailable.

2.3 Multiple AC Connections and/or DER Devices

Using the web interface, NSPs can:

- Add one or multiple new AC Connection(s) and/or DER Device(s).
- Link new DER devices to new or existing AC connections.
- Remove existing **Idle** or **Initial** AC connections or DER devices. They cannot remove existing Confirmed or Conditional DER records.

Using the APIs, NSPs can:

- remove **Idle** or **Initial** AC Connections or DER Devices by submitting a payload without including these AC Connections or DER Devices.
- Remove **Confirmed** or **Conditional** AC Connection or DER Device by submitting these AC Connections or DER Devices with status set to **Decommissioned**. If the submitted payload does not contain an existing **Conditional** or **Confirmed** AC Connection or DER Device, the DER Register will reject the submission.

2.4 Inverter Lookup

NSPs and Account-holders can look up inverter manufacturer/model information, to populate accurate data for inverters via the DER web interface only.

Using the DER Register web, when NSPs and Account-holders select an accredited inverter manufacturer/model number, the form will auto-populate certain attributes from reference database.

2.5 Device Lookup

NSPs and Account-holders can look up device manufacturer/model information, to populate accurate data for new DER devices, using the DER web interface only.

Using the DER Register web, when NSPs and Account-holders select an accredited device manufacturer/model number, the form will auto-populate certain attributes from reference database.

2.6 Pre-submission validation & submitting installation data

Three forms of validation are applied to submitted data:

- Stage 1 (codes 1000 – 1161): *Invalid data*. Record cannot proceed.

- Stage 2 acceptance permitted (codes 2000 – 2022): These are lower order data discrepancies that *inform* the user that things may not be quite as expected. These will have low impact on the efficacy of the DER Register database and the NSP's approval. The acceptance allows the user to review and update or submit as is and AEMO is comfortable with either choice.
- Stage 2 acceptance not permitted (codes 2023 – 2062): These are higher order data discrepancies that reflect *inadequate* or *inappropriate information*. This includes information that is outside the bounds of what has been permitted by the NSP, or where reference data sources are providing significantly different data. If unresolved these will have a higher impact on the DER Register database and the NSP's approval. AEMO expects these fields to be corrected to resolve these exceptions.

Validation and submission:

- NSPs and Account-holders can validate DER installation data before submission (web interface only). The system does not allow submissions unless pre-submission validations are completed. For data submitted via APIs, validation takes place as part of the submission.
- NSPs can edit and re-submit DER Installation data after first submission.

2.6.1   Validation rules

- If the submission fails the 1st level validation, it is rejected, and no record of the submission will be kept.
- If the submission fails a 2nd level validation, it will result in an exception, but submission will be accepted (with the exceptions) and recorded.

2.7   Update Record/Resolve Exceptions

NSPs can resolve exceptions and re-submit data. They can:

- View attributes that are associated with the exception code which failed Pre-Submission Checks, and review these for accuracy.
- Edit these attributes and re-submit data
- Acknowledge exceptions- When NSPs acknowledge an exception related to AC Connection or DER Device, the status will change from **Conditional** to **Confirmed**, if there are no other exceptions.

NSPs can update or resolve exceptions associated with submissions, using the same API used for creating a new record.

Note: When resubmitting information, NSPs must include information for all DER records, including previously decommissioned AC Connections and DER Devices.

2.8   DER Process Update

DER Register will determine the installation progress of AC Connection(s) or DER Device(s) –**Idle**, **Initial**, **Confirmed**, or **Conditional**.

Definitions in relation to installation progress as follows:

- Idle: When a record is **Initial** for 365 days, it becomes idle

- Initial: AC Connection/DER Device records exist but the DER system is not yet physically installed or operating.

- Conditional: AC Connection/DER Device records exist, and the DER system physically was/is installed and operating. However, an action is required from the user.

- Confirmed: AC Connection/DER Device record exist and they DER system physically was/is installed and operating.

The installation progress is associated with AC Connections and DER Devices. They are not used to define an NMI installation progress.

The system shall determine installation progress post submission. If AC Connection/DER Device status is:

- Null or **Inactive**, installation progress shall be **Initial**

- **Active** or **Decommissioned**, installation progress shall be either **Conditional** or **Confirmed** subjective to validation.

