

DER REGISTER INFORMATION GUIDELINES

FINAL REPORT AND DETERMINATION

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NOTICE OF FINAL REPORT – DER REGISTER INFORMATION GUIDELINES - 2019

National Electricity Rules – Rule 8.9

Date of Notice: Friday, 31 May 2019

This notice informs all Registered Participants, interested parties and other stakeholders (Consulted Persons or stakeholders) that AEMO has made its final determination on the *DER register information guidelines*. This follows consultation conducted under clause 3.7E of the National Electricity Rules (NER), in accordance with the Rules consultation procedures detailed in rule 8.9 of the NER.

Inquiries

Stakeholders are invited to direct inquiries to this Final Report by email to DERRegister@aemo.com.au.

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EXECUTIVE SUMMARY

Australian consumers are leading the world in adopting Distributed Energy Resources (DER), with around one in five homes having rooftop solar photovoltaic (PV) systems and growth in residential battery storage.

This growth is forecast to continue, with AEMO's 2018 Integrated System Plan (ISP) projecting rooftop PV to become the largest aggregate source of generation in the National Electricity Market (NEM) by 2040¹. In fact, in some states, consumer-led DER is already the largest power supplier when rooftop PV is aggregated together.

The deep penetration of DER throughout Australia presents opportunities to exchange consumer value that can support the electricity system moving forward, and challenges for managing power system reliability. Effective integration of DER assets with electricity and ancillary service markets, and within the local constraints of the network, is necessary to maximise the potential value of these consumer-led investments while ensuring effective market and system operation into the future.

A growing dependency on DER as a major contributor to Australia's energy mix also increases the importance of integrity in the performance of the DER fleet. AEMO is working with stakeholders to develop standards to integrate, operate, and manage DER assets, pilot solutions through our Virtual Power Plant (VPP) demonstrations, and recommend a model with Energy Network Australia to efficiently and cost-effectively operate and trade related services to support the NEM².

AEMO's *DER register* lays the foundations of realising consumer value from DER. Upon implementation on 1 December 2019, the *DER register* systems will support a consistent approach to gathering information on DER assets across the NEM.

It will increase visibility of where DER are connected and the forms of DER in service, and provide details of the operating characteristics of these assets, with the aim of enhancing AEMO's ability to manage planning and forecasting, power system security, and operation in a NEM with high penetrations of DER.

The publication of this Final Report and Determination (Final Report) concludes AEMO's consultation process conducted to develop the *DER register information guidelines* (Guidelines) under the National Electricity Rules.

The Guidelines will specify the information that *Network Service Providers* (NSPs) must submit to AEMO to support Australia's first centralised register of DER. The *DER register* will comprise the information submitted by NSPs to AEMO after these Guidelines come into effect on 1 December 2019. The database will also pull together existing disparate datasets held by NSPs and build on these with the supporting infrastructure to enable ongoing timely data collection.

This Final Report reflects AEMO's views and the culmination of stakeholder engagement to date. It reflects the final decisions made on both the Guidelines and the Information Collection Framework that will support NSPs in ongoing *DER generation information* collection. It is AEMO's view that these decisions and final design choices are aligned to the principles as set out in the Issues Paper earlier in 2019³, including:

- Data collected should initially comprise of the statically configured, physical, DER system, at the time of installation.
- Have regard to reasonable costs of efficient compliance compared to the likely benefits from the use of *DER generation information*.
- Best practice data collection should be implemented, wherever possible, leveraging existing data collection methods.

¹ AEMO, 2018 ISP, July 2018, at <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Integrated-System-Plan>.

² See AEMO DER Program for more: <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/DER-program>

³ DER register, Information Guidelines Issues Paper, p. 7.



- Balancing information and transparency, the *DER register* should be accessible and easy to use, while confidentiality and privacy are protected.

AEMO has prepared the Guideline and Final Report building on its Draft Report⁴ while considering and responding to stakeholders with its final decisions across major areas. These decisions include:

- The removal of a minimum DER size threshold.
- AEMO considering the need for NEM-wide standard reporting for NSPs if this is identified during the implementation and subsequently post the go-live date.
- Consideration of stakeholder feedback on and final changes to the Data Model as defined in the Guidelines, along with supporting justifications for any changes.
- The approach to collecting existing *DER generation information* from NSPs to initiate the *DER register*, including the expectation that NSPs provide AEMO with advice on how they propose to align their available data by 1 September 2019.
- AEMO's consideration and approach towards aligning *demand side participation information* with the *DER register*, including a proposal to review the DSP Guidelines to consider alignment.
- The actors associated with the collection of *DER generation information* via the Information Collection Framework, including how the *DER register* could support NSPs in compliance activities associated with their *small generating unit* connection agreements.
- Facilitating the supply of default information from NSPs as per their local requirements, and the use of third party databases to support the efficient provision of *DER generation information*.
- The role of third parties such as DER installation contractors in supporting NSPs to provide 'as-installed' *DER generation information*, including how AEMO's Information Collection Framework will enable optionality for NSPs to select the appropriate and efficient approach to provide *DER generation information*.
- The Information Collection Framework including the final design and how this design will manage concerns raised by stakeholders.
- The time boundaries applied to the provision of *DER generation information*, including how the Information Collection Framework manages these, and the expectation placed on NSPs to provide *DER generation information* within 20 business days of the commissioning of the related *small generating unit*.
- How the Information Collection Framework will notify NSPs of changes and other activities.
- Aspects of submitting to, accessing, and editing *DER generation information* held in the *DER register*.
- How the *DER register* will support the capability of equipment manufacturers' remote setting change and data acquisition capability in the future as a form of ongoing validation.
- AEMO's approach to managing related privacy concerns.
- AEMO's approaches to reporting based on aggregate *DER generation information* in the *DER register*.

AEMO has also further considered the Draft Guidelines⁵ to correct any minor drafting errors and ensure consistency with the drafting conventions adopted in other AEMO guidelines.

AEMO's Final Report is to make the *DER register information guidelines* in the form attached to this Final Report (Appendix B)⁶.

⁴ DER register, Draft Report and Determination. 5 April 2019.

⁵ DER register, Draft Information Guidelines.

⁶ As per NER cl. 3.7E(g)-(k).



In making this Final Report, AEMO acknowledges the contributions of stakeholders who have participated and contributed to date, and that there will be further engagement as this project moves forward.

Following this Final Report, AEMO will move forward with the implementation of the *DER register* and Information Collection Framework.

AEMO also considers that other stakeholders carefully consider their role in reinforcing and/or enabling implementation of the *DER register* and information provision to it, including:

- State and federal governments in relation to incentives for DER uptake,
- The Australian Energy Regulator in considering and as appropriate approving, revised model standing offers,
- State jurisdictional and energy safety regulators or bodies in reinforcing the need for compliance with the provision of *DER generation information*, and
- DER installer accrediting and licencing bodies in supporting the integrity of DER installations.

Note that there is a glossary of terms used in this Final Report at Appendix A. Italicised terms in this document have the same meaning as that in the NER. Further detail to support AEMO's Final Report and the stakeholder understanding of the Information Collection Framework is available at Appendix E to Appendix G.



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1. STAKEHOLDER CONSULTATION PROCESS

As required by clause 3.7E(h)(3) of the National Electricity Rules, AEMO has consulted on **the development of the DER register information guidelines** in accordance with the NER consultation process in rule 8.9.

2. BACKGROUND

2.1. NER requirements

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, including:

- *The details of the DER generation information* NSPs must provide to AEMO for inclusion in the *DER register*.
- Any demand side participation information that AEMO will include in the *DER register*.
- When NSPs must provide or update *DER generation information*.
- How NSPs must provide or update *DER generation information*.
- How AEMO will store the information in the *DER register*.
- The manner and form in which AEMO will publish details in a report on the extent to which that information informed its *load forecasts* or the performance of its *powers system security responsibilities*.
- How AEMO will provide NSPs with access to the *DER register information*.
- The contents, form, timing and methodology for constructing the *DER register report* to be published by AEMO.
- AEMO's approach to the protection of any *confidential information* or personal information in the *DER register*.

AEMO is required to develop and publish the *DER register information guidelines* by 1 June 2019, with a minimum of three months before they come into effect.

2.2. Context

On 13 September 2018, the AEMC finalised NER 3.7E for AEMO to establish a register of DER in the NEM, including, but not limited to, small scale battery storage systems and rooftop PV.

The aim of the register is to give network businesses and AEMO visibility of where DER are connected to support the management of power system security, planning and forecasting, and operation.

The new register must be in place by 1 December 2019. The transitional rule provisions commenced on 18 September 2018, include an obligation on AEMO to make and publish the first Guidelines by 1 June 2019.

2.3. First stage consultation

AEMO issued a Notice of First Stage Consultation on 29 January 2019. AEMO developed and published an issues paper, which outlined the questions and issues central to the development of the DER Guidelines.

AEMO received 15 written submissions in the first stage of consultation and held a series of stakeholder meetings and forums where several of the material issues were also raised, which were noted and discussed in the Draft Report.

2.4. Second stage consultation

AEMO issued a Notice of Second Stage Consultation on 5 April 2019. Concurrently, AEMO published its Draft Report and Draft Guidelines, which outlined and responded to issues raised by stakeholders and



AEMO's draft decisions based around key elements of the Guidelines and a draft overview of the Information Collection Framework.

AEMO received 12 written submissions in the Second Stage Consultation and held a series of stakeholder meetings and forums where material issues were also raised and discussed. Where significant and not previously addressed, all issues are discussed here in this Final Report.

AEMO thanks stakeholders for their contributions to the development and design of the *DER register* and its associated systems. In particular, the support from the Clean Energy Regulator, *Distribution Network Service Providers* (DNSPs) and the Clean Energy Council has significantly contributed during the consultation process.

Meeting name	Attendees	Date
Delivery Team 2 (Collection Framework)	As per minutes available online at https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation?Convenor=AEMO%20NEM .	6 May 2019 22 May 2019
Delivery Team 1 (data model)	As per minutes available online at https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation?Convenor=AEMO%20NEM .	7 May 2019
Other stakeholder meetings and briefings	AEMO, AER, AEMC, Energy Market Transformation Project Team, Energy Queensland, CitiPower Powercor and United Energy and AusNet Services.	March-May 2019

Copies of all written submissions and minutes of stakeholder workshops (excluding any confidential information) have been published on AEMO's website at <https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation?Convenor=AEMO%20NEM>.

3. SUMMARY OF MATERIAL ISSUES

The material issues arising from the proposal and raised by Consulted Persons in formal written submissions are summarised in the following table, demonstrating the wide range of views AEMO has considered in this Final Report.

	APA	Ausgrid	AusNet Services	CEC	CitiPower Powercor	Endeavour Energy	EnergyAustralia	Energy Queensland	Jemena	SAPN	TasNetworks	United Energy
Min. size of <i>small generating unit</i>		X	X		X			X		X		X
Standard, packaged reports		X	X		X			X		X		X
Effective means to communicate		X	X		X			X				X
Fields			X		X			X	X			X
Structure		X	X		X						X	X
Existing DER generation information			X		X				X		X	X
<i>Demand side participation information</i>		X										
Collection actors				X				X	X		X	
3 rd party databases & default data			X					X	X		X	
Third party data submission					X				X		X	X



	APA	Ausgrid	AusNet Services	CEC	CitiPower Powercor	Endeavour Energy	EnergyAustralia	Energy Queensland	Jemena	SAPN	TasNetworks	United Energy
Information collection framework		X	X		X		X	X	X	X		X
Timing and time limitations		X	X		X		X	X	X		X	X
Notifications		X	X		X			X				X
Data editing & access limitations			X		X			X	X	X		X
User access and data submission					X				X			X
Third party access				X			X		X			
Post-installation setting changes			X				X	X		X		
Privacy			X				X					
Supporting information			X				X		X			X
DER eligibility	X							X				
DER register report							X				X	

AEMO notes that further views have been received via email from some stakeholders. A detailed summary of the issues raised, together with AEMO's responses, is contained in Appendix D.

4. DISCUSSION OF MATERIAL ISSUES: INFORMATION GUIDELINE AND DATA MODEL

The following sections summarise the material issues raised by stakeholders in relation to the Data Model as set out in Appendix A of the Guidelines, along with AEMO's assessment and final decisions around these issues.

4.1. Question 1: Minimum size threshold

4.1.1. Issue summary and submissions

The made Rule has a provision that the Guideline needs to specify any minimum size of *small generating units* for which an NSP is required to provide *DER generation information*. Following initial consultation, the Draft Guideline proposed that this minimum value is 1 kW. The consultation paper requested feedback on this proposed value. AusNet Services and Ausgrid both agreed with the proposed value⁷.

Energy Queensland noted that this value would exclude micro-inverters, and so recommended that if this is intentional, improved terminology to reflect this is included⁸. Endeavour, SA Power Networks (SAPN), CitiPower Powercor, and United Energy all suggested that no minimum, that is, 0 kW, is specified. SAPN's position is that all sites need NSP approval and NEM-compliant metering, and so no differentiation should be introduced⁹. CitiPower Powercor and United Energy stated that many units have nil export at times and should not be excluded¹⁰. Energy Queensland recommended that the minimum value is 1 kVA, as it has 74

⁷ Ausnet Services and Ausgrid submissions to second stage consultation.

⁸ Energy Queensland submission to second stage consultation.

⁹ Endeavour, SAPN, CitiPower Powercor, United Energy submissions to second stage consultation.

¹⁰ CitiPower Powercor and United Energy submissions to second stage consultation.



arrays connected to the network which are rated less than 1 kW, and 61 inverters with capacities rated less than 1 kVA, with significant overlap between those groups¹¹.

4.1.2. AEMO's assessment

AEMO considered the submissions to remove the minimum size threshold proposed in the Draft Guideline and discussed with key internal and external stakeholders¹². Removing the proposed lower limit increases efficiency by removing the need for multiple DER databases (that is, for capacities above and below the minimum size).

4.1.3. AEMO's conclusion

The minimum threshold for *small generating units* to be captured in the *DER Register* will be defined as 0 kW, that is, there is no lower limit, as it facilitates efficiency across NSPs and AEMO. Removing the proposed lower limit increases efficiency by removing the need for multiple DER collection processes, for capacities above and below the threshold. This conclusion is reflected in Section 3.1.1 of the Guidelines.

4.2. Question 2: Standard packaged reports

4.2.1. Issue summary and submissions

The Rule requires that reports must be made available to NSPs to access the *DER generation information* relating to connection points in their own network areas. AEMO is proposing having a customisable reporting option available where NSPs can create any report required. AEMO posed the question in the consultation as to whether any "standard" reports are needed in addition.

