DER Register

Delivery Team 1 – Data Model
March 2019

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AUSTRALIAN ENERGY MARKET OPERATOR

Update on project

DER Rule Change

The aim of the Distributed Energy Resources (DER) Register (the Register) is to improve power system operation and security through greater visibility of where DER are connected in the NEM.

- On **13 September 2018** the AEMC made a final rule determination on NER clause 3.7E
- The rule places obligations on AEMO and NSPs for delivery by **1 December 2019**:

AEMO	NSPs
a) Establish, maintain and update a DER Register b) Develop, maintain and publish DER Register Information Guidelines c) Share disaggregated data with NSPs d) DER Register Report on website e) Consider DER information in load forecasts f) Share information with emergency services	a) Collect the data outlined in the DER Register Information Guidelines b) Provide AEMO with their known information about existing DER in their network

DER Guidelines Consultation

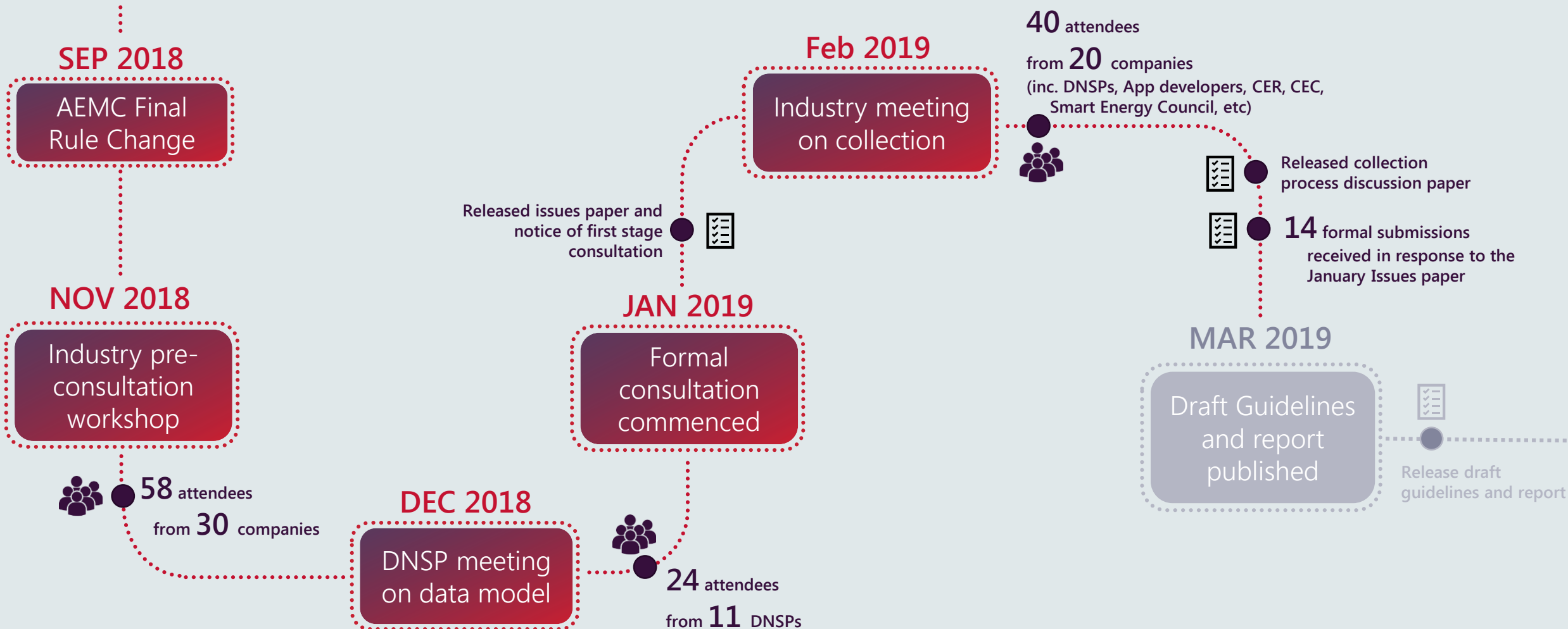NER 3.7E specifies the minimum requirements for the DER Register.

To achieve efficient outcomes, as intended by the Rules, we also need to look at all existing users and processes, and avoid duplication as much as possible.