The validation rules are defined in the API Guide.

AC Connections/DER Devices are updated to **Confirmed**, when the status is active or decommissioned and either:

- All applicable attributes are submitted (see Section 2.81), and validation is successful; or

- All applicable attributes are submitted and validation 2nd level fails but the NSP acknowledges the exception

If the submitted commissioning date is in future, when <today's date> = commissioning date, the system will change the status of AC Connection and DER Device linked to it to **Active**. The system will also determine if AC Connection and DER Device are **Confirmed** or **Conditional** based on the validation rules.

AEMO runs a daily batch job for checking submission data.

2.8.1   DER Process and data provision

For clarity, data provision under the DER Register Information Guidelines expects that all relevant fields are provided for a DER installation to achieve compliance. Where the above section refers to all applicable attributes' this includes data marked as both Mandatory (M) and Optional (O) in the API tables documented in this Technical

Specification. Given the complementary nature of these documents, the following table provides an overview of how these fields should be interpreted for the provision of data to the register.

Notes:

- Where a control mode or selection of Yes/No is null or not provided, it is set to 'Not enabled' or 'No' respectively.

- Fields marked as Mandatory (M) are required for the creation and existence of a DER Record. These fields are the minimum requirement for the creation of an **initial** record.

- The examples below indicate how the data model should be read in accordance with the Information Guidelines. These are provided for guidance only:
  - Example 1: A small residential solar PV DER installation.
  - Example 2: A small grid-tied waste-to-gas synchronous generator.

The following fields are for Level 1 data

Field	Description	Mandatory (M) / Optional (O)	Example 1: Required for confirmation of record	Example 2: Required for confirmation of record
nmi	Unique identifier for each connection point where DER installation has been installed/approved.	M	Required	Required
jobNumber	Unique identifier associated with the NSP's connection offer/agreement for the approved DER works.	M	Required	Required
approvedCapacity	Approved small generating unit capacity as agreed with NSP in the connection agreement, expressed in kVA.	M	Required	Required
availablePhasesCount	The number of phases available for the installation of DER.	M	Required	Required
installedPhasesCount	The number of phases that DER is connected to.	M	Required	Required
islandableInstallation	Identifies small generating units designed with the ability to operate in an islanded mode.	M	Required	Required
centralProtectionControl	For DER installations where NSPs specify the need for additional forms of protection above those inbuilt in an inverter.	M	Required	Required
centraProtectionControl	Selection of yes or no for central protection control fields	O	Not required	Not required
exportLimitkva	Export limit (kVA) Maximum amount of power (kVA) that may be exported from a connection point to the grid, as monitored by a control / relay function.	O	Not required, however if 'centralProtectionControl' = yes then at least one of these fields must be provided	Not required, however if 'centralProtectionControl' = yes then at least one of these fields must be provided
underFrequencyProtection	Under frequency protection in Hz.	O		

underFrequencyProtectionDelay	Under frequency protection delay in seconds.	O
overFrequencyProtection	Over frequency protection in Hz	O
overFrequencyProtectionDelay	Over frequency protection delay in seconds	O
underVoltageProtection	Under voltage protection in volts (V)	O
underVoltageProtectionDelay	Under voltage protection delay in seconds	O
overVoltageProtection	Over voltage protection in volts (V)	O
overVoltageProtectionDelay	Over voltage protection delay in seconds	O
sustainedOverVoltage	Sustained Over voltage protection in volts (V)	O
sustainedOverVoltageDelay	Sustained Over voltage protection delay in volts (V)	O
frequencyRateOfChange	Rate of change of frequency trip point (Hz/s).	O
voltageVectorShift	Trip angle (Deg.)	O
interTripScheme	Description of the form of inter-trip (e.g. "from local substation").	O
neutralVoltageDisplacement	Trip voltage (V)	O