Submissions received in relation to the draft Guideline noted that:

- AusNet Services and Endeavour prefer using an Application Programming Interface (API) to create internal business reports, as this provides greater flexibility to integrate internally¹³.
- Ausgrid would like access to obtain all information submitted to the *DER register* post-validation of *DER generation information* in its network area¹⁴.
- Energy Queensland proposed a structure for a standard report, and also recommended monthly or quarterly reports on the volume and aspects such as data quality exceptions, pre- and post-installation data anomalies, timeframe exceptions, and data issues¹⁵.
- The majority of submissions supported the ability to create bespoke reports and demand, and also support the use of standard reports for analysis of errors.
- All submissions that commented on the reporting frequency agreed that a monthly report was suitable.
- EnergyAustralia agreed that privacy is a substantial concern, however noted that DNSPs already have information on feeder level constraints. They encouraged AEMO to look further into this and provide a *DER register* report at feeder level (or substation) where installations can be sufficiently aggregated for better understanding of constraints to make the report more useful¹⁶.
- EnergyAustralia agreed and supported providing the data in CSV file format¹⁷.

¹¹ Energy Queensland submission to second stage consultation.

¹² Delivery Team 1 – Data Model – meeting 2.

¹³ Ausnet Services and Endeavour submissions to second stage consultation.

¹⁴ Ausgrid submission to second stage consultation.

¹⁵ Energy Queensland submission to second stage consultation.

¹⁶ EnergyAustralia submission to second stage consultation.

¹⁷ EnergyAustralia submission to second stage consultation.



- TasNetworks found the format of the aggregated, regional *DER register* report is appropriate. However, it contended the information contained within it might be supplemented to align with the Australian Energy Regulator (AER) Regulatory Information Notice (RIN) requirements on DER. Such duplication should be minimised¹⁸.

4.2.2. AEMO's assessment

In determination of this issue, AEMO considered the following points:

- AEMO's approach to reporting on *DER register* information will comply with the protected information provision of the NEL and ensure compliance with the Privacy Act.
- AEMO agrees with stakeholders that the aggregation must balance providing value from the *DER register* with the need to protect privacy and confidential information. These matters are considered when designing the scope and content of the report as contained in the Guidelines. In addition, the report will remain subject to review to ensure appropriate privacy and confidentiality protections are maintained in practice.
- AEMO notes that NSPs will have access to all *DER register information* for their network, and access to create bespoke reports, at whatever granularity they prefer.

4.2.3. AEMO's conclusion

AEMO will provide access for NSPs to obtain the *DER generation information* that they are entitled to via an API and web interface. This will be limited to *DER generation information* that relates to National Metering Identifiers (NMIs) within the network of the relevant NSP. AEMO will consider the need for NEM-wide standard reporting for NSPs if this is identified during the implementation and subsequently post the go-live date.

4.3. Data content

The Draft Guideline included a draft Data Model. Seven submissions were received with commentary on the data content, and further discussions have been had with Delivery Team 1 – Data Model¹⁹ since the release of the Consultation papers. The submissions included specific feedback on data fields as well as general comments on the data model structure. A comprehensive table of responses to all submissions are found in Appendix D.

4.3.1. Field-specific feedback

This section lists summarised comments made by Consulted Persons on certain fields within the Data Model, alongside AEMO's assessment of the issues raised. Note that full details of comments made in seven submissions to the Draft Report are available in Appendix D and meeting minutes are available on the AEMO website²⁰.

¹⁸ TasNetworks submission to second stage consultation.

¹⁹ Delivery Team 1 – Data Model – meeting #2 7 May 2019.

²⁰ Available at <https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation?Convenor=AEMO%20NEM>.

**Proposed new data fields**

No.	Level	Field	Comments	AEMO's assessment
1	DER Installation	Approved capacity (kVA)	Connection point net export limit agreed with the DNSP in the connection agreement. AusNet Services noted that information that defines the maximum agreed and hence permit features impacting the grid, including connection point net export limit.	The Field "Export limitation" exists at the NMI level, and it is defined as "Maximum amount of energy (kVA) that may be exported from an electrical installation to the grid".
2	AC Connection Level	'Islandable' installations	Energy Queensland noted that an increasing number of solar PV and battery energy storage systems are designed with the ability to island themselves from the grid during grid outages to continue to supply the premises. While not relevant to network load, Energy Queensland intends to add this field to its application portals to enhance its understanding of the penetration of this technology, and suggested it is included in the <i>DER register</i> .	This field to be included, as AEMO expects it may be of value to Emergency Services.
3	DER Device	EV battery	Energy Queensland proposed that a flag is used to identify that this battery is an EV battery used in a vehicle to grid (V2G) arrangement. It is part of the device sub-type.	AEMO has considered through consultation that collecting this information in relation to EVs will be useful and future-looking. This has been implemented as device sub-type.
4	DER Device	Depth of discharge	Energy Queensland noted that different battery chemistries have differing recommended maximum Depth of Discharge (DoD), stated as a percentage. They suggested that a similarly sized lithium-ion battery has a much greater nominal DoD compared to other battery chemistries and therefore a greater proportion of usable capacity.	Factors such as this are already considered in system modelling. Also, as manufacturer and model are captured, this value can be looked up in manufacturer data sheet.
5		Disconnection times	Energy Queensland noted that under and over frequency, and under and over voltage disconnection settings prescribed by NSPs, may vary from the Standard. It proposed capturing both the protection setting value and the specified disconnection time.	This attribute will now be collected. Used together with the protective function limit, it provides a better understanding of the central protection arrangements for better modelling.



Proposed changes to data fields

No.	Level	Field	Comments	AEMO's assessment
1	DER Installation	Installer identification	This identifier should be the installer's unique qualification number (that is, electrical tradesperson's licence or similar accreditation number).	AEMO has now confirmed this field.
2	DER Installation	Non-inverter small generating unit protection modes	Suggestion that this information is to be populated by the installer and not the NSP. The installer will access this information from the non-inverter equipment data sheet and will be required to populate within the <i>DER register</i> .	The Information Collection Framework allows the NSP to determine the source of the information.
3	AC Connection	AC Connection group count & Number of AC Connections	Deleted field and new field appear to be the same. Please confirm if fields are requesting the same information; appears to be a conflict between the <i>DER register information guidelines</i> and the Draft Report.	The data table in the guideline uses Number of AC Connections (L2) and Number of Devices (L3). Draft report spoke of "group count". The Guideline is consistent and will ensure Final Report is consistent with this.
4	All	Data field requirements	Use of MSATS NMI Standing Data field requirements (M (Mandatory), R (Required) or O (Optional)) for the <i>DER register</i>	All fields in the <i>DER register</i> are expected to be delivered as per the NER requirements, so there is no value in assigning different levels.
5	All	Data sources	CitiPower Powercor and United Energy noted that certain fields have multiple possible data sources listed (such as Installer/NSP). There is a query as to how the source will be determined in these cases, and recommended that only the NSP should be the Data source for this data.	The NSP is ultimately responsible for the provision of this information. It may request the Installer to provide the information if required, or might pre-populate or populate itself.
6	DER Installation	Nominal export capacity	Energy Queensland suggested there is a potential for confusion with the "Export Limit" value. Energy Queensland suggested this field be renamed as "Nominal generation capacity", or "Rated generation capacity", or simply "Nominal capacity".	Industry consultation has determined that the term "Export Limit" is preferred by most NSPs, therefore no change will be made.



Proposed data fields to remove

No.	Level	Field	Comments	AEMO's assessment
1	AC Connection	Inverter power quality response modes - Voltage response modes – volt-watt response for energy storage systems	This field is a duplicate of Inverter power quality response modes - Voltage response modes – volt-watt response.	Duplicate field removed.
2	DER Installation	Voltage vector shift	Energy Queensland noted that although voltage vector shift been required on some systems >30 kVA in the past, there is emerging evidence that this protection scheme can lead to unintended disconnection of DER during system events, and it should not be allowed on future DER systems.	This field will be retained. It is used by most participants, and is not an obligatory field to fill.

4.3.2. AEMO's assessment

In determination of this issue, AEMO considered the following points:

- The Data Model focuses on the collection of data that would assist AEMO to manage power system security, planning and forecasting, and operation and assist NSPs to meet their *regulatory obligations or requirements*.
- The AEMC Final Determination noted that it is important that the costs of the register will not be disproportionately large in comparison to its expected benefits and, where possible, existing mechanisms should be leveraged.

4.3.3. AEMO's conclusion

AEMO determines to make the following amendments in the Draft Guidelines:

- AEMOs conclusion on field specific feedback is contained in Section 4.3.1.
- To reduce the administrative burden on NSPs and installers, the Data Model will be enhanced by allowing NSPs to provide default information to support the Information Collection Framework which will also draw from existing product databases (where available) to streamline data population.

4.4. Data structure

4.4.1. Issue summary and submissions

During the initial rounds of consultation, and in the Issues Paper published in January, AEMO had proposed a four-level data structure, including NMI level, DER ID level, AC Connection level, and device level.

Reponses to the issues paper and related analysis identified that the proposed level 2, DER ID level, was superfluous, and the AC Connection level provided that same functionality. As such, the data model was reduced to three levels – NMI level, AC Connection level, and Device level.

This was included in the Draft Guideline, and was well received by participants, with no contrary views submitted.

AusNet Services raised an issue that the model may be onerous to maintain the mapping between the AC Connection and DER Device, and proposed grouping these two levels. It also proposed that doing so would



better enable batteries with combined inverter energy systems to be characterised, and simplify data management for NSPs and AEMO. AEMO's view is that for embedded inverter models, the data model works with a 1:1 relationship selected at the two levels.

Submissions and workshop discussions have indicated that a field in the data model to indicate which fields are mandatory will be very useful.

Ausgrid suggested the need for addition of an NSP-approved total inverter/ generation capacity limit or export capacity limit to Level 1 for sites that do not have central protection requirements, and this has now been included at the NMI level.

There was a recommendation from CitiPower Powercor to move the central protection control modes from Level 1 to Level 2.

4.4.2. AEMO's assessment

AEMO has considered all suggestions relating to the structure and fields in the data model, and discussed outstanding issues with Delivery Team 1 – Data model during a teleconference²¹.

AEMO has considered these suggestions related to mandatory data fields. On review of the Rule, AEMO has concluded that all data fields are mandatory and are expected to be delivered where available, and therefore no categorisation of fields is required.

4.4.3. AEMO's conclusion

AEMO has maintained the three-level data structure proposed in the draft Guideline. It is a flexible model that allows most DER use cases to be captured accurately.

4.5. Existing DER generation information

Clause 11.108.3 requires that NSPs must provide existing *DER generation information* that they hold to AEMO, by no later than the commencement date (1 December 2019). This existing *DER generation information* must be provided to AEMO in the form and manner specified in the Guidelines.

AEMO notes that existing datasets held by NSPs will be in a different form and manner from the data to be collected under the *DER register* Information guideline. AEMO is seeking to accommodate differences in datasets held by NSPs to facilitate the delivery of existing datasets and their integration into the *DER register*.

4.5.1. Issue summary and submissions

A number of NSPs have noted that their existing data collected on DER devices is incomplete in relation to the data requirements specified for collection under the Guidelines. There have also been queries about the collection process, and how the data will be managed.

4.5.2. AEMO's assessment

AEMO acknowledges that the Guidelines were insufficiently clear about the distinction between an NSP's obligation to provide existing *DER generation information* prior to the commencement date and the NSP's ongoing obligation to provide *DER generation information* in respect of new installations of *small generating units* or modifications, replacements, or removals of existing *small generating units*. The Rules only require NSPs to provide AEMO with information that they have collected historically. There is no requirement for retrospective collection of data to fill gaps and complete historical/existing records.

AEMO is seeking to accommodate differences in existing datasets and to minimise the compliance cost for NSPs in providing existing *DER generation information* to AEMO in accordance with the Rules and the

²¹ Delivery Stream 1 – Data model – meeting #2 – 7 May 2019.



Guidelines. To this end, AEMO will be requiring NSPs to confirm their delivery plans by 1 September 2019. AEMO will be convening a Delivery Team to assist participants on the integration of existing DER data sets.

4.5.3. AEMO's conclusion

AEMO revised the approach in the Draft Guidelines to address the issues raised by Consulted Persons. The Guidelines clearly distinguish between:

- On the one hand, the ongoing obligations on NSPs to provide *DER generation information* with respect to the installation of a new *small generating unit*, or a modification, replacement, or removal of an existing *small generating unit*, which is set out in section 4.1 and 4.3 of the Guidelines; and
- On the other, the obligation on NSPs to provide existing *DER generation information*, which is set out in section 4.2 of the Guidelines.

NSPs are required to provide to their existing *DER generation information* to AEMO by 1 December 2019. Each NSP will be required to provide AEMO with written notice of its intended method of transferring data to AEMO by 1 September 2019. AEMO will notify the NSP in writing if it cannot accept the *DER generation information* in the manner and form proposed by the NSP, in which case AEMO and the NSP will agree an alternative approach.

4.6. Demand site participation information

4.6.1. Issue summary and submissions

In the Draft Report and Draft Guideline, AEMO noted that although the *DER generation information* is currently proposed to be stored in a new AEMO-managed database other than Market Settlement and Transfer Solutions (MSATS), AEMO does not intend to immediately pursue a combined storage architecture for both *Demand side participation information* and *DER generation information*.

However, combination of the *Demand side participation information* and *DER generation* databases is flagged for alignment in a future development of the *DER register* or *Demand side participation information* portal.

AEMO also concluded that, where possible, the *DER register* will also be used for validation and reconciliation of the *Demand Side Participation Information*.

Ausgrid was the only participant that provided a response on this matter, and disagreed with AEMO's assessment that access to *demand side participation information* by NSPs through the *DER register* would not assist in fulfilling their regulatory obligations or requirements. It noted that *Demand side participation information* holds useful information such as whether individual sites are participating in active load or active generation DSP activities as opposed to passive generation sites.

Ausgrid proposed that Status flags or even basic knowledge of sites that are participating in DSP activities and the type of *Demand side participation information* activities would assist NSPs.

4.6.2. AEMO's assessment

NER clause 3.7E(b)(2) specifies that the *DER register* must include any DSP information which in AEMO's reasonable opinion will assist NSPs to meet their regulatory obligations or requirements and/or assist AEMO in the exercise of its statutory functions under the Rules. AEMO has considered the key areas of Privacy and Intersection of DER and *Demand side participation information* datasets in determination of this issue.

The AEMC noted in its Final Determination²² that there is currently no formalised data sharing arrangement that supports AEMO sharing DSP information with third parties. The AEMC also noted that AEMO will need to consider privacy and confidentiality arrangements when disclosing the data obtained from other sources

²² AEMC, Register of distributed energy resources, Rule determination, 13 September 2018, p. 62.



to NSPs, and concluded that AEMO should be able to share the locational and technical characteristics of devices in the *DER register* with NSPs in relation to their network areas. AEMO notes that while DSP information does contain some locational and technical characteristics, the majority of *Demand side participation information* data is contractual information.