Collection

Definition

Access

DER Register

Reporting

Storage

Integrity
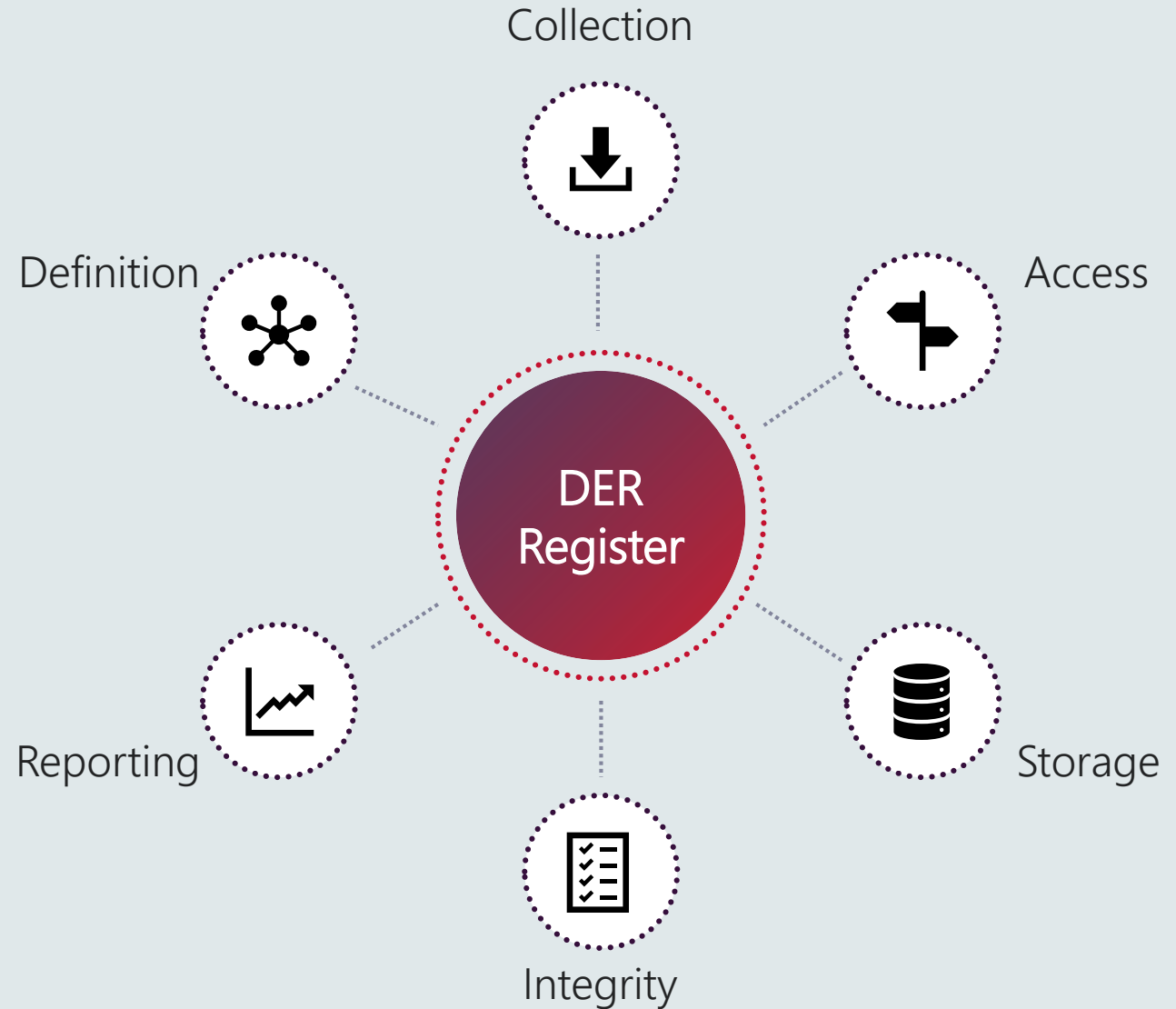
NER 3.7E focuses on these **key areas** for inclusion in the DER Register Guidelines

Summary of stakeholder engagement

Previous engagement

SEP 2018

AEMC Final Rule Change

NOV 2018

Industry pre-consultation workshop

58 attendees from 30 companies

DEC 2018

DNSP meeting on data model

24 attendees from 11 DNSPs

Released issues paper and notice of first stage consultation

JAN 2019

Formal consultation commenced

Feb 2019

Industry meeting on collection

40 attendees from 20 companies (inc. DNSPs, App developers, CER, CEC, Smart Energy Council, etc)

Released collection process discussion paper

14 formal submissions received in response to the January Issues paper

MAR 2019

Draft Guidelines and report published

Release draft guidelines and report

Summary of stakeholder feedback

General Data Model Structure

Data Requirements

- Remove "Inactive" requirements in "Status" at DER Device level

- Is AC connection to DER device mapping onerous and difficult to maintain?