The following fields are for all AC Connections

installerId	Unique identifier for the DER Account-holder accountable for the installation, modification or removal of the small generating unit in accordance with this NMI and Connection Agreement 'Job number'.	O		
comments	Comments to help with DER Submission.	O	Not required	Not required
connectionId	Unique identifier for each AC Connection or Group in a DER installation. **Note**: a. Use Null if adding a new AC Connection b. Use existing connectionId for updating an existing record.	O	Required	Required
nspConnectionId	An AC Connection identifier used by NSP internally	O	Not required	Not required
commissioningDate	The date that an AC Connection becomes "Active".	O	Required	Required
equipmentType	Indicates whether the DER device is connected via an inverter (and what category of inverter it is) or not (e.g. rotating machine).	M	Required	Required
count	Number of AC Connections in the group. For the suite of AC Connections to be considered as a group, all AC Connections included must have the same attributes.	O	Required	Required
statusCode	Code used to indicate the status of the AC Connection. This will be used to identify if an AC Connection is active or inactive or decommissioned. This status will also track commissioning and decommissioning date. When a new record is inserted in the database, the installation date/ start date is defined by the user and may be backdated.	O	Required	Required
frequencyRateOfChange	Rate of change of frequency (Hz/s)	O	Not required	Not required
voltageVectorShift	Trip angle (Deg.)	O	Not required	Not required

Field	Description			
interTripScheme	Description of the form of inter-trip (e.g. "from local substation").	O	Not required	Not required
neutralVoltageDisplacement	Trip voltage (V)	O	Not required	Not required
dredInverterInteraction	Selection of Yes or No for inverter interaction with DRED	O	Not required (default to 'No')	Not required
The following fields are for all inverter-type AC Connections				
serialNumbers	The serial number of the device(s)	O	Required	Not required
manufacturerName	The name of the inverter manufacturer	O	Required	Not required
modelNumber	The model number of the inverter.	O	Required	Not required
inverterSeries	The inverter series.	O	Required	Not required
inverterStandard	What standard/s is the inverter manufactured, tested and installed to? Examples include AS4777.2:2015, IEC 62109-1 and -IEC 62019-2.	O	Required	Not required
inverterDeviceCapacity	The rated AC output power that is listed in the product specified by the manufacturer. This value refers to a single device.	O	Required	Not required
sustainOpOvervoltLimit	Indicates the sustained operation overvoltage limit, when the average voltage for a 10-minute period exceeds the V¬nom-max. The unit is in (V)	O	Required	Not required
stopAtOverFreq	Frequency (stop), In Hz Permitted range is between 51 and 52 (inclusive)	O	Required	Not required

stopAtUnderFreq	Frequency (stop), In Hz Permitted range is between 47 and 49 (inclusive)	O	Required	Not required
invVoltWattRespMode	This mode is described in AS4777.2:2015, section 6.3.2.2. Permitted Value is either 'Enabled' or 'Not Enabled'	O	Required (where provided as null or not provided 'Not Enabled' will be set)	Not required
invWattRespV1	Unit is in (V) Permitted range is between 200 and 300 (inclusive)	O	Required, if invVoltWattRespMode = Enabled, otherwise Not required	Not required
invWattRespV2	Unit is in (V) Permitted range is between 216 and 230 (inclusive)	O		Not required
invWattRespV3	Unit is in (V) Permitted range is between 235 and 255 (inclusive)	O		Not required
invWattRespV4	Unit is in (V) Permitted range is between 244 and 265 (inclusive)	O		Not required
invWattRespPAtV1	Unit is in (%) Permitted range is between 0 and 100 (inclusive)	O		Not required
invWattRespPAtV2	Unit is in (%) Permitted range is between 0 and 100 (inclusive)	O		Not required
invWattRespPAtV3	Unit is in (%) Permitted range is between 0 and 100 (inclusive)	O		Not required
invWattRespPAtV4	Unit is in (%) Permitted range is between 0 and 20 (inclusive)	O		Not required