AEMO is further considering what *Demand side participation information* could be provided to NSPs in the context of its privacy and protected information obligations, and will consider a review of DSP Guideline arrangements in the near future.

4.6.3. AEMO's conclusion

The Guideline does not require the inclusion of any demand side participation information. AEMO's assessment is that access to the demand side participation information in its current formats through the DER register would not assist NSPs to meet their regulatory obligations or requirements due to:

- differences between the data format of demand side participation information and the DER generation information;
- restrictions on AEMO's ability to provide the demand side participation information to NSPs due to information confidentiality concerns; and
- misalignment between the data types, as the demand side participation information is not site-specific, in contrast to the DER generation information.

5. DISCUSSION OF MATERIAL ISSUES: INFORMATION COLLECTION FRAMEWORK

The following sections summarise the material issues raised by stakeholders, along with AEMO's assessment of the issues and final response in relation to the Information Collection Framework.

5.1. Collection actors

5.1.1. Issue summary and submissions

Many DNSP stakeholders noted that there is no compliance regime for DER installers to adequately manage compliance with technical requirements for DER installations or to provide/update data in the *DER register* within a defined time²³. This perspective was supported with arguments that without a strong compliance regime, DER installers would not provide data to the required quality²⁴, leading to an excessive burden on NSPs to validate the data²⁵. NSPs also noted that updates to their deemed standard and basic model standing offers need to be supported by AEMO's view of what is needed to support compliance with the *DER register*²⁶.

TasNetworks raised the need for AEMO to continue to work with jurisdictional safety regulators to develop a national approach to compliance²⁷.

The CEC noted that NSPs have no natural compliance levers and are not set up to manage this, proposing that AEMO work directly with them to incorporate DER installer accreditation schemes into the *DER register*²⁸. Jemena noted that the CEC is developing a digital solution that may support this²⁹.

²³ Energy Queensland submission to second stage consultation.

²⁴ CEC submission to second stage consultation.

²⁵ Meeting minutes, Delivery Team 2, 6 May 2019.

²⁶ Jemena submission to second stage consultation.

²⁷ TasNetworks submission to second stage consultation.

²⁸ CEC submission to second stage consultation, and meeting minutes, Delivery Team 2, 6 May 2019.

²⁹ Jemena submission to second stage consultation.



Similar views were expressed in the working group meeting held on 6 May 2019³⁰, where some NSPs argued that the Draft Report was premised on a gap in understanding of NSPs' capacity to pursue installers for compliance deficiencies. They proposed that AEMO should restrict access to the *DER register* to installers that are accredited with the CEC (including stating this in the Guidelines) as NSPs have no other compliance lever. For example, NSPs consider that jurisdictional safety agencies will only pursue installers or electricians where material safety concerns arise, and providing data to the *DER register* does not clearly align to this role. Further, NSPs argued that they only have a relationship with the customer who would suffer any recourse for non-compliance³¹.

An alternative to compliance could rely on incentives³². Some stakeholders suggested submission of data to the *DER register* should be a factor for eligibility for incentives such as small technology certificates (STCs)³³.

5.1.2. AEMO's assessment

In the Draft Report, AEMO agreed with stakeholders' views expressed in meetings and in response to the Issues Paper that gathering 'as installed' information will increase the efficacy of the *DER register*³⁴. This approach, however, requires AEMO to design its systems to allow third parties to access and edit the information held in the register under controlled conditions.

The question of whether third party actors using the *DER register* would comply with the NSP expectations (as set out in connection offers and agreements) is one that exists regardless of the *DER register*. While the *DER register* introduces new data provision obligations, it does not impede the current compliance regime in any way.

AEMO understands there are compliance challenges for NSPs, but has a view that NSPs are already better placed to act on these than AEMO because NSPs are responsible for defining the terms of their connection offers, which can in turn require certain conditions on connections approvals. AEMO has no equivalent remit. As the CEC and other accrediting bodies are not actors considered by the national electricity regulatory framework, regulatory instruments produced by AEMO (such as the Guidelines) do not have scope to place obligations on these parties.

A further challenge with relying on the available accrediting body is that not all DER 'installers' are required to hold accreditation (for example with the CEC). The current solar installer accreditation scheme has been specifically created to support eligibility for STCs, so it is only required for small-scale Renewable Energy Systems (with capacities below 100 kW) that wish to access this subsidy. DER installations for larger and non-renewable generating units rely on existing jurisdictional safety and electrical licencing frameworks instead.

AEMO must provide for a broader range of users to access the *DER register* within established controls. Restricting access to only CEC accredited solar installers is likely to limit the value and intent of the *DER register*.

The AEMC's Final Rule and Final Determination impose a clear obligation on NSPs to provide to AEMO *DER generation information* in relation to connection points on their network which they are entitled to collect under the Rules. It will be for NSPs to manage their compliance with this obligation.

To support NSPs to manage their compliance obligations with the *DER register*, AEMO proposes that:

- The Information Collection Framework supports optionality for NSPs to input the *DER generation information* directly (without relying on the installer), or to nominate a third party such as an installer as a source of as-installed information.

³⁰ Meeting minutes, Delivery Team 2, 6 May 2019.

³¹ Ibid.

³² SAPN submission to second stage consultation.

³³ Energy Queensland, Jemena, and TasNetworks submissions to second stage consultation.

³⁴ Draft Report p. 11.



- The Information Collection Framework further permits NSPs to change DER Records which have been entered by third parties ('account-holders') if the information recorded by the third party is incorrect in the NSP's view or to handle exceptions.
- The *DER register* captures the accountable person's qualifications (licence or accreditation number) of a third party who has accessed the *DER register* to record information with each DER Record to maintain continuity for each DER installation.
- AEMO will develop training modules for *DER register* account-holders to encourage effective and correct use of the *DER register*.
- AEMO will work with the parties to consider and enhance the role of a post-submission validation checks in validating installation compliance.

AEMO has considered the role of jurisdictional safety bodies in relation to the *DER register*. Discussions to date have revealed that while there may be scope for some jurisdictions to reinforce data provision, this support is not NEM-wide so AEMO is unable to rely on this solution alone. However, any such support would be complementary to the Guidelines obligations and *DER register* design. AEMO encourages jurisdictional safety and electrical licencing bodies to consider their role in obliging the provision of data to the *DER register*.

Following implementation of the *DER register*, AEMO would be willing to work with NSPs and other stakeholders to better understand how the *DER register* can support nationally consistent approaches to DER installation compliance.

With regards to the role of the *DER register* as an eligibility criterion for DER incentives, AEMO again notes the extent of its regulatory role. The *DER register* will generate receipts confirming that a DER Record has been confirmed for a DER installation. AEMO recommends that agencies providing incentives for DER consider how this receipt could support eligibility for their schemes.

5.1.3. AEMO's conclusion

AEMO has developed an Information Collection Framework that enables NSPs to draw on information from DER installers and/or their representatives. AEMO's view is that these parties could provide a more effective source of 'as-installed' *DER generation information*.

However, AEMO notes that there are existing compliance challenges that NSPs are best placed to manage. To support them AEMO has made specific provisions in the *DER register* and Information Collection Framework. AEMO's view is that this approach is consistent with the National Electricity Objective (NEO) as the *DER register* will be better informed, NSPs better supported, and risks remain with those parties who are best placed to manage them.

AEMO recommends that agencies developing or managing incentive schemes for DER consider the role of the *DER register* in supporting this scheme and encourages jurisdictional safety and electrical licencing bodies to consider their role in obliging the provision of data to the *DER register*.

5.2. Use of third party databases and default data

5.2.1. Issue summary and submissions

Most Consulted Persons supported the use of methods to streamline the provision of *DER generation information* to reduce burden on NSPs or other third parties. NSPs raised concerns however about whether they would be required to duplicate³⁵ or verify the integrity³⁶ of these databases. Concerns were also raised about the burden of providing data that is not populated from these databases, or from default data that

³⁵ AusNet Services submission to second stage consultation.

³⁶ TasNetworks submission to second stage consultation.



could be established from relevant Australian Standards³⁷, and whether these default values can be overridden by the NSP³⁸.

Some NSPs also raised concerns about who would be providing and setting default data to support auto-population, noting that application developers or applications provided by AEMO could do this on behalf of NSPs³⁹.

Energy Queensland suggested that there where equipment installed on site does not conform to that permitted by a connection offer, it is likely that DER installers will simply accept the default data anyway. A proposed measure to manage this could be to validate serial numbers against original equipment manufacturer (OEM) databases to confirm alignment to manufacturer, series and model⁴⁰.

AEMO also notes that the AEMC's rule suggests that AEMO can supplement the *DER register* with data available from other sources⁴¹ (for example, Clean Energy Regulator data or similar).

5.2.2. AEMO's assessment

To minimise the need for manual data handling, AEMO proposes to draw from existing data sets (such as that available from the CEC) and to supplement this data with default data available from the NSP.

Where feasible and permitted by the terms of use of existing data sets, AEMO will make this data available to users of the *DER register*. However, these data sources will be used to supplement other forms of default data. Work will be required to further define default data such as inverter protection settings available from the AS4777 standard, or NSP-specific settings relevant to a connection offer.

AEMO will rely on NSPs to provide default data in the implementation stages of the project. This data would be provided by NSPs in tables for direct use in the *DER register*, and access will be via AEMO's web interface. AEMO will allow for differing requirements for different DER installation sizes and configurations as defined by the NSP to support efficient data collection. In June 2019, AEMO will commence its IT implementation working group (Delivery Team 4), which will further design and confirm the default data arrangement.

AEMO expects that application developers may self-source this default data or access it directly from NSPs as part of their service offering to their users.

AEMO has not identified the clear need to draw from data sets OEMs might be able to provide. While this data may provide some value from a validation perspective, AEMO's view is that that these data sources have more value in the context of ongoing integrity than to minimise manual handling for gathering *DER generation information*. For example, solar panel serial number verification for STC eligibility is intended to identify parallel imported and counterfeit solar panels, not to confirm specific operational settings.

The Information Collection Framework will incorporate a capability to run post-submission validation checks on DER Records, which could consider OEM data sets for any device in the *DER register*. AEMO proposes that this opportunity is explored at a later stage if there is value in doing so.

At this time, AEMO is intending to use available databases such as the approved product databases available from the CEC. AEMO is willing to work with stakeholders in the future to identify how additional sources can complement the *DER register's* objectives.

5.2.3. AEMO's conclusion

In developing the Information Collection Framework, AEMO has sought to minimise the need for manual data handling by drawing on available databases and default data to populate DER Records. Further, this

³⁷ AusNet Services submission to second stage consultation.

³⁸ Energy Queensland submission to second stage consultation.

³⁹ Jemena and Energy Queensland submissions to second stage consultation.

⁴⁰ Energy Queensland submission to second stage consultation.

⁴¹ AEMC, 2019, National Electricity Amendment (Register of distributed energy resources) Rule 2018 No. 9, cl. 3.7E(b)(3).



solution will draw default data directly from NSPs to ensure consistent with local connection requirements and will manage optionality for different *small generating unit* sizes.

AEMO's view is that the proposed approach to minimise data handling and retain NSP oversight of default data is consistent with the NEO as it reduces compliance costs and maintains NSP control over connection requirements 'seen' by the Information Collection Framework.

5.3. Submission of data by third parties

5.3.1. Issue summary and submissions

Some NSPs⁴² submitted that DER installers or contractors are not always best placed to provide information to the *DER register* and should be excluded from the Information Collection Framework. Reasons cited for this include

- That some NSPs use a system of automatic approval for some DER types. In this case they are only notified of a DER installation following its completion, no connection inquiry/application process takes place and retailers have a role in providing data to the NSP⁴³.
- Allowing these NSPs to directly submit the data to the *DER register* would better integrate with their existing DER connection processes (including by drawing from commissioning reports to provide data for negotiated connections⁴⁴).
- As the obligation for data provision is placed on NSPs, installers should only be submitting data to NSPs, and not directly to the Register⁴⁵.
- That allowing third parties to 'submit' data to the *DER register* undermines the NSPs' ability to pursue these parties where this is needed for compliance purposes⁴⁶.
- Handing of exceptions would be reduced⁴⁷.

CitiPower Powercor also suggested that the guidelines need to clearly state what are the responsibilities of the NSPs and what are the responsibilities of the installers⁴⁸.

5.3.2. AEMO's assessment

AEMO recognises that a variety of different DER connection processes and requirements are in use across the NEM. In response to stakeholder feedback, the *DER register* is being designed with the capability to support third party access and updating to DER Records under controlled conditions.

However, the Information Collection Framework must also efficiently integrate with NSPs that have varying levels of sophistication in their current systems and processes. As such, AEMO proposes that these differences are managed with optionality, and will support NSPs to use the *DER register* through:

- AEMO's web interface system, with a third party (account-holder⁴⁹) reviewing, confirming, and passing the data to the NSP to manage exceptions and confirm the record to the *DER register* (either by exception or for every record).
- AEMO's web interface system, with the NSP entering and confirming the as-installed data and confirming the record in the *DER register*.

⁴² CitiPower Powercor and United Energy submissions to second stage consultation.

⁴³ United Energy and TasNetworks submissions to second stage consultation.

⁴⁴ Jemena submission to second stage consultation.

⁴⁵ CitiPower Powercor submission to second stage consultation.

⁴⁶ Jemena submission to second stage consultation.

⁴⁷ CitiPower Powercor, United Energy, and Jemena submissions to second stage consultation.

⁴⁸ CitiPower Powercor submission to second stage consultation.

⁴⁹ See Glossary, Appendix A



- An API that will link an NSP's systems to the *DER register* systems.
- Enabling application developers to develop systems that can support NSPs and third parties to provide data to the *DER register's* systems.
- These options will enable NSPs to manage their connection processes and integrate the provision of *DER generation information* to the *DER register* in all cases, as is further explored in Appendix F.1.
- NSP system considerations.

In cases where NSPs are providing data from their in-house systems to the *DER register* systems, some additional considerations need to be accounted for, including

- As AEMO's systems will not be able to provide a receipt of a DER Record confirmation to an account-holder, the NSP would be required to do this.
- NSPs using APIs will be in control of the cadence at which information is pulled from AEMO's systems. This will also dictate the frequency at which they receive notifications from the *DER register* system (Section 5.6).
- NSPs will be fully accountable for technical support of their systems. AEMO will not be providing this support.
- AEMO will not be creating account systems that NSPs can use in their systems.

5.3.3. AEMO's conclusion

The revised Information Collection Framework is described in Appendix G. This includes the options that will be available for NSPs to submit data in the cases considered here. AEMO's view is that building flexibility into the Information Collection Framework is the most efficient way to support NSP compliance, given the various approaches to DER connections across the NEM. Thus, the final Information Collection Framework is consistent with the NEO.