- Inclusion of "Decommissioned systems"

- Inclusion of photos and product serial information

- It is understood that the DER register will capture resources up to 30MW, including hydro and internal combustion generation.

- Consideration of a 'new type' or 'other' with a free text entry box supplied in the 'Device sub-type' category.

Q1: Is the proposed data model too large and detailed?
Q2: It has been suggested that we use another term instead of 'generator' for the non-inverter technologies. 'Generator' is a NER defined term and may cause confusion – what about ***Generating System*** or ***small generating unit?***
Q3: Decide what terminology to use instead of lead/ lag.

Proposed data structure

- How to collect and store information about non-inverter DER systems

- Removal of "AC Connection" and "DER Device" levels

- A data model with NMI 1:1 ratio to DER installation would be the preferred data model. Having multiple aggregates of DER does not make sense under the examples provided.

- The purpose of level 2 in the data structure is unclear. There is concern that the level 2 trip (frequency and voltage) settings are both duplications of trip settings captured in level 3 devices and not complete enough to capture the complete response of sub devices.

- Level 2: DERID: it is unclear of the benefit of assigning a DERID to each installed asset. The critical piece of information is the export capacity at the NMI.

- Level 4: Separating DER device requirements from AC Connection data requirements (level 3) is going to cause confusion where devices are fully integrated (such as a BESS with an integrated inverter). The data model needs to avoid duplication of the same device level information being provided twice.

- Need for aggregate information fields in level 2 of the model – incl. total inverter, generator and storage capacity, Volt-Var-Watt limits - These could provide verification of installer compliance to connection requirements

Q1: Should we change from a 4 level to a 3 level data structure?

Current Data Model structure

	Description
Level 1: NMI	• Records the Master NMI record information as per the MSATS Procedures. • Each NMI may have many DER Installations referenced to it.
Level 1: DER Installation	• Records the Master NMI record information as per the MSATS Procedures. • Each NMI may have many DER Installations referenced to it. • This level applies to a DER installation in aggregate. • Each DER installation is uniquely identified by NMI and DERID. • Each DER Installation may only be associated with 1 NMI. • Each DER installation may have many AC connections related to it.
Level 2: AC connection	• Each Inverter is uniquely identified by NMI, DERID and ACconnectionID. • Each AC connection may only be associated with 1 DER Installation. • Each AC connection may have many DER devices related to it.
Level 3: DER Devices	• Each DER Device is uniquely identified by NMI, DERID, ACconnectionID and DeviceID. • Contains information relating to the DER Device specifications (e.g. solar panel, battery cell, etc), including device type, nominal capacity, etc. • A DER device may be one or many devices that have exactly the same specifications. • Each DER Device is related to a single AC connection.

Relationships between levels – is change needed?
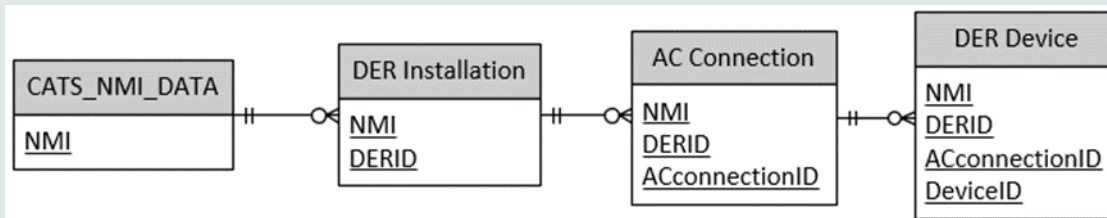
Variables, data fields and AC connection

Data Variables

- It would be useful to have discrete inputs for the AS4777 inverter settings in the data model.

  - Note: AS477?7 (a 2005 Standard) has been superseded by AS/NZS 4777. The relevant voltage and protection settings are in AS/NZS 4777.2.

- These data variables should be set to default values where possible, with the facility for values to be overridden by installers when relevant. Default values assigned for: Under frequency protection, Over-frequency protection, Undervoltage protection

Q1: Default values should be provided by NSPs where available – this can be different for each NSP – agree?

- Approved settings based on results from a site investigation may be beneficial

- Should be discrete inputs to simplify current and future system changes.

- Anything prescribed by AS4777 or other Australian Standards should not separately be reported in the DER Register.

- NSP requirements that differ from the standard requirements of AS4777, should be provided by the NSP into the DER Register.

- Where non-inverter protection mode settings and non-inverter generator controller settings best reside within the data model and structure needs further consultation and consideration

- Non-inverter DER must abide with more stringent protection requirements, however it is not appropriate to characterise these modes with AS4777 functionality.