invVoltVarRespMode	This mode is described in AS4777.2:2015, section 6.3.2.3. Permitted Value is either Enabled or Not Enabled	O	Required (where provided as null or not provided 'Not Enabled' will be set)	Not required
invVarRespV1	Unit is in (V) Permitted range is between 200 and 300 (inclusive)	O	Required, if invVoltVarRespMode = Enabled, otherwise Not required	Not required
invVarRespV2	Unit is in (V) Permitted range is between 200 and 300 (inclusive)	O		Not required
invVarRespV3	Unit is in (V) Permitted range is between 200 and 300 (inclusive)	O		Not required
invVarRespV4	Unit is in (V) Permitted range is between 200 and 300 (inclusive)	O		Not required
invVarRespQAtV1	Unit is in (%) Permitted range is between 0 and 60 (inclusive)	O		Not required
invVarRespQAtV2	Unit is in (%) Permitted range is between -100 and 100 (inclusive) -ve sign refers to "sink"	O		Not required
invVarRespQAtV3	Unit is in (%) Permitted range is between -100 and 100 (inclusive) -ve sign refers to "sink"	O		Not required
invVarRespQAtV4	Unit is in (%) Permitted range is between -60 and 0 (inclusive) -ve sign refers to "sink".	O		Not required

invReactivePowerMode	Select which power quality response modes are enabled on the inverter. Permitted Value is either Enabled or Not Enabled. Note: It should equal to 'Not Enabled', if InvVoltVarRespMode or/and InvVoltWattRespMode = Enabled.	O	Required (where provided as null or not provided 'Not Enabled' will be set).	Not required
invFixReactivePower	Reactive Power. Specified in % output of the system. Permitted range is between -100 and 100 (inclusive) -ve sign refers to "sink"	O	Required, if invReactivePowerMode = Enabled, otherwise Not required	Not required
The following fields are for non-inverter-based AC Connections				
fixPowerFactorMode	Select which power quality response modes are enabled on the inverter. Permitted Value is either Enabled or Not Enabled. It should equal to "Not Enabled", if InvVoltVarRespMode or/and InvVoltWattRespMode = Enabled.	O	Required (where provided as null or not provided 'Not Enabled' will be set).	Not required
fixPowerFactor	Permitted range is between 0.8 and 1 (inclusive)	O	Required, if fixPowerFactorMode = Enabled, otherwise Not required	Not required
fixPowerFactorQuad	Permitted Value is either Source or Sink	O		Not required
powerRespMode	Select which power quality response modes are enabled on the inverter. Permitted Value is either Enabled or Not Enabled. It should = "Not Enabled", if InvVoltVarRespMode or/and InvVoltWattRespMode = Enabled.	O	Required (where provided as null or not provided 'Not Enabled' will be set).	Not required
referencePointP1	Unit is in (%)	O		Not required

referencePointP2	Unit is in (%)	O	Required, if powerRespMode = Enabled, otherwise Not required	Not required
powerFactorAtP1	Permitted range is between 0.9 and 1 (inclusive)	O		Not required
powerFactorQuadAtP1	Permitted Value is either Source or Sink	O		Not required
powerFactorAtP2	Permitted range is between 0.9 and 1 (inclusive)	O		Not required
powerFactorQuadAtP2	Permitted Value is either Source or Sink	O		Not required
powerRateLimitMode	Select which power quality response modes are enabled on the inverter. Permitted Value is either Enabled or Not Enabled.	O	Required (where provided as null or not provided 'Not Enabled' will be set).	Not required
powerRampRate	Unit is W_{Gra}. The power rate limit range shall be adjustable in the range of 5 - 100 of rated power per minute.	O	Required, if powerRateLimitMode = Enabled, otherwise Not required	Not required
reactivePowerRegulation	Select reactive regulation mode. Permitted Value is either None, Voltage droop or Fixed power factor.	O	Not required	Required (where provided as null or not provided 'None' will be set).
voltageSetPoint	The voltage set point	O	Not required	Required, if reactivePowerRegulation = Voltage droop, otherwise Not required
voltageSetPointUnit	The unit for VoltageSetPoint	O	Not required	
deadband	± x%	O	Not required	
droop	In %	O	Not required	
baseForDroop	kVA	O	Not required	