AEMO expects that NSPs pursue options that are consistent with minimising costs to consumers, but also notes that in cases where NSPs are using their own systems they may also need to take on some roles that AEMO may do otherwise.

5.4. Information Collection Framework

5.4.1. Issue summary and submissions

Consulted Persons provided a range of views about the process proposed by the Draft Information Collection Framework. Generally, these revolved around four areas.

Connection Application, Offer and Agreement

Ausgrid noted that the process as described omitted the customer and therefore did not capture the various connection processes effectively⁵⁰, while providing a range of suggested improvements that could resolve this.

CitiPower Powercor and United Energy submitted that there was not enough clarity on what the NSP would be submitting to the *DER register* at the time the connection offer is made, or how the NSP may be notified if this data was not accepted by the *DER register*⁵¹.

⁵⁰ Ausgrid submission to second stage consultation.

⁵¹ CitiPower Powercor and United Energy submissions to second stage consultation.



EnergyAustralia queried the impact of the collection process on meter installation processes. They note that electricity retailers need to be involved if changes are anticipated, and that the *DER register* has the potential to impact the customer experience and DER installation/commissioning timeframes⁵².

Third party access and data entry

Energy Queensland noted that mandatory data fields and other measures would support data entry by third parties⁵³. SAPN raised concerns about the resources needed to support third parties in data entry and to manage quality. They suggested that the *DER register* manage this operationally with simplicity, up-front validation, standardised default data and incentives on installers⁵⁴.

AusNet Services raised a concern about who would be accountable for technical support for third parties using the *DER register* system⁵⁵.

Post-submission validation

CitiPower Powercor⁵⁶ and other NSPs⁵⁷ sought clarification on the data validation measures proposed by AEMO following installer or NSP submission. United Energy noted that there may be an opportunity to validate reverse power flow from the meter, using this an automatic acceptance criterion⁵⁸, while other NSPs suggested these checks remain focused on concerns about security and/or reliability⁵⁹.

AusNet Services submitted that post-submission validation checks should be avoided arguing that it may create a

“difficult situation for the DNSP to resolve with either the installer or customer. The DNSP attempts to compel either party to provided updated information would either be ineffective or create a consumer backlash against the DNSP and AEMO in the case of the DNSP suggesting their connection alteration is voided by the data quality issue”⁶⁰.

Exception-handling and DER Record review

Ausgrid noted that where a third party is revising data that is submitted to the *DER register* then all submissions should be reviewed and approved by the NSP, suggesting that exception flags may be a good way to do this, and that exceptions should include some descriptive text⁶¹. Other NSPs expressed a similar view that they require review of all submissions to have confidence their regulatory obligations are being met⁶².

Jemena suggested that managing exceptions beyond an NSP submitting data would create an additional cost that would be passed on to customers. It felt this is above the scope required for the *DER register* and requires greater clarity on the scope of effort expected to manage additional exceptions⁶³.

⁵² EnergyAustralia submission to second stage consultation.

⁵³ Energy Queensland submission to second stage consultation.

⁵⁴ SAPN submission to second stage consultation.

⁵⁵ AusNet Services submission to second stage consultation.

⁵⁶ CitiPower Powercor submission to second stage consultation.

⁵⁷ Meeting minutes, Delivery Team 2, 6 May 2019.

⁵⁸ United Energy submission to second stage consultation.

⁵⁹ Meeting minutes, Delivery Team 2, 6 May 2019.

⁶⁰ AusNet Services submission to second stage consultation.

⁶¹ Ausgrid submission to second stage consultation.

⁶² Meeting minutes, Delivery Team 2, 6 May 2019.

⁶³ Jemena submission to second stage consultation.



5.4.2. AEMO's assessment

Connection Application, Offer and Agreement

AEMO acknowledges that customer relationships are important to the DER connection process however does not see the need for additional changes to the Information Collection Framework (Appendix G) as this already intrinsically captures the key actors in the process. The various connection processes considered in the selection of this framework were presented and discussed at the Delivery Team 2 meeting on 6 May 2019⁶⁴ and presented again in Appendix F.1.

NSPs control the point at which DER Records are generated by the *DER register* system, as long as the connection agreement parameters include the minimum data required to pass validation checks. NSPs would have the option to include any additional data at this time too. See Appendix C for specific data requirements.

AEMO notes EnergyAustralia's view. No stakeholders have identified any metering installation implications in relation to the implementation of the *DER register*.

Third party access and data entry

AEMO will be responsible for technical support for third parties that are using AEMO's web interface and account system. AEMO's role does not extend to NSP systems, and applications these parties use. AEMO has applied similar principles to as those set out by SAPN⁶⁵ for the final Information Collection Framework.

Post-submission validation

AEMO proposes that any post-submission validation it undertakes would rely on automated solutions only. As a result, these checks would have inconsequential impact on the timing for exception notifications being created. These checks will provide information to the NSP, which NSPs can choose to accept without making changes or resolve by making changes before confirming the DER Record (also see the Section 6.2).

Post-submission validation checks may include cross-checking equipment against available databases (such as the CEC approved product database), where anomalies would generate exceptions that provide information to the NSP. All checks undertaken at this step would be optional for NSPs. If requested during and following the implementation stage AEMO will work with stakeholders to explore the value of additional measures, such as those that rely on metered consumption data.

Exception-handling and DER Record review

AEMO's web interface would support NSP discretion over the review of DER Records where exceptions have not been flagged ('Initial DER Records') and manual confirmation, in addition to 'conditional' DER Records which have exceptions associated with them.

5.4.3. AEMO's conclusion

AEMO's final Information Collection Framework has accounted for stakeholder feedback in relation to the above areas and will be able to work with stakeholders to implement these solutions. AEMO's view is that these measures will more effectively integrate the *DER register's* solution with existing NSP processes, leading to an efficient implementation of the *DER register*.

⁶⁴ Meeting presentation material, Delivery Team 2, 6 May 2019.

⁶⁵ SAPN submission to second stage consultation.



5.5. Timing and time limitations

5.5.1. Issue summary and submissions

Consulted Persons were asked to consider the timeframes associated with providing *DER generation information* in line with the Information Collection Framework. More specifically, the Information Collection Framework contains some independent but foundational timeframe parameters.

Timeframe between the *small generating unit* being commissioned, modified or decommissioned and related *DER generation information* being submitted in the *DER register*

The Draft Guidelines specified that the “maximum period for a completed submission of *DER generation information* for a site installation is 20 *business days* following the date of the installation”⁶⁶.

In response, NSP stakeholders have generally noted that 20 business days would be acceptable. Stakeholders noted that as the timeline is coded in a regulatory instrument, relying on the date of installation would not provide sufficient clarity and a more specific definition was required.

Some also raised concern about the reliance on a third party to initiate this timeframe with DER installation. For example, Energy Queensland sought a defined period of five days between the installation occurring and any third party (account-holder) reviewing and submitting the DER Record for NSP Review, noting that extensive installer education would be required to support compliance with this timeframe, and NSPs may face additional burden in pursuing DER installers to manage their compliance⁶⁷. Jemena also raised similar concerns, and sought precise obligations on the parties for each step in the process⁶⁸.

TasNetworks noted that 20 business days would be acceptable with caveats such as applications to support third parties and the use of pre-populated data⁶⁹. AusNet Services provided a similar view that installers should be notified with reminders to ensure they are providing timely information⁷⁰.

CitiPower Powercor sought clarity on whether the period provided flexibility to account for time to manage exceptions or seek additional information from installers, querying whether this situation allowed the period to reset⁷¹.

Strong views have also been offered on the definition of the starting time for this period, with the consensus being that the definition should refer to the commissioning or decommissioning date for the *small generating unit*⁷².

Timeframe for a DER Record to remain unreviewed by an NSP or account-holder before the system takes some action (Idle DER Records)

The Draft Report asked for stakeholder views on the length of idling time after an ‘initial’ DER Record is created before some automatic action is taken. The proposed action was to raise an exception and automatically submit the DER Record to a ‘conditional’ state.

Consulted Persons provide a range of views about possible timeframe and actions:

- Ausgrid noted that connection offers have a 12-month validity period, and that multiple offers can be made against one NMI. It recommended that an automatic ‘default expiry’ occurs 12 months after the NSP being alerted to take some action for the DER Record⁷³.

⁶⁶ Draft Information Guideline, p. 7.

⁶⁷ Energy Queensland submission to second stage consultation.

⁶⁸ Jemena submission to second stage consultation.

⁶⁹ TasNetworks submission to second stage consultation.

⁷⁰ AusNet Services submission to second stage consultation.

⁷¹ CitiPower Powercor submission to second stage consultation.

⁷² CitiPower Powercor, United Energy, Energy Queensland, and EnergyAustralia submissions to second stage consultation.

⁷³ Ausgrid submission to second stage consultation.



- Energy Queensland noted that their 65-day validity period can be extended for another 65 days by the customer, and that some DER installations occur after the period has lapsed. It suggested that automatic submission should not occur until after 6 months⁷⁴.
- AusNet Services' connection offers are valid for 90 days, which it recommended is the period before some action is taken. It also raised the need for NSPs to be able to cancel DER Records where offers are not accepted by customers, and suggested that no timeline be applied where the NSP is acting on behalf of installers⁷⁵.

The matter was further discussed at the Delivery Team 2 meeting on 6 May 2019, where stakeholders generally accepted 12 months as an acceptable timeframe. Some NSPs also suggested that the action should be for an automatic deletion of the record on the basis that the connection offer has not been accepted. NSPs also proposed that they have a 'dashboard' view of the status of the records which displayed the relevant timeframes⁷⁶.

Integration with connection application process

Energy Queensland also raised some concern about the impact the timeframe as defined may have on the connection application and negotiation process⁷⁷.

5.5.2. AEMO's assessment

AEMO has considered the views of Consulted Persons and provides the following responses.

Timeframe between the *small generating unit* being commissioned, changed or decommissioned and related *DER generation information* being confirmed in the *DER register*

AEMO agrees that relying in the date of installation of a *small generating unit* introduces an element of uncertainty for NSPs and does not directly relate to the time at which system impacts occur. A more workable definition for the commencement of this period is the time at which the system is energised or commissioned. A revised description of the starting date was offered for stakeholder input at the Delivery Team 2 meeting on 6 May that commenced the 20-business-day period from the date of commissioning of a new or modified *small generating unit* or decommissioning an existing *small generating unit*.

AEMO's view is that this updated definition⁷⁸ creates greater clarity than relying on the physical installation and reflects the time at which any potential impact on the power system commences. AEMO also acknowledges the need for the Guidelines to provide greater certainty around when DER generation information is considered to be 'submitted'.

AEMO further agrees with stakeholders that a time limit should be applied to account-holders when they access an 'initial' DER Record. This will be addressed through the Information Collection Framework.

Accessed and idling 'initial' DER Records

Issuing notices to installers to remind them to review and confirm the DER Record is not feasible, as the *DER register* systems will not have any detail about an account-holder prior to them accessing the 'initial' DER Record for the first time. To support this, AEMO will however allow five (5) business days between an 'initial' DER Record being accessed by an account-holder and then left unsubmitted. At this time an 'Accessed and idling 'initial' DER Record' exception will be flagged a notification created. These DER Records will be automatically identified for the NSP to review and take the appropriate action (the *DER register* system will enable NSPs to allow account-holders to re-access the DER Record with the same time limitation applying).

⁷⁴ Energy Queensland submission to second stage consultation.

⁷⁵ AusNet Services submission to second stage consultation.

⁷⁶ Meeting minutes, Delivery Team 2, 6 May 2019.

⁷⁷ Energy Queensland submission to second stage consultation.

⁷⁸ *DER register information guidelines*, cl. 4.3(c).



Timeframe for a DER Record to remain unreviewed by an NSP or account-holder third party before the system takes some action (Idle DER Records)

AEMO's view is that a time limit must be applied to prevent 'initial' DER Records remaining idle indefinitely. However, the duration of the limit is of more consequence for NSPs than for AEMO. NSP stakeholders have said that 12 months (365 days) is likely to be acceptable, and AEMO can support this. The age of all DER Records will be clearly visible via AEMO's web interface, such that NSPs can prioritise if necessary.

AEMO considers that a decision to delete DER Records rests with the NSP and should not be a design feature of the Information Collection Framework. After 365 days the DER system will move idle 'initial' DER Records to a 'conditional' state, on the expectation that the NSP is best placed to take the appropriate action.

Integration with connection application process

AEMO does not see the need to integrate the connection application and negotiation process with the Information Collection Framework, because DER Records are not anticipated to commence until the connection offer is made after the negotiation process. NSPs will have discretion over the time at which they initiate the creation of a DER Record.

5.5.3. AEMO's conclusion

AEMO has determined that there are three key timeframes that need to be applied to the *DER register* Information Collection Framework:

1. The period defined in the Guidelines as 20 business days following the date of commissioning a new or altered *small generating unit* or decommissioning of an existing *small generating unit* (see Section 4.3(b)).
2. A timeout period in the Information Collection Framework of 5 business days for "Accessed and Idling DER Records".
3. A timeout period in the Information Collection Framework for "Idle DER Records" of 365 days where the NSP is alerted to take the appropriate action (not that this is not a Guidelines requirement).

The Guidelines also clarify that *DER generation information* is submitted when it is in a confirmed state in the *DER register*. This will require all exceptions handling to be dealt with within the 20 business day period.

These timeframes will be supported by the following features of the *DER register* system:

- Account-holders will be locked out of records that have moved to a 'confirmed' or 'conditional' state,
- NSPs will be able to allow account-holders to re-access 'conditional' DER Records, at which time they would be reinstated to 'initial' state and time limits would apply again,
- The age and status of all DER Records will be clearly visible via AEMO's web interface,
- NSPs will be notified about DER Records that submit automatically due to time limits, and
- NSPs will have the ability to access and process a DER Record at any time.

AEMO's view is that the proposed approach will enhance the opportunity for NSPs to efficiently comply with the Guidelines.

5.6. Notifications

5.6.1. Issue summary and submissions

Consulted Persons offered varying views about the notifications they may receive from the *DER register* system. NSP stakeholders generally submitted a preference for system-to-system notifications, rather than



system-to-human notifications (email)⁷⁹. Ausgrid requested additional notifications that updated the NSP when an installer accesses a DER Record and checks the record prior to submitting it to the NSP⁸⁰.

5.6.2. AEMO's assessment

AEMO's *DER register* system will produce notifications accessible immediately in via AEMO's web interface and via API. Where an NSP is using API, they will determine the cadence of this function to support immediate access and reconciliation.

AEMO does not see the need for additional notifications, as the web interface will permit access to all relevant DER Records at all times.

5.6.3. AEMO's conclusion

AEMO will provide NSPs with access to notifications through its web interface and via APIs. In parallel, AEMO will generate and allow access to receipts of 'confirmed' DER Records for account-holders. However, as discussed in Section 5.3.2, AEMO's systems will not be able to provide these receipts to account-holders where the NSP's information collection systems are used instead of AEMO's.