Q2: Should we use KW or kVA?
Q3: Add fields for phase (1,2,3)?
Q4: Add fields for tilt and orientation?

AC connection table

- No national standards for these types of modes for non-inverter based technologies.

- AEMO should consult further with the ENA to foster national alignment on this as a requirement.

- Non-inverter DER must abide with more stringent protection requirements, however it is not appropriate to characterise these modes with AS4777 functionality.

Q1: Where do non-inverter protection mode settings and non-inverter generator controller settings best reside within the data model and structure?
Q2: Should we include RoCoF, anti-island, inter trip scheme, export limiter/prevention, volt/var control and power factor control?

Other data fields

- Standby/back-up generators found in large buildings or hospitals should be collected as in the majority of cases this would be considered embedded generation under 30MW.

- Consideration for the integration of remote monitoring of invertors as a future state requirement.

- Installer details are not included. These details should be available and an audit trail of installers interaction with data changes should be maintained.

Q1: Should we record the details of the installer that is the data source provider?
Q2: Should we the capture of photographic evidence of the installation and serial numbers of the products?

Data sources

Data source/ provider

- Greater clarity is needed around 'data source/providers' in the table, potentially via two columns: one headed 'Data source' and another headed 'Data provider to Register', as these are often different entities.

- Propose for consideration that the DERID have a DNSP prefix and be numerically assigned by the DNSP in its source system.

- The DNSP may be the better data source/ provider of the DERID which would be issued by the DNSP when a connection application is approved for connection of a DER system.

- SA Power Networks believes the data sources/providers are reasonable however the data should first flow to the NSP before being sent to AEMO as described in section 3.1 above.

- Process would be simpler to enforce, with a greater likelihood of success where all information is provided by the NSP rather than the installer.

Other issues

Other DER installation configurations to consider

1. Upgrade example: a site has an existing solar PV system (DERID1), and where a customer/ installer adds a second Solar PV system (DERID2) and a battery system with a separate inverter (DERID3). In this case it could be treated as three separate DERIDs at the same NMI or potentially as a single DERID with three different ACConnectionIDs.

2. We would recommend that some flexibility is allowed to DNSPs in how they might treat these multiple DER system sites in terms of allocating a single or multiple DERIDs (still uniquely linked to the NMI). In some cases, it may be more useful for the DNSP to be able to allocate different DERIDs depending on generation system type or installation date rather than changing the information held at the Level 3 or 4 and using the same DERID.

3. EN: Where a child may have a connection agreement with the parent, there is no connection agreement to reflect any export which is sent from parent to DNSP. If the intent of DER Register is to better monitor DER export across the NEM, this scenario should also be considered.

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Other issues

- If AEMO is allocating unique identifiers at the different data model levels, how will the NSP access/ know how to access these. Recommend that unique IDs be provided by AEMO to NSP.

- Export Limit field it states 'Exceeding this limit will require the installation to disconnect'. Requested clarity as to which jurisdictional instrument supports this?

- Confidence flags that indicate level of confidence in the data and the source. This should capture where settings are assumed (based on a standard), from a template, have been confirmed/commission checked, or have been digitally checked (for example via an API to a manufacturer).

- A flag to indicate whether a DER device is under feed in management control by a NSP is needed. For example, to capture if the solar generation output can be ramped for system stability.

- As the DER register represents a large change to industry and individual processes and requirements for various parties within the 'information stream', e.g. installers, solar retailers, NSPs, etc, it's a good approach to take a 'softer' stance when first implementing the register, i.e. allow a little wiggle room in things like data variables at first and then gradually tighten them up and lock them down after a few months in operation

- Initial bulk upload will not have this detail, therefore the benefit of providing this relationship mapping going forward is questionable

Q1: Consideration should be given to incentivising data quality – how can we do this?
Q2: There have been suggestions that the data model is too detailed and contains data fields that are unlikely to be used – is this true?

Next steps

Key Dates

Item	Indicative Date	Action
Submissions on Issues paper close	7 March 2019	Consultation
Submissions on data collection process discussion paper due	18 March 2019	Stakeholder Feedback
Draft Guidelines (inc data model) and report published	29 March 2019	Consultation
Draft technical specification	April 2019	System Implementation
Submissions on draft guidelines and report close	15 April 2019	Consultation
Final Guidelines (inc data model) and report published	31 May 2019	Consultation
Final technical specification	June 2019	System Implementation
System go-live in pre-production	September 2019	System Implementation
System go-live in production	31 November 2019	System Implementation

Contact

https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation

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