reactivePowerSourceLimit	kVAr	O	Not required	
reactivePowerSinkLimit	kVAr	O	Not required	
reactiveFixPowerFactor	Power factor set point (0-1)	O	Not required	Required, if reactivePowerRegulation = Fixed power factor, otherwise Not required
reactiveFixPowerFactorQuad	Power factor quadrant	O	Not required	
generatorRampRate	Enable generator ramp rate. Permitted Value is either Enabled or Not Enabled.	O	Not required	Required (where provided as null or not provided 'Not Enabled' will be set)
powerRampGradient	Power ramp rate (%/min)	O	Not required	Required, if generatorRampRate = Enabled, otherwise Not required
frequencySensitiveMode	Enable frequency response mode. Permitted Value is either Enabled or Not Enabled.	O	Not required	Required (where provided as null or not provided 'Not Enabled' will be set)
frequencyDeadband	In Hz	O	Not required	Required, if frequencySensitiveMode = Enabled, otherwise Not required
frequencyDroop	In %	O	Not required	

The following fields are for the DER Device level

deviceId	Unique identifier for a single DER device or a group of DER devices with the same attributes. **Note**: a. Use Null if adding a new AC Connection b. Use existing connectionId for updating an existing record.	O	Required	Required
nspDeviceId	A DER Device identifier that is used by NSP internally	O	Not required	Not required
type	Used to indicate the primary technology used in the DER device.	M	Required	Required
subType	Used to indicate the primary technology used in the DER device.	O	Required	Required
count	number of devices in the group of DER devices.	O	Required	Required
status	Code used to indicate the status of the DER Device. This will be used to identify if a Device is active or inactive or decommissioned. This status will also track commissioning and decommissioning date. When a new record is inserted in the database, the installation date/ start date is defined by the user and may be backdated. Permitted value is one of Inactive, Active or Decommissioned.	O	Required	Required
manufacturerName	The name of the device manufacturer	O	Required	Required
modelNumber	The model number of the device.	O	Required	Required
nominalRatedCapacity	Maximum output in kVA that is listed in the product specification by the manufacturer. This refers to the capacity of each unit within the device group.	O	Required	Required
nominalStorageCapacity	Maximum storage capacity in kWh. This refers to the capacity of each storage module within the device group.	O	Required if Device Type = Storage	Not required

2.9   NMI Extinct and Idle Records

- AEMO will update the status of all AC Connections and DER Devices to **Decommissioned** when an NMI becomes extinct.
- AEMO will change **Initial** AC Connections and/or DER Devices to **Idle** if they stay **Initial** for 365 days.

AEMO runs a daily batch job for updating the NMI status.

2.10   Notification of Receipt

AEMO will generate a receipt for NSPs and Account-holders when a job is complete, using APIs and the web interface. A job is complete when all associated AC Connections and DER Devices become **Confirmed** and all NMI data (Level 1 data) is submitted.

The DER Portal and API performs these checks before displaying receipts.

Business Rule	Impacted Field	Applicable to	Exception Code
The combination of NMI, Job Number, and Installer Id must be valid.	NMI, jobNumber, and installerId	Account-holders only	4000

2.11   List of Receipts

- NSPs can view a list of notifications of receipt for NMIs that are in their geographical area (i.e. NMIs for which they are the Local Network Service Provider, LNSP). They cannot view notifications of receipt of NMIs outside their NSP area.
- Account-holders can only view a list of notification of receipts for DERs they have submitted.

2.12   List of DER records

NSPs can view a list of NMIs with DER records for which they are the LNSP, using the web interface and APIs. They cannot view any other NMIs.

2.13   NSP Preferences

- NSPs manage their contact details (Role, Email and Contact number) using the web interface.
- NSPs can set Inverter Settings to be used for automatically populating inverter attributes using the DER web screen. Those settings are based on **Inverter Device Capacity** range.
- NSPs have the option of reviewing and approving DER installation data submissions by the Account- holders based on approved capacity range.

2.14   View record versions

NSPs can track all submissions for a DER record, using the web interface and APIs. Any edits to any attribute will result in a new version. Using the web interface and APIs, NSPs can retrieve a version history of a single DER Record.

2.15   Search NMI

NSPs can search DER records related to a specific NMI via the DER Register Web Portal.

2.16   DER Record Access

Account-holders can access a DER Record when submitting the correct combination of NMI and Job number.