AEMO is of the view that this approach provides for the efficient integration of the *DER register* while delivering the desired outcome.

6. DISCUSSION OF MATERIAL ISSUES: IMPLEMENTATION AND USE OF THE DER REGISTER

The following sections summarise the material issues raised by Consulted Persons, along with AEMO's assessment of the issues and final response in relation to the implementation and use of the *DER register*.

6.1. Question 3: Stakeholder engagement

6.1.1. Issue summary and submissions

The draft report requested views on effective means to communicate to key stakeholders on the use of the *DER register*. Submissions were received from six consulted persons.

AusNet Services suggested that AEMO hold technical forums during the development and implementation period⁸¹. Energy Queensland suggested using channels with parties such as PV installers, and suggest including EV stakeholders. It also suggested a dedicated *DER register* contact email⁸². Endeavour proposed leveraging on the channels established by the CEC, and that the AEMO website could be used for providing informative and supporting documents⁸³. CitiPower Powercor and United Energy suggested using the AEMO website, AEMO webinars, and communication through CEC and industry bodies⁸⁴.

6.1.2. AEMO's assessment

AEMO has considered the stakeholder feedback and recognised that the majority of these communication paths already exist. AEMO has established a series of Delivery Teams to assist in the design, development, implementation, and integration of the *DER register*, and has put a contact email address in place⁸⁵. All information is being made available on the AEMO website, and access is public⁸⁶. CEC and other industry

⁷⁹ AusNet Services, CitiPower Powercor, United Energy and Energy Queensland submissions to second stage consultation.

⁸⁰ Ausgrid submission to second stage consultation.

⁸¹ Ausnet Services submission to second stage consultation.

⁸² Energy Queensland submission to second stage consultation.

⁸³ Endeavour submission to second stage consultation.

⁸⁴ CitiPower Power, United Energy submission to second stage consultation.

⁸⁵ derregister@aemo.com.au.

⁸⁶ <https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation>.



bodies have been engaged in the design to date, and the collection process will leverage off their expertise to improve the accuracy of collection.

6.1.3. AEMO's conclusion

AEMO will continue to engage with interested parties through the Delivery teams. Team 1 (Data Model) and Team 2 (Collection framework) have been active on the development path for the Final Report and Guideline. Team 3 (Integration of existing data) will be initiated shortly and will facilitate the inclusion of NSPs' existing *DER generation information* into the *DER register*. Team 4 (IT integration) will also be initiated soon to ensure that NSPs and others are well informed and assisted in the technical development of the *DER register* and interfaces. AEMO will also continue to use its website for the sharing of information, and other paths such as training webinars will be considered.

Following on from the publication of this Final Report, AEMO will also continue working with and raising awareness of the *DER register* implementation, with an aim to ensure stakeholders are prepared by the 1 December 2019 commencement date.

6.2. Data editing and access limitations

6.2.1. Issue summary and submissions

Consulted Persons had differing views on the data fields in relation to the read/write access of NSPs, the ability for account-holders to edit fields, and the selection of mandatory and optional fields.

AusNet Services submitted an interpretation that only data fields which are provided by the NSP as part of the connection offer would be mandatory⁸⁷. While AusNet Services, Energy Queensland, and SAPN suggested NSPs should have full editing rights for all fields⁸⁸, Energy Queensland also raised a concern about the extent of data validation NSPs would have to carry out⁸⁹.

CitiPower Powercor, United Energy and Jemena all argued that the NSPs should be able to control the extent to which an installer could edit data fields⁹⁰. AusNet Services suggested that any fields entered by the NSP should be designated as 'read-only' for an installer and provided an accompanying list of these fields⁹¹. SAPN also suggested that the sources of the data should be available⁹².

6.2.2. AEMO's assessment

All fields established by the Guidelines will be mandatory, where the data is relevant to the *small generating unit*⁹³.

AEMO has considered stakeholder feedback and considers that the appropriate solution would provide NSPs with read and write access to all fields and account-holders with read and write access to most fields related to the DER installation (see Appendix C). This solution will be uniform for all DER Records. Data entry will be supported by a combination of device databases and default data for auto-population, and exception creation for NSP review when fields are changed by an account-holder. Account-holder training will also be provided to encourage appropriate management of the data.

AEMO's web interface will not provide NSPs with control over which fields account-holders can edit. However, there is no barrier to NSPs or application developers providing this solution in their systems.

⁸⁷ AusNet Services submission to second stage consultation.

⁸⁸ AusNet Services, Energy Queensland and SAPN submissions to second stage consultation.

⁸⁹ Energy Queensland submissions to second stage consultation.

⁹⁰ CitiPower Powercor, United Energy and Jemena submissions to second stage consultation.

⁹¹ AusNet Services submissions to second stage consultation.

⁹² SAPN submissions to second stage consultation.

⁹³ Guideline, Section 3.3.



DER Record data validation will occur in two stages:

- Stage 1 checks for presence of mandatory data fields and data formats and whether the NMI provided exists and aligns to the NSP in MSATS. DER Records cannot progress until Stage 1 checks have passed.
- Stage 2 checks will undertake more analytical assessment and raise exceptions for the NSP to review and accept or resolve (including permitting an account-holder or installer to access the record again).

Post-submission validation is an additional feature that would produce information for the NSP to review and accept, or resolve, as discussed in Section 5.4.

6.2.3. AEMO's conclusion

All fields established by the Guidelines will be mandatory, where the data is relevant to the *small generating unit*.

AEMO's view is that the proposed approach will support efficient data entry and monitoring of changes by account-holders and provide NSPs with visibility of the quality of information they receive for confirmation. Further the approach ensures that those accountable for the DER installation can be given the opportunity to confirm the parameters that define the *small generating unit's* performance.

Appendix C provides a full overview of the field access levels and expected sources, and Appendix F outlines a range of use cases for the Information Collection Framework.

6.3. User access and data submission

6.3.1. Issue summary and submissions

Some Consulted Persons sought clarity and provided feedback on how they would access the *DER register*. For example, CitiPower Powercor and United Energy sought confirmation that they would be able to update their systems on a regular basis⁹⁴ while Jemena requested the ability to access a report with all data in a DER Record for all NMIs for reconciliation purposes⁹⁵.

6.3.2. AEMO's assessment

AEMO's web interface will provide NSPs with access to all DER Records associated with their NMIs, and the use of API will allow NSPs to access and update their systems at their discretion (Section 5.4).

AEMO would enable account-holders to access DER Records based on the unique combination of NMI and job number only. This access would be time-bound and require NSP approval for re-access once the DER Record has been submitted for the NSP's review (Section 5.5.2).

6.3.3. AEMO's conclusion

AEMO's web interface solution provides NSPs with full access to the *DER register*. Optionality to use API permits NSPs to use their own systems, and for application developers to support DER installers. AEMO's view is that this solution creates the greatest flexibility at the lowest implementation cost.

⁹⁴ CitiPower Powercor and United Energy submissions to second stage consultation.

⁹⁵ Jemena submissions to second stage consultation.



6.4. Third party access

6.4.1. Issue summary and submissions

Consulted persons raised issues relating to third party access to the *DER register*.

EnergyAustralia raised the issues of allowing for future access by retailers, and suggested that the ACCC's work on the Consumer Data Right in the energy sector should be considered, and that the *DER register* is future proofed to ensure that these reforms can be benefitted from⁹⁶.

Jemena raised concern on the increase in operational effort required to manage exceptions. It sees the NSPs' compliance obligation is fulfilled earlier on in the collection process, and that any additional effort to validate any exceptions are above and beyond the scope of what is required, and will introduce cost across the board. Jemena suggested leveraging off the CEC identification scheme to minimise efforts.⁹⁷

The CEC raised an issue in relation to identification of third parties to enable access. It noted that if CEC's identification system is adopted by AEMO, it would be a relatively simple matter for CEC to formally expand its accreditation system to include, for example, engineers, data managers, or other parties who would need to access AEMO's Register⁹⁸.

6.4.2. AEMO's assessment

The rule is specific about users that are to be accounted for within the implementation of the *DER register*. This includes general access to related *DER generation information* for NSPs and Emergency Services (on request), and unrestricted access to *DER generation information* for AEMO.

6.4.3. AEMO's conclusion

The *DER register* has been developed in compliance with the NER. The design and development have taken potential future uses of the data into account as well as aligning the *DER Register* with initiatives like virtual power plant trials, to ensure that the *DER Register* is expandable and forward looking and will efficiently facilitate change moving forward.

The *DER register* will be enabled by an account-based system. Account-holders will be able to log electrical contractor, electrical tradesperson and accredited installer licence details (or equivalent) which will be associated with DER Record submission. AEMO will not be conducting any form of identity verification against these details as DER installation compliance is a matter for NSPs.

AEMO will not be conducting any form of identity verification against these details, as DER installation compliance is a matter for NSPs.

6.5. Post-installation setting changes

6.5.1. Issue summary and submissions

Consulted Persons generally agreed that there are challenges with post-installation setting changes where NSPs do not have visibility of them. These changes could be made by a customer, their agent, or an OEM with remote access capability. For example, AusNet Services suggested this can make it difficult for the NSP to confirm the correctness of the *DER generation information*⁹⁹.

Regarding remote inverter setting changes from OEMs, Energy Queensland suggested it could not see a workable model that would allow OEMs to make a change, or where the OEM could check settings for an

⁹⁶ EnergyAustralia submission to second stage consultation.

⁹⁷ Jemena submission to second stage of consultation.

⁹⁸ CEC submission to second stage of consultation.

⁹⁹ AusNet Services submissions to second stage consultation.



NSP¹⁰⁰. Conversely, SAPN suggested that this model could work and are investigating it with OEMs, but expressed a view that provision and enforcement could be an issue¹⁰¹. EnergyAustralia supported AEMO's suggestion that DER installers and OEMs should be supporting customers in complying with the obligations placed on them by DNSPs¹⁰².

6.5.2. AEMO's assessment

In the Draft Report, AEMO queried the role of remote settings changes by OEMs and how this may interact with the *DER register*, but did not provide a proposed solution. The potential for remote settings changes is an existing compliance challenge for NSPs. After considering submissions and discussing with stakeholders, AEMO's position is that the *DER register* is not able to resolve all potential compliance challenges.

AEMO understand this situation exists now and presents both risk and opportunity. Rather than resolve this issue now, AEMO's preference is to enable the *DER register* to support NSPs and OEMs in the future. To do this, the Guidelines are requiring NSPs and account-holders to provide AEMO with serial numbers for generating equipment (such as inverters). As a result, DER Records will link specific devices to NMIs, allowing the opportunity for NMI-specific querying of inverters in the future. Subsequently, and pending the availability of serial numbers in the initial and operational data sets, AEMO will consider the need for remote reading for audit, compliance, and/or monitoring purposes.

6.5.3. AEMO's conclusion

AEMO has concluded with a preference that the *DER register* creates a uniform national approach to the collection of information that can enable the use of remote reading of changes of generating equipment in the future as this technology becomes more widespread and accessible.

To further support this, AEMO recommends that NSPs reinforce their connection offers to ensure customers have clear obligations around changes to equipment settings.

6.6. Privacy

6.6.1. Issue summary and submissions

The made Rule requires AEMO to specify AEMO's approach to the protection of any confidential information or *personal information* contained in the *DER register* in the Guidelines.

AEMO only received limited responses from stakeholders regarding privacy. AusNet Services suggested that the *DER register* should not simply rely on privacy by design¹⁰³. EnergyAustralia noted the value of public reports that show constraints down to distribution feeder level¹⁰⁴ where DER installations can be sufficiently aggregated.

6.6.2. AEMO's assessment

AEMO has integrated privacy and confidentiality considerations into the design of the *DER register* and the approach to reporting as set out in the Guideline. Consistent with AEMO's commitment to ensuring all data projects are supported by best practice privacy management, AEMO has conducted a review of the *DER register* design and Information Collection Framework to assess and appropriately manage any personal information that is involved in the *DER register* project and implementation.

¹⁰⁰ Energy Queensland submissions to second stage consultation.

¹⁰¹ SAPN submissions to second stage consultation.

¹⁰² EnergyAustralia submissions to second stage consultation.

¹⁰³ AusNet Services submissions to second stage consultation.

¹⁰⁴ EnergyAustralia submissions to second stage consultation.



AEMO understands the value of 'feeder-level' reporting and, as was discussed in the Draft Report¹⁰⁵, is open to working with NSPs to develop this. Any such reporting will apply the approach set out in Section 6.9.

6.6.3. AEMO's conclusion

AEMO has taken measures to manage privacy of personal information and protection of *confidential information* in the design of the *DER register* and AEMO's reporting on the *DER register*. AEMO will continue to actively manage privacy and information protection throughout the implementation and operation of the *DER register* and its systems.

6.7. Supporting information

6.7.1. Issue summary and submissions

The made Rule requires that AEMO develop the Guideline, and that this Guideline will describe how NSPs must provide and maintain the *DER generation information*.

AEMO had previously stated in the Draft Report that a companion guide "Guide to the *DER register* – how to submit and receive information"¹⁰⁶ would contain the technical documentation. Submissions received raised the following points:

- CitiPower Powercor, Jemena, AusNet Services, EnergyAustralia, and United Energy have queried the timing of the publication of this companion guide, as they see it as critical to their system readiness¹⁰⁷.
- EnergyAustralia went on to state that the companion guides should not place any new obligations on parties, and that they should be consistent with the Guideline¹⁰⁸.

6.7.2. AEMO's assessment

AEMO understands the need for NSPs to receive timely technical information. The initial approach described in the Draft Report has now been updated and AEMO plans to release a companion Technical Specification to support the implementation of the *DER register*. Following this publication, AEMO will also commence stakeholder engagement as needed to support the successful implementation of the *DER register*.

6.7.3. AEMO's conclusion

AEMO will publish an initial companion Technical Specification to assist NSPs in integrating their systems. AEMO will also commence stakeholder engagement and initiate a Delivery Team to work with industry on this system development and integration path.

6.8. DER eligibility

6.8.1. Issue Summary and Submissions

Clarity was sought on eligibility or access to the *DER register*:

- APA, as a TNSP, sought clarity on obligations arising from the *DER register information guidelines* with regard to initial and ongoing reporting requirements for NSPs with no DER connected to their network¹⁰⁹.

¹⁰⁵ Draft Report, p. 28.

¹⁰⁶ Draft Report section 4.5.3.

¹⁰⁷ CitiPower Powercor, Jemena, Ausnet Services, Energy Australia, United Energy submissions to second stage consultation.

¹⁰⁸ EnergyAustralia submission to second stage consultation.

¹⁰⁹ APA response to second stage consultation.



- Energy Queensland sought clarity on the link between the *DER register* and Generator Registration Status. It considered a case where the registered status of a generating system 5-30 MW is not resolved at the time of network connection application. Assuming that the DNSP will treat the DER installation as non-registered and submit data to the *DER register*¹¹⁰, Energy Queensland said it was unclear as to how the registered status of the DER installation will be advised to the DNSP.

6.8.2. AEMO's assessment

In APA's case, AEMO's understanding is that NER obligations to provide *DER generation information* only apply where an NSP has eligible *small generating units* connected to its network, and so no obligations exist if there is no DER on the network.

In relation to registration status, AEMO notes that inclusion in the *DER register* has no impact on Market Registration as a Generator. The DNSP will receive separate notifications that the *small generating unit* has been captured in the *DER register*, and a subsequent notification in terms of its Market registration.

6.8.3. AEMO's conclusion

AEMO concludes that the *DER register* has been developed in compliance with the made Rule, and will operate it as such.

6.9. DER register report

6.9.1. Issue summary and submissions

AEMO is required to publish a report of aggregated *DER register* information on its website, where the Guidelines specify the contents, form, timing, and aggregation of the report¹¹¹. AEMO's draft Information Guideline stated that AEMO intended to provide a monthly report in CSV (data) and graphical format on the AEMO website, and also to enable users to create bespoke reports using the data they are entitled to access. The details AEMO intends to provide include region, installed capacity (MW, MWh) and fuel type, which are, in general, to be aggregated by postcode.

Submissions received in relation to the Draft Guideline noted that:

- AusNet Services prefers using APIs to create internal business reports, as this provides greater flexibility to integrate internally¹¹².
- Ausgrid would like access to obtain all information submitted to the *DER register* post-validation of DER installation information in its network area¹¹³.
- Energy Queensland proposed a structure for a standard report, and also recommended monthly or quarterly reports on the volume and aspects such as data quality exceptions, pre- and post-installation data anomalies, timeframe exceptions, and data issues¹¹⁴.
- The majority of submissions supported the ability to create bespoke reports and demand, and also supported the use of standard reports for analysis of errors¹¹⁵.
- All submissions that commented on the reporting frequency agreed that a monthly report was suitable.

¹¹⁰ Energy Queensland response to second stage consultation.

¹¹¹ See NER clause 3.7E(f), (l) and (m).

¹¹² Ausnet Services submission to second stage consultation.

¹¹³ Ausgrid submission to second stage consultation.

¹¹⁴ Energy Queensland submission to second stage consultation.

¹¹⁵ Submissions to second stage consultation at <http://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation>.



- EnergyAustralia agreed that privacy is a substantial concern, however noted that DNSPs already have information on feeder level constraints. It encouraged AEMO to look further into this and provide a *DER register* report at feeder level (or substation) where installations can be sufficiently aggregated for better understanding of constraints to make the report more useful¹¹⁶.
- EnergyAustralia agreed and supported providing the data in CSV file format¹¹⁷.
- TasNetworks found the format of the aggregated, regional *DER register* report is appropriate. However, it contended the information contained within it might be supplemented to align with the AER's (RIN) requirements on DER. Such duplication should be minimised¹¹⁸.

6.9.2. AEMO's assessment

In determination of this issue, AEMO considered the following points:

- AEMO's approach to reporting on *DER register* information will comply with the protected information provision of the NEL and ensure compliance with the Privacy Act.
- AEMO agrees with stakeholders that data aggregation must balance providing value from the *DER register* with the need to protect privacy and confidential information. These matters are taken into account when designing the scope and content of the report as contained in the Guidelines. In addition, the report will remain subject to review to ensure appropriate privacy and confidentiality protections are maintained in practice.
- AEMO notes that NSPs will have access to all DER information for their network, which will enable them to produce bespoke reports, at whatever granularity they prefer.

6.9.3. AEMO's conclusion

The Guidelines include the requirement to publish a regular (at least quarterly) *DER register* report in a CSV data format and graphical format on the AEMO website. The *DER register* report will contain *DER register* information by region, installed capacity (MW, MWh) and fuel type, which are to be aggregated at a postcode level and state level. AEMO will only publish data where it is comfortable that privacy and confidentiality of protected information is preserved in the aggregation group (postcode or state).

7. FINAL DETERMINATION

Having considered the matters raised in submissions and at meetings and forums, AEMO has made the Guidelines in the form found at **Appendix B (Attachment 1)**, in accordance with clause **3.7E(g)** of the NER.

¹¹⁶ EnergyAustralia submission to second stage consultation.

¹¹⁷ Energy Australia submission to second stage consultation.

¹¹⁸ TasNetworks submission to second stage consultation.



APPENDIX A. GLOSSARY

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
ACCC	Australian Competition and Consumer Commission
Account-holder	A person, acting under certain permissions, to create an account with AEMO to access and enter <i>DER generation information</i> to the <i>DER register</i>
API	Application Programming Interface
CEC	Clean Energy Council
CER	Clean Energy Regulator
COAG	Council of Australian Governments
CSV	Comma separated values
DER	Distributed Energy Resources
DER Record	A record containing <i>DER generation information</i> as stored in the <i>DER register</i>
DNSP	Distribution Network Service Provider
Draft Report	The <i>DER register</i> Draft Report and Determination published on 5 April 2019
DSP	Demand Side Participation
ENA	Energy Networks Australia
Final Report	This <i>DER register</i> Final Report and Determination published on 31 May 2019
Installer	A qualified person who is acting on behalf of a customer to physically install a DER system
ISP	Integrated System Plan
MSATS	Market Settlement and Transfer Solutions
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
NER	National Electricity Rules
NEO	National Electricity Objective
NMI	National Metering Identifier
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
PV	Photovoltaic
RoCoF	Rate of Change of Frequency
SAPN	South Australia Power Networks
STC	Small-scale Technology Certificate
VPP	Virtual Power Plant



APPENDIX B. ATTACHMENTS

B.1 ATTACHMENT 1: DER REGISTER INFORMATION GUIDELINES

The final *DER register information guidelines* has been published at:

<https://www.aemo.com.au/Stakeholder-Consultation/Consultations/NEM-Distributed-Energy-Resources-Information-Guidelines-Consultation?Convenor=AEMO%20NEM>

APPENDIX C. REQUIRED DATA, ACCESS LEVELS AND SOURCES

The following tables provide an overview of a DER Record indicating the required fields for the initiation of a DER Record, permissions and expected sources of the data. All fields are mandatory for a 'confirmed' DER Record if they apply to the DER installation in question.

C.1 Level 1: DER Installation

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
NMI	NSP	Yes	NSP	
Approved capacity	NSP	Yes	NSP	
Installer identification	NSP/Account-holder	Optional	NSP/account-holder	
Connection Agreement 'Job number'	NSP	Yes	NSP	
Number of phases available	NSP	Yes	NSP	
Number of phases with DER installed	NSP	Yes	NSP	
Central protection and control	NSP	Yes	NSP	
Protection and control modes (If "Central protection and control" = Enabled, then one of these fields (any) MUST be mandatory.)				
Export limitation	NSP	Optional	NSP	
Under-frequency protection (F<)	NSP	Optional	NSP	
Under-frequency protection delay(F<)	NSP	Optional	NSP	
Over-frequency protection (F>)	NSP	Optional	NSP	
Undervoltage protection (V<)	NSP	Optional	NSP	
Undervoltage protection delay (V<)	NSP	Optional	NSP	
Overvoltage protection 1 (V>)	NSP	Optional	NSP	
Overvoltage protection 1 delay (V>)	NSP	Optional	NSP	
Overvoltage protection 2 (V>>)	NSP	Optional	NSP	
Rate of Change of Frequency (RoCoF)	NSP	Optional	NSP	
Voltage Vector Shift	NSP	Optional	NSP	
Inter-trip scheme	NSP	Optional	NSP	

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
Neutral voltage displacement	NSP	Optional	NSP	

C.2 Level 2: AC Connection

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
AC connection ID	AEMO	N/A	N/A	System generated.
Number of AC Connections	NSP/account-holder	Optional	NSP/account-holder	
AC equipment type	NSP	Yes	NSP	
Inverter/ small generating unit Manufacturer	NSP/account-holder via manufacturer/model database	Optional	NSP/account-holder	Manufacturer/model data source database will be searchable.
Inverter Model Number	NSP/account-holder via manufacturer/model database	Optional	NSP/account-holder	Manufacturer/model data source database will be searchable.
Inverter Series	NSP/account-holder	Optional	NSP/account-holder	Auto-populated based on manufacturer and model, or manually entered if Model = 'other'.
Inverter serial number	NSP/account-holder	Optional	NSP/account-holder	
Commissioning date	NSP/account-holder	Optional	NSP/account-holder	
Status code	NSP/account-holder	Optional	NSP/account-holder	
Inverter device capacity (kVA)	Manufacturer/model data source	Optional	NSP/account-holder	Auto-populated based on manufacturer and model, or manually entered if Model = 'other'.
What standard(s) apply to the inverter?	Manufacturer/model data source	Optional	NSP/account-holder	Auto-populated based on manufacturer and model, or manually entered if Model = 'other'.

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
$V_{\text{nom-max}}$ (sustained operation overvoltage limit)	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
F_{stop} (over-frequency)	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
$F_{\text{stop-CH}}$ (under frequency)	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Inverter – DRED interaction	NSP/account-holder	Optional	NSP/account-holder	
Inverter power quality response modes - Voltage response modes – volt-watt response	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Inverter power quality response modes - Voltage response modes – volt-var response	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
Inverter power quality response modes - Reactive power mode	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Inverter power quality response modes - Fixed power factor mode	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Inverter power quality response modes - Power factor curve/power response mode	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Inverter power quality response modes - Power rate limit mode – ac operation and control change	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".

Data field	Expected source	Required for 'Initial' DER Record creation?	Editing rights	Comments
Inverter power quality response modes - Voltage response modes – volt-watt response for energy storage systems	NSP-defined default (enablement decision)	Optional	NSP	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Settings	NSP-defined default (based on applicable standards)	Optional	NSP/account-holder	NSP provides default settings using the Web Portal. Default settings will be able to be set relative to "Inverter device capacity (kVA)".
Non-inverter generator – voltage/reactive power regulation	NSP	Optional	NSP	AEMO is not providing capabilities for NSP-defined default data for non-inverter generators.
Settings	NSP	Optional	NSP/account-holder	
Non-inverter Generator ramp rate	NSP	Optional	NSP	
Settings	NSP	Optional	NSP/account-holder	
Non-inverter Generator frequency response mode	NSP	Optional	NSP	
Settings	NSP	Optional	NSP/account-holder	
Protection and control modes				
Settings	NSP	Optional	NSP/account-holder	AEMO is not providing capabilities for NSP-defined default data for non-inverter generators.

C.3 Level 3: DER Device

Data field	Expected Source	Required for 'Initial' DER Record creation?	Editing rights	Comments
Device ID	AEMO	N/A	N/A	System generated.
Number of devices	NSP/account-holder	Optional	NSP/account-holder	
Manufacturer	NSP/account-holder	Optional	NSP/account-holder	Manufacturer/model data source database will be searchable.



Data field	Expected Source	Required for 'Initial' DER Record creation?	Editing rights	Comments
Model Number	NSP/account-holder	Optional	NSP/account-holder	Manufacturer/model data source database will be searchable.
Status	NSP/account-holder	Optional	NSP/account-holder	
Device Type	NSP	Mandatory	NSP	
Device sub-type	NSP/account-holder	Optional	NSP/account-holder	Auto-populated based on manufacturer and model (where available), or manually entered if Model = 'other'.
Nominal rated capacity (kW)	NSP/account-holder	Optional	NSP/account-holder	Auto-populated based on manufacturer and model (where available), or manually entered if Model = 'other'.
Nominal storage capacity (kWh)	Model/ Manufacturer data source	Optional	NSP/account-holder	Auto-populated based on manufacturer and model (where available), or manually entered if Model = 'other'.



APPENDIX D. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES

The following sections summarise key issues raised in submissions received and AEMO's responses, as discussed in this determination.

D.1 Information Guideline and Data Model summary of submissions and AEMO responses

Guideline question 1 – Minimum size of small generating unit for capture in the DER register			
1.	AusNet Services, Ausgrid	Agree with 1 kW	Noted.
2.	Endeavour, SAPN, CitiPower Powercor and United Energy	Propose no minimum. SAPN believes added complexity of decision making for when to collect is counter-productive. SAPN's position is that all sites need NSP approval and NEM-compliant metering, so no differentiation should be introduced. CitiPower Powercor and United Energy state that many units have nil export.	The minimum threshold for <i>small generating units</i> to be captured in the <i>DER register</i> will be defined as 0 kW, that is, there is no lower limit.
3.	Energy Queensland	Issue 1: This would exclude micro-inverters, and assume this is intentional. If so, recommend improved terminology to reflect this. Issue 2: Energy Queensland recommends minimum of 1 kVA, as in its area there are 74 arrays connected to the network which are rated less than 1 kW, and 61 inverters with capacities rated less than 1 kVA, with significant overlap between those groups.	The requirement has been changed to having no minimum value, so these issues are resolved.
Guideline question 2 – Are standard, packaged reports also required for NSPs? If so, what information is required?			
4.	AusNet Services	AusNet Services prefers using APIs to create internal business reports, as this provides greater flexibility to integrate internally.	AEMO is planning on making bespoke reports available for NSPs, with access to all DER installed on the NSP's network.
5.	Ausgrid	What is most important to Ausgrid is to allow access to obtain all information submitted to the <i>DER register</i> post-validation of DER installation information in its network area.	AEMO is planning on making bespoke reports available for NSPs, with access to all DER installed on the NSP's network.
6.	Energy Queensland	Issue 1: Energy Queensland is identifying standard reports – an example was attached to submissions. Issue 2: Energy Queensland recommends monthly or quarterly reports on the volume and aspects such as data quality exceptions, pre- and post-installation data anomalies, timeframe exceptions, and data issues.	Energy Queensland's proposed report structures will be considered.
7.	Endeavour	Endeavour agrees that they should be able to extract bespoke reports for their network area, and that this reduces need for standard reports. However, standardised reports may facilitate accurate and consistent DER reporting.	Noted. AEMO plans to provide standard reports as suggested.