Using this functionality, Account-holders:

- Can retrieve DER record connection application parameters for **Initial** and **Idle** Records related to the job number and edit them
- Can retrieve current Confirmed and Conditional DER installation data for an NMI and edit them, if required.
- Are unable to view Confirmed and Conditional AC Connections/DER Devices with Status = **Decommissioned**.
- Cannot retrieve historical versions of any DER Record. NSPs can view this data.
- Can view the NSP's contact details if provided by NSP (Email, Role and Phone number).
- Can save modified data, without submitting. The system will retain all changes made when the participant logs back in.

Accessing a DER Record using a job number is valid for 365 days from the date of submitting that job number for the first time. When an Account-holder accesses a DER Record via the correct combination of a NMI and a job number and a receipt is generated for that job number, this access shall be blocked.

Note: The record is locked permanently after 365 days of submitting the job number. Account-holders will no longer be able to access request for the NMI and the Job Number.

The DER Portal performs these checks before enabling user access to a DER Record.

Business Rule	Impacted Field	Exception Code
NMI must exist in the DER register database	NMI	3000

Business Rule	Impacted Field	Exception Code
Job Number must exist in the DER register database	jobNumber	3001
Combination of Job Number and NMI is correct i.e. Job number is associated with the submitted NMI in connection agreement submission	NMI & jobNumber	3002
If NSP did not grant job access, Job Creation Date must be within 365 days from today's date, i.e. <Today's Date> - <Job Creation Date> must be equal or smaller than 365 days	jobNumber	3003
If NSP granted job access, today's date must be within 365 days of NSP granting date	jobNumber	3004

2.17   Grant or block DER record access

NSPs can grant or block DER record access for Account-holders anytime needed via the DER web interface and APIs.

Granting access for a job number will not reset the allowed time for accessing a DER Record, i.e. job access will last 365 days from the date of submitting that job number for the first time. When all associated records for that job number reach a confirmed state (i.e. a receipt is generated for that job number), account-holder access is blocked again.

To edit the DER installation details, Account-holders will need to request access to use the Portal.
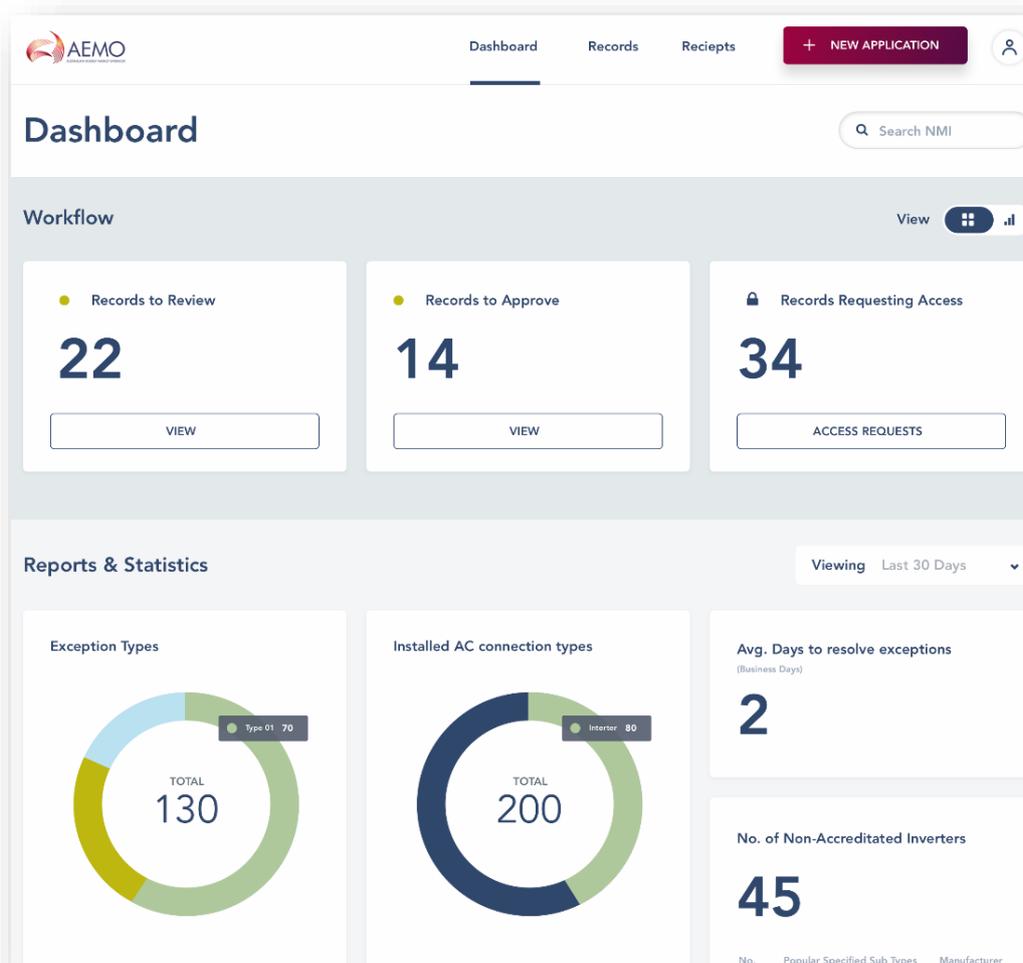
3. DER Register web interface