8.	SAPN	SAPN suggests reports to support the operational management of the DER database in addition to the proposed reporting methods (for example, for analysis of errors and exceptions).	Noted. AEMO plans to provide standard reports as suggested.
9.	CitiPower Powercor and United Energy	CitiPower Powercor and United Energy believe standard reports would be useful for reconciliation of data between AEMO and DNSP.	Noted. AEMO plans to provide standard reports as suggested.
Guideline question 3 – Effective means to communicate to key stakeholders on use of the DER register			
10.	AusNet Services	AusNet Services suggests that AEMO hold technical implementation forums between July and December 2019.	AEMO is convening a Delivery Team to assist and be engaged in the technical implementation of the <i>DER register</i> .
11.	Ausgrid	No strong views.	
12.	Energy Queensland	Energy Queensland suggests using existing channels with PV installers, and also suggests including communication to EV stakeholders. Energy Queensland expects DNSP staff could refer significant or difficult issues to a dedicated <i>DER register</i> phone number and email if relevant.	Noted.
13.	Endeavour	Endeavour proposes that the channels developed by the CEC could be used. Advice on the effective use of the register for other parties should be accessible through the AEMC website with NSPs supporting and referencing such documents through their own web portals and contractual documentation.	Noted.
14.	CitiPower Powercor and United Energy	AEMO website, AEMO webinar/s for a walkthrough of new functionality, communication through the CEC and any other relevant industry bodies.	Noted.
Data model – Fields, and are there any other devices/equipment that should be included in the Register?			
15.	Energy Queensland	EVs. Energy Queensland considers that V2G-capable EVs may need special consideration.	AEMO has considered through consultation that collecting this information in relation to EVs will be useful and future looking. This has been implemented as device sub-type.
16.	AusNet Services	New data field. AusNet Services recommends the inclusion of critical information that defines the maximum agreed and hence permit features impacting the grid, including connection point net export limit: Connection point net export limit (agreed with the DNSP in the connection agreement).	This field has been included, and title “Approved capacity”. It is displayed in kVA.
17.	AusNet Services	New data field. Installer Details – Ausgrid suggests using installers ‘ACN - Australian Company Number’ as the identifier.	AEMO has now confirmed this field.

		Non Inverter <i>small generating unit</i> protection modes – This information is to be populated by the installer and not the NSP. The installer will access this information from the non-inverter equipment data sheet and will be required to populate within the <i>DER register</i> .	
18.	AusNet Services	Data field query. AC Connection group count & Number of AC Connections – deleted field and new field appear to be the same. Please confirm if fields are requesting the same information; appears to be a conflict between the <i>DER register</i> Information Guidelines and the Draft Determination report.	The data table in the guideline uses Number of AC Connections (L2) and Number of Devices (L3). Draft report spoke of “group count”. This has been clarified.
19.	CitiPower Powercor and United Energy	Non-inverter connections. CitiPower Powercor and United Energy seek clarification about what information will be required for non-inverter connections. They would like to incorporate these requirements in their project for the <i>DER register</i> so that they don't have to expand additional effort and need to stand up another project for these changes in the future.	Non-inverter generation included resources such as Co-Gen.
20.	CitiPower Powercor and United Energy	Data field requirements. CitiPower Powercor and United Energy propose the use of MSATS NMI Standing Data field requirements (M (Mandatory), R (Required), or O (Optional)) for the <i>DER register</i> .	All fields in the <i>DER register</i> are expected to be delivered as per the NER requirements, so there is no value in assigning different levels.
21.	CitiPower Powercor and United Energy	Data field requirements. CitiPower Powercor and United Energy seek clarification where fields are listed as mandatory. They query if a submission can complete with mandatory fields missing.	All fields in the <i>DER register</i> are expected to be delivered as per the NER requirements, so there is no value in assigning different levels. If a submission has relevant fields missing, an exception flag will be raised for action by the NSP.
22.	CitiPower Powercor and United Energy	Data sources. Certain fields have multiple possible data sources listed (for example, Installer/NSP). CitiPower Powercor and United Energy query how the source will be determined in these cases, and recommend that only the NSP should be the Data source for this data.	The NSP is ultimately responsible for the provision of this information. The NSP may request the Installer to provide the information if required, or might pre-populate or populate itself.
23.	Jemena	Data field query. Jemena asks, if AEMO have a common defined period for which a site has had consistently zero generation reads, would that be classified as 'inactive' or 'decommissioned'? Should this be defined individually by NSPs?	AEMO expects NSPs will have their own processes to manage these instances.
24.	Energy Queensland	Data field query. Energy Queensland notes that the example given for export limitation is not valid as it is a frequency value, and suggest deleting the example.	Agreed – this has been deleted.

25.	Energy Queensland	<p>Neutral displacement voltage.</p> <p>This field has been listed as “Trip Voltage (V)” with Field Type “Numeric”, and Energex and Ergon specify this value as a percentage (not voltage).</p> <p>Energy Queensland recommends changing this to a “Text” Field type to enable different DNSPs to enter values which are suitable.</p>	<p>The Delivery team discussed this issue, and agreed that a numeric value is most suitable.</p>
26.	Energy Queensland	<p>AC equipment type.</p> <p>Energy Queensland recommends that if this list is expanded in the future, this value should be automatically matched for inverters that are on the Clean Energy Council (CEC) list to ensure the veracity of the information.</p> <p>Energy Queensland also suggests that if this list is expanded in the future, standalone PV inverters that are not compliant with AS/NZS 4777.2:2015 should not be connected to the distribution network. As such, this option should not be available for an installer to select.</p>	<p>The <i>DER register</i> system will be able to validate entries against available lists.</p> <p>The Guidelines will include this.</p>
27.	Energy Queensland	<p>New data field.</p> <p>Energy Queensland notes that an increasing number of solar PV and battery energy storage systems are designed with the ability to island themselves from the grid during grid outages to continue to supply the premises. While not relevant to network load, Energy Queensland intend to add this field to its application portals to enhance its understanding of the penetration of this technology, and suggest it is included in the <i>DER register</i>.</p>	<p>This field to be included. This will be of value to Emergency Services.</p>
28.	Energy Queensland	<p>B2B Notification.</p> <p>Energy Queensland notes that most metering providers issue a B2B notification when a meter is installed/changed for a new DER installation, implying the connection of first active date. There is, however, no obligation for this. Energy Queensland considers that introducing this obligation would strengthen the <i>DER register</i> in this regard.</p>	<p>The <i>DER register</i> is being developed on a new platform, and will not interface to the B2B hub.</p>
29.	Energy Queensland	<p>Battery capacities, depth of discharge.</p> <p>Different battery chemistries have differing recommended maximum Depth of Discharge (DoD), stated as a percentage. A similarly sized lithium-ion battery has a much greater nominal DoD and therefore a greater proportion of usable capacity.</p> <p>Energy Queensland recommends consideration of this aspect and either collection of both values or clear guidance to DNSPs, DER applicants, and installers as to the type of value to be entered.</p>	<p>This field will not be added. This aspect of battery performance is already included in the mathematical modelling that forecasting teams perform. Also, as manufacturer and model have been captured, it can be obtained from manufacturer data sheet. If required.</p>
30.	Energy Queensland	<p>Under and over frequency.</p> <p>Energy Queensland notes the under and over frequency, and under and over voltage disconnection settings, prescribed by NSPs may vary from the Standard. They propose it may be desirable to capture both the protection setting value and the specified disconnection time.</p>	<p>This attribute will now be collected. Used together with the protective function limit, it provides a better understanding of the central protection arrangements for better modelling.</p>



31.	Energy Queensland	Export limit terminology. Energy Queensland notes that the draft guideline defines export limit as ' <i>Maximum amount of energy (kVA)...</i> ' and suggest it should be " <i>Maximum amount of power (kVA)...</i> "	This is a valid correction – J is the unit for energy.
32.	Energy Queensland	Status indication. Energy Queensland says while the installers will update installation status in the <i>DER register</i> , it is not clear if the notification is done via the NSP, or independent of the NSP.	Either option will be possible. NSPs are able to select the option that suits their connection process/arrangements.
33.	Energy Queensland	Status indication. Energy Queensland seeks confirmation that that if a National Metering Identifier with DER is abolished without update of the installation status in the <i>DER register</i> , AEMO will assume the DER is inactive.	It is confirmed that this link to the status in the CATS_NMI_TABLE will be maintained.
34.	Energy Queensland	Inverter PQ Response Modes. Energy Queensland notes that some of the reactive power compensation modes do not specify the quadrant. Energy Queensland suggests clarification is required as to whether it is intended that a positive or negative sign will define the sourcing or sinking aspect. Alternatively, an additional field could be added to capture this aspect as is the practice where power factor is specified.	AEMO's understanding is that use of source/sink terminology removes this ambiguity.
35.	Energy Queensland	Nominal export capacity. Energy Queensland notes the potential for confusion with the "Export Limit" value. Energy Queensland suggests that this field be renamed as "Nominal generation capacity", or "Rated generation capacity", or simply "Nominal capacity".	The term "Export Limit" is preferred by most NSPs – no change.
36.	Energy Queensland	Voltage vector shift. Energy Queensland notes that although this has been required on some systems >30 kVA in the past, there is emerging evidence that this protection scheme can lead to unintended disconnection of DER during system events and should not be allowed on future DER systems.	This field was proposed by CP/PC/United Energy in first round. This field will be retained. It is used by most participants, and is not an obligatory field to fill.
Data model - structure			
37.	TasNetworks	Data model levels. TasNetworks supports the reductions in the data model hierarchy from four to three levels. TasNetworks also supports the reduction in the fields for collection and the use of pre-populated and auto-populated fields as much as possible.	Noted.
38.	AusNet Services	Data model structure. The proposed data model hierarchy is onerous on DNSPs. Maintaining the AC connection to DER device mapping will be difficult to maintain in the long term. Ausgrid suggests grouping AC Connection together with DER device. Doing so would better enable batteries with combined inverter energy systems to be characterised, and simplify data management for DNSPs and AEMO.	DER devices aggregated under an AC Connection are all identical – the only update field is the number of devices and associated totals. The model also allows a 1:1 link for DER devices and AC connections.

39.	Ausgrid	<p>Data model structure.</p> <p>Consider the need for addition of an NSP-approved total inverter/generation capacity limit or export capacity limit to Level 1 for sites that do not have central protection requirements. For example:</p> <ul style="list-style-type: none"> • NSP approved export capacity limit. • NSP approved total generation capacity limit (usually taken as the total inverter capacity). <p>This issue can be further explored with stakeholders in the delivery teams.</p>	<p>The NSP approved capacity has been included in Level 1 of the data table.</p>
40.	CitiPower Powercor and United Energy	<p>Data model structure.</p> <p>CitiPower Powercor recommends:</p> <ul style="list-style-type: none"> • The protection control modes defined under L1 should be moved to L2. (Note: This information is repeated in L2 for non-inverter connections). • L1 information should be entered by the DNSPs (including the phase information). • Pick lists should be available at L2 – for inverter and non-inverter connections. Based on the selection criteria, only relevant information should be visible for data entry. 	<p>These are central protection settings, and so need to remain at Level 1.</p> <p>The NSP can choose if this information is entered by installer or NSP.</p> <p>Pick lists will be used wherever possible.</p>
Existing small generator information			
41.	TasNetworks Jemena CitiPower Powercor and United Energy AusNet Services	<p>A number of NSPs noted that the existing data collected on DER devices is incomplete in relation to the data requirements specified for collection under the DER Information Guidelines. There have also been queries about the collection process, and how the data will be managed.</p>	<p>This is understood, and the Rules only call for whatever information exists historically. There is no requirement for retrospective collection of data to fill gaps and complete historical/existing records. AEMO will be convening a Delivery Team to get industry input on the integration of existing DER data sets. AEMO will assist all NSPs to ensure that the data submitted here is fit for purpose.</p>
Demand side participation information			
42.	Ausgrid	<p>Ausgrid disagrees with AEMO's assessment that access to DSP Information by NSPs through the <i>DER register</i> would not assist in fulfilling the NSP's regulatory obligations or requirements. The DSP information holds useful information, such as whether individual sites are participating in active load or active generation DSP activities as opposed to passive generation sites.</p> <p>Status flags, or even basic knowledge of sites that are participating in DSP activities and the type of DSP activities, would assist Ausgrid (and it believes other NSPs).</p> <p>Ausgrid suggests that including (at a minimum) a flag against the NMI at Level 1 in the <i>DER register</i> that indicates whether the NMI is included in either Data Model 1 or Data Model 2 of the DSP</p>	<p>It is AEMO's understanding through discussions that with NSPs that this is not practical, mainly due to the annual collection of DSP information – the information relating to inclusion of an NMI in a DSP program may not be current, compromising the reliability of the data. AEMO will be reviewing the</p>



		Information Guidelines and what type of DSP information it is (for example, categories in Data Model 1 or DSP type fields in Data Model 2) would be beneficial.	DER register and DSP portal to try and bring them closer together in the future.
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D.2 Information Collection Framework summary of submissions and AEMO responses

Information Collection Framework: Collection Actors			
43.	Energy Queensland	<p>Installer compliance challenges.</p> <p>It is unclear what measures are in place to compel an installer to submit information to the <i>DER register</i> as soon as possible after installation and within a defined period. If the claiming of STCs was contingent on the submission of <i>DER register</i> data, Energy Queensland anticipates that this would greatly increase the likelihood of accurate and fulsome post-installation data being submitted.</p>	See Section 5.1.2. AEMO is not well placed to take this action but recommends that incentive schemes are designed in this way.
44.	Jemena	<p>Installer compliance challenges.</p> <p>During first round consultation, stakeholders have provided a view that installers do not have incentive to provide accurate DER information. Jemena agrees and believes this could lead to increased volumes of exception handling for NSPs (specifically the case where they don't or partially submit, or flag fields for exception).</p> <p>AEMO has indicated this can be managed through accredited installers and changes to model standing offers. Given this position, AEMO must clearly set out a formal process to rescind accreditation where installers do not meet their role/obligation to collect the requisite DER information as it would reinforce installer behaviours.</p>	<p>The <i>DER register</i> will enable NSPs to pursue compliance matters, as they are best placed to do so. See Section 5.1.2.</p> <p>NSPs should consider this final determination when revising their connection offers. See Section 5.1.2.</p>
45.	Jemena	<p>Installer compliance challenges.</p> <p>The CEC has suggested development of a digital solution to facilitate the collection of quality data from installers, using their accreditation scheme to incentivise and penalise them.</p>	The <i>DER register</i> will enable NSPs to pursue compliance matters. See Section 5.1.2.
46.	TasNetworks	<p>Installer compliance challenges.</p> <p>There will be little incentive for installers to accurately record DER information in all cases. Some jurisdictions are proposing to refuse connections unless a certificate of safety compliance is completed which would increase the compliance requirement on installers. There is no such leverage available in Tasmania at this time. TasNetworks therefore suggests that AEMO continue to work with electrical safety governing bodies to implement a national requirement for <i>DER register</i> compliance.</p>	The NEM-wide solution available to implement the <i>DER register</i> is the NER's connection framework.
47.	TasNetworks	<p>Installer compliance challenges.</p> <p>Changes to deemed connection contracts may be required to facilitate the collection of DER information. In some cases, this may require AER approval. If so, and there are many NSPs in the</p>	NSPs should consider this final determination when revising their connection offers. See Section 5.1.2.