This section contains examples and information on the screens that are presented in the web interface to the DER Register.
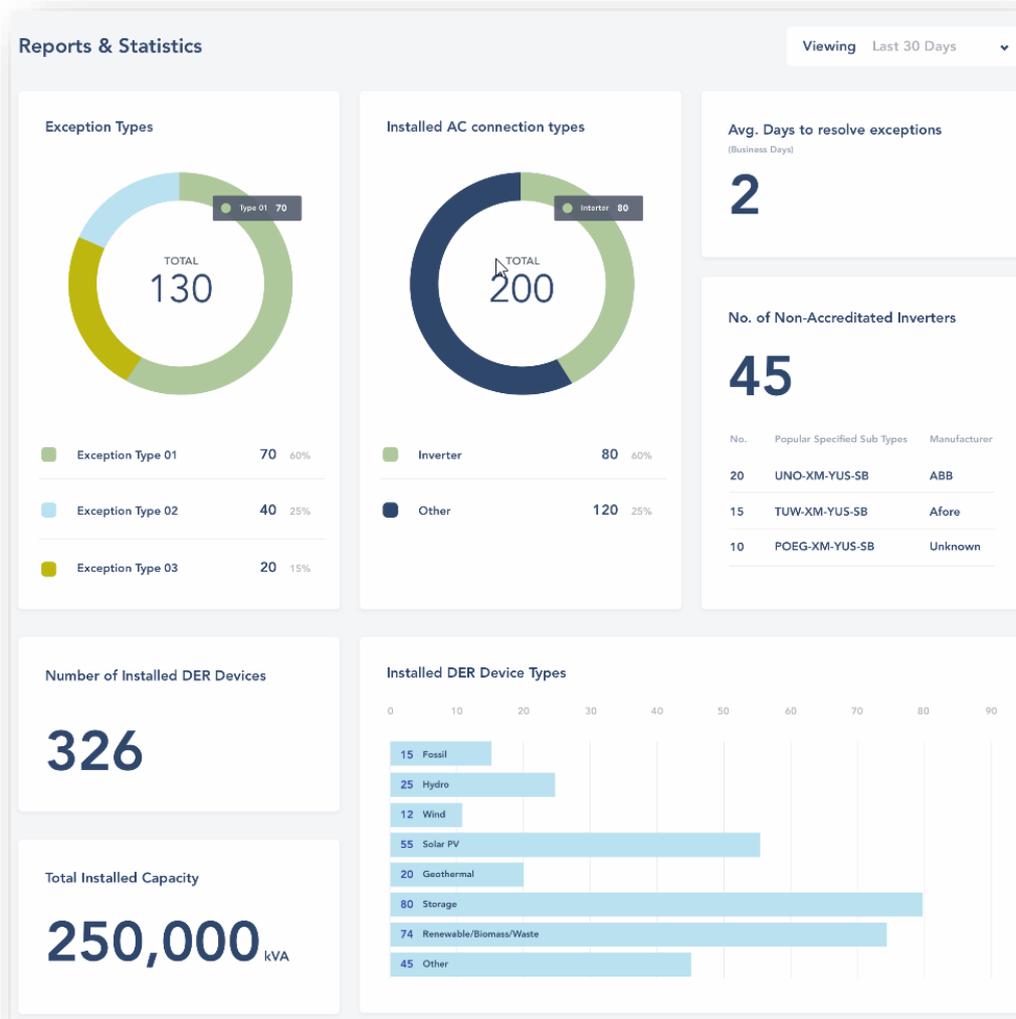
AEMO has developed a prototype system, to illustrate DER Register web interface features. There are two versions of the prototype, one for NSPs and one for Installers, and they can be found at:

- NSP version: https://invis.io/NDT18QRZSW5
- Installer version: https://invis.io/HJT18PPSTR3

3.1.1 Dashboard

3.1.2　Report and Statistics

3.1.3   Records

4. DER APIs

As part of the DERR implementation, AEMO has introduced these APIs to create, maintain and update the DER register.

API Name	Support Method	Entity Description
submitDER	POST	Submit a single DER record. The return response includes AC Connection ID, DER Device ID with the current status and exceptions, if any. This API is used for creating, updating, and handling exceptions for a DER Record.
submitPreferences	POST	Submit default inverter settings, notification preference and contact details.
getPreferences	GET	Retrieve default inverter settings, notification preference and contact details.
getDERSummary	POST	Retrieve latest version single or multiple DER Record as per parameters supplied.
getDER	POST	Retrieve full history/versions of a single or multiple DER Records. File Limit to be confirmed
grantJobAccess	POST	Grant/Block access to Account-holder for specific DER Job.
requestJobAccess	POST	Account-holder requests access to a DER job.
getReceipts	POST	Retrieve receipts for a single DER Record
initiateLogin	GET	Redirect the Account-holder to the login page, where they can register or log in (if already registered).
requestAccessToken	POST	Return an access token, access token expiry time in seconds, Id token, refresh token and refresh token expiry time in seconds after a successful authentication.
refreshAccessToken	POST	Get a new access token when the existing access token has expired
logout	GET	Invalidate the current user session and redirect the user to the login page. That is, log the user out.

For more information, refer to Guide to DERR APIs.

5. Implementation

5.1 Transition

There is no transition required for this release.

5.2 Implications

To maintain systems in-line with AEMO's market systems, participants need to:

- Review and assess the impact on their market systems with respect to the changes implemented as part of this Release.
- Change their systems prior to the implementation of this Release.
- Schedule staff and resources to upgrade their market systems for the production implementation of this Release.

5.3 Risks

- No critical impacts to participants identified.

6. Glossary

Term	Explanation
Account-holder	Any person (non-NSP) holding an account with AEMO that allows access to the DER Register under controlled access conditions. This may be a DER installer or someone acting on behalf of a DER installer.
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
DER	Distributed Energy Resources
DNSP	Distribution Network Service Provider
DSP	Demand Side Participation
EMMS	Electricity Market Management System; software, hardware, network and related processes to implement the wholesale energy market
MSATS	Market Settlement and Transfer Solution for retail electricity
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Metering Identifier for electricity meters
TCPF	Transmission Connection Point Forecast

7. **References**

Data Interchange Framework and Glossary: provides important information about upgrading your Data Interchange (DI) environment, explains DI terms, and DI related resources. Please read this guide in conjunction with this technical specification.

Guide to AEMO's e-Hub APIs: Provides details about using AEMO's e-Hub as an interface to communicate information with AEMO. It assists Wholesale electricity and gas participants developing their own APIs.

Guide to Electricity Information Systems: Provides guidance for *Registered Participants* and interested parties about AEMO's participant electricity market systems.

Guide to User Rights Management: Assists participant administrators (PAs) to use the user rights management functions in the MSATS Web Portal.

Retail Electricity Market Glossary and Framework: assist participants of the Retail Electricity Market to understand the overall framework. It also contains a list of terms used in the Retail Electricity Market Procedures and a full list of NEM procedures, guidelines, and documents.