		same situation, an expedited process to secure such approval might be considered to ensure compliance with the <i>DER register</i> implementation timetable.	
48.	CEC	<p>Installer compliance challenges.</p> <p>Without a strong compliance framework, installers are unlikely to comply with AEMO's data entry requirements. NSPs have no natural compliance levers, nor is compliance something that NSPs are set up to do. CEC encourages AEMO to work constructively together to support the effective incorporation of CEC's Accreditation compliance framework into AEMO's rules.</p>	The <i>DER register</i> will enable NSPs to pursue compliance matters, as they are best placed to do so. See Section 5.1.2.
49.	Energy Queensland	<p>NSP portals for collecting post-installation data.</p> <p>Energy Queensland notes that the wording implies that post-installation data will be collected through DNSP portals. However, Energex's and Ergon Energy Network's application portals cannot feasibly be upgraded to also collect post-installation data.</p>	AEMO's collection framework will enable the collection of this post-installation information.
Information Collection Framework: Use of third party databases and default data			
50.	AusNet Services	<p>Auto-population: Use of databases.</p> <p>AusNet Services is concerned that DNSPs would be required to duplicate AEMO's manufacturer and model number validation and provision process to otherwise populate these remaining fields, for example, the Inverter/<i>small generating unit</i> manufacturer, Solar Inverter Model Number, and default settings that are not mandated by DSNP or AS/NZS4777 standards.</p>	AEMO will provide this capability in its web interface. Independent parties such as NSPs and application developers may use other sources. Section 5.2.2.
51.	TasNetworks	<p>Auto-population: Use of databases.</p> <p>Anything that can reduce the administrative burden for installers and NSPs is only likely to lead to more accurate and timely provision of DER information. Conversely, lacking such automation, the risk is that the value of information submitted to the register is reduced through inaccuracy and/or incompleteness. In this regard, it should be noted that NSPs will not have the ability, nor the resources, to be able to verify that information from these external sources are accurate.</p>	AEMO's web interface will draw on NSP-defined default data and available product databases. Section 5.2.2.
52.	Energy Queensland	<p>Auto-population: Use of applications.</p> <p>Energy Queensland suggests that AEMO develop a separate app which will apply nationally and can be managed by DNSPs. In this way, manufacturer specifications, such as 'Inverter device capacity' (from CEC) and DER Device type (from manufacturer), can be auto-populated once key details (manufacturer, series, model) are entered.</p> <p>In addition, Australian standards values can be auto-populated as default values, but then overridden by DNSPs where relevant based on state or DNSP connection standards.</p> <p>Energy Queensland assumes manufacturer and Australian standards default details will be sourced and managed by app developers to support the post-installation data collection process. It is not feasible for DNSPs to do this separately.</p>	AEMO's web interface will draw on NSP-defined default data and available product databases. See Section 5.2.2.



53.	Jemena	<p>Auto-population: Default NSP-approved data.</p> <p>Jemena agrees with use of default values and standard databases to auto-populated DER information. Will the NSP be required to provide default connection parameters, or will these be set by AEMO? CEC?</p> <p>If NSPs are required to provide default connection parameters, further details are required on how these will be agreed, set and maintained.</p>	<p>AEMO's web interface will enable NSPs to define the default data. See Section 5.2.2.</p>
54.	Energy Queensland	<p>Auto-population: Of application data into installers' apps.</p> <p>In most cases the NSP could pre-populate the information the installer would have to confirm at the time of installation. Main concern with this approach is that the inverter attributes could change. Installers would be likely to simply confirm what is in the <i>DER register</i>, rather than update for what has been installed.</p> <p>A solution could match serial numbers to inverter OEM databases of devices.</p>	<p>This issue exists irrespective of the <i>DER register</i>. Installer compliance with connection agreement parameters is an NSP issue. The <i>DER register</i> creates a nationally consistent approach to capturing data that could enable future validation of settings. See Section 6.2.</p>
55.	Energy Queensland	<p>Supporting installation compliance.</p> <p>One way to address risk of non-approved equipment being installed is to require the serial number to be linked in the supporting database of inverter details to the relevant Manufacturer, Series and Model. In this way, if the serial number does not correspond with the Manufacturer, Series and Model, the installer will not be able to proceed to complete the submission.</p>	<p>Noted. AEMO is open to continued discussion on how the <i>DER register</i> can further support installation compliance post implementation. See Section 5.2.2.</p>
Information Collection Framework: Submission of Data by Third parties			
56.	CitiPower Powercor	<p>Installer submission of data.</p> <p>CitiPower Powercor strongly disagrees with the concept of the installer submitting information directly to the register. Installers should submit data to the NSP who then has the opportunity to validate and ensure completeness before submitting directly to the register, because:</p> <ul style="list-style-type: none"> • At step 1.4 the NSP, in many instances, will not have all the mandatory data to submit to the register, this data will only be available following completion of the installation (step 1.5). • If the NSP cannot submit before the installation has concluded then the installer will be expected to submit to the NSP and AEMO. • To reduce manual effort, at step 1.14, where the NSP has to validate data, attempt to contact installers and chase them for information it would be more efficient to do this at the commencement where all the data is collected by the NSP. • Under the Rules, the obligation of providing DER information to AEMO only resides with the NSP. • This avoids additional effort of completing these tasks later on, as currently outlined in the process flow. 	<p>Noted. AEMO is providing optionality for NSPs on how the data is provide to AEMO. NSPs will have the ability to require review and confirmation of every DER record. See Section 5.3.2.</p>



57.	CitiPower Powercor and United Energy	<p>Installer submission of data.</p> <p>Given the <i>DER register</i> Information Guidelines state that the NSP is responsible for providing the <i>DER register</i> information, the guidelines need to clearly state (apart from within the data model) what are the responsibilities of the NSPs and what are the responsibilities of the installers.</p> <p>CitiPower Powercor and United Energy also recommend including information about the responsibilities of installers (if not removed from the submission to register process).</p>	<p>The obligation to provide DER generation information lies with NSPs. AEMO will work with stakeholders to implement the <i>DER register</i>, which includes informing DER installers.</p>
58.	Jemena	<p>Installer submission of data.</p> <p>The collection process does not appear to provide any recourse with the installer if missing or onerous data is submitted by the installer. Jemena’s strong preference is that the NSP submits all data to the AEMO DERR and can manage the collection of data from installers through the connection process (as per NER Chapter 5a):</p> <ul style="list-style-type: none"> • This is to proactively manage the quality of DERR data – rather than reactively manage by exception (Task 1.14). This would leverage Jemena’s existing connection application process, systems and responsibilities. • Under the Rules, it is NSPs that are obligated to provide DER information to AEMO. Having the installer provide data directly to AEMO, without obligation, and without direct involvement of the NSP undermines the NSP’s obligation to fulfil the above. • This approach lends itself well to Basic connections where the installation has already been performed prior to initiation of the NSP connection process. It is unlikely the installation will change once the connection application completes. • For Negotiated connections, accuracy of the ‘as-installed’ details would be validated against the ‘as-offered’ settings outlined in the connection offer, through the commissioning report process, and updates (including the update to ‘active’ status’) published to the DERR. 	<p>Noted. AEMO is providing optionality for NSPs on how the data is provide to AEMO. NSPs will have the ability to require review and confirmation of every DER Record through its web interface. See Section 5.3.2.</p>
59.	United Energy	<p>Managing alternative connection processes.</p> <p>Most connections are ‘Basic connections’ where the NSP receives DER information from retailers after the system is installed. United Energy’s view is that DER data should be collected and entered to the register at the installation stage by the DNSPs and leverage data collection from existing processes (retailer providing DER information along with meter requests, for example). This will ensure:</p> <ul style="list-style-type: none"> • The ‘static’ installed data is captured. • Data is entered by the DNSPs and they therefore are responsible for the data as per the Rules. • Exception handling is managed earlier in the collection process and addressed within the DNSP connection process. • It adheres to various connection processes adopted by the DNSPs. • Additional changes to systems and processes currently in place are avoided. 	<p>Noted. AEMO is providing optionality for NSPs on how the data is provide to AEMO. NSPs will have the ability to require review and confirmation of every DER record. See Section 5.3.2.</p>



		<ul style="list-style-type: none"> Unnecessary connection enquires that do not eventually proceed to a connection (but are registered in <i>DER register</i>) are avoided. 	
60.	TasNetworks	<p>Managing alternative connection processes.</p> <p>The collection process diagram does not accurately represent every element, or the order of each step, involved with the collection process in Tasmania. As one example, a NM) is not assigned until an Electrical Works Request (EWR) has been completed. The process will be required to include flexibility to handle differing regional processes.</p>	Noted. NSPs will have the ability to require review and confirmation of every DER record. See Section 5.3.2.
Information Collection Framework: Information Collection Framework			
61.	EnergyAustralia	<p>1.1-1.4 Connection Application, Offer and Agreement.</p> <p>Are there foreseen to be any impacts on connection application processes, particularly the meter installation process? If there is any impact on the process retailers should be involved in this stage of delivery; in addition, while it may not directly impact the regulatory timeframes retailers have to meet in installing a meter, it does affect the overall customer experience and end-to-end timeframe for the customer.</p>	Section 5.4.2.
62.	Ausgrid	<p>1.1-1.4 Connection Application, Offer and Agreement.</p> <p>The process flow diagram should be updated to represent the customer as the connection applicant, and therefore capture the various relationships more effectively, and the connection processes that apply to various DER connections (expedited basic connection service, non-expedited basic connection service, standard connection service or negotiated connection service). Recommendations are provided in the submission that would recognise the information flow between the NSP, connection applicant and DER installer more accurately.</p>	
63.\	CitiPower Powercor and United Energy	<p>1.4 Connection Application, Offer and Agreement.</p> <p>What data do NSPs submit to the <i>DER register</i> as part of Step 1.4?</p>	
64.	CitiPower Powercor and United Energy	<p>1.4 Connection Application, Offer and Agreement.</p> <p>If there are any exceptions at step 1.4, how will the NSP be notified?</p>	
65.	AusNet Services	<p>1.5-1.9 Third party Access Issues.</p> <p>How will installers manage <i>DER register</i> technology issues or enquiries (troubleshooting when registering and using the <i>DER register</i>)? DNSPs will not be able to provide support to installer experiencing <i>DER register</i> systems issues, because the associated system and third party apps interface directly with AEMO's API.</p>	
66.	Energy Queensland	<p>1.6-1.9 Third party-Entered Data.</p>	



		Energy Queensland recommends the use of mandatory fields and other technological measures to encourage completion of the submission.
67.	SAPN	<p>1.6-1.9 Third party-Entered Data.</p> <p>SAPN believes it will be difficult and resource-intensive to review and address issues with the data provided by third parties and installers, especially if they need to be manually contacted. This is best managed operationally with the following approach:</p> <ul style="list-style-type: none"> • Make it simple, easy for the installers to comply (only have to enter a few fields for most standard equipment, consistent approach and standards across all jurisdictions). • Validate upfront (for example, online confirmation while on site, electronic registration). • Ensure consistent settings to begin with (standardised pre-programmed settings). • Incentivise installers to provide accurate information (including audits, avoid demerit points, reduced installer site visits to rectify, recommended installers programs).
68.	CitiPower Powercor and United Energy	<p>1.11 Post-Submission Validation (AEMO).</p> <p>What is AEMO validating at step 1.11? CitiPower Powercor and United Energy would like to see details of what data validation AEMO will be undertaking at this step before being able to provide feedback.</p>
69.	Ausgrid	<p>1.11 Post-Submission Validation (AEMO).</p> <p>Confirmation of exported electricity to the grid using bi-directional meter information could be used to trigger an automatic submission of an entry into the register.</p>
70.	AusNet Services	<p>1.11 Post-Submission Validation (AEMO).</p> <p>Post submission validation checks should be avoided, because it creates difficult situation for the DNSP to resolve with either the installer or customer. The DNSP attempts to compel either party to provided updated information would either be ineffective or create a consumer backlash against the DNSP and AEMO in the case of the DNSP suggesting their connection alteration is voided by the data quality issue.</p>
71.	Ausgrid	<p>1.12 DER Record Review by NSPs.</p> <p>Step 1.12 in the current collection process flow should send all submitted <i>DER register</i> information to the DNSPs not just exceptions. An exception flag status can be included in this step. In addition, a reason for the invalid data or exception flag should also be included.</p>
72.	Jemena	<p>1.14 Management of exceptions by DNSPs</p> <p>Jemena has significant concerns on the uplift in operational effort required to manage exceptions (Task 1.14). It sees the NSP's obligation fulfilled in task 1.4, and any additional effort to validate any exceptions are above and beyond the scope of what is required. The additional cost of high volumes of exceptions, or an onerous resolution process would be passed onto the customer.</p>



		Need clarity on the obligation on the NSPs for follow up and resolution. What are the Service Level Agreements or expectations on exception data management?	
Information Collection Framework: Timing and Time Limitations			
73.	Energy Queensland	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>In some instances (especially for larger DER) the 'installation' date does not align to the commissioning date. Energy Queensland suggests that the definition be changed to reflect the time at which the system is commissioned: 'connection to the distribution network' rather than 'installation'.</p>	20 business days, which will commence from the commission date, which the NSP or an account-holder will enter. See Section 5.5.2.
74.	Energy Queensland	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>20 business days is only reasonable if installers are required to submit data within 5 business days, given the reasonable likelihood of incomplete data and exception investigations by NSPs. Robust policies, communications and legislation should also support installer compliance.</p>	
75.	Energy Queensland	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p><i>"Additionally, there are varying time requirements for proponents to notify DNSPs on the type of connection and the connection contract associated with the connection application. These timeframes can be six months from connection for large low voltage generating systems, and six to 12 months for embedded network connections such as Strata Title. The requirement to meet a 20 business-day timeframe for installations would have significant impacts on businesses involved in the commissioning and connection of these generating systems. Energy Queensland recommends introducing enforceable regulatory timeframes for submission of DER connection information for installers and customers."</i></p>	
76.	EnergyAustralia	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>To avoid different interpretation by DNSPs the 'date of installation' should be precisely defined in the Information Guidelines. Options to manage installer interpretation of this date could include relying on the date when the DER installation is actually exporting energy, which also accounts for</p> <ul style="list-style-type: none"> • Physical delays occurring to the 'installation commences' date in step 1.5, and • Potentially linking to the date when MSATS is updated with a new meter. 	
77.	Jemena	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>The requirement of 20 business days needs to be supported by Service Level Agreements that define:</p>	



		<ul style="list-style-type: none"> • Step 1.4: What applies for the initial NSP submission of connection application/job number parameters. • Step 1.9: What applies for the Installer to upload subsequent installation information. • Step 1.14: What applies to the NSP for actioning exceptions.
78.	TasNetworks	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>TasNetworks considers that 20 business days is a prudent timeframe that strikes an appropriate balance between the need for up to date information and recognition of the challenges that can arise throughout the DER installation process.</p> <p>Further caveats to accepting the 20 business day timeframe include the use of:</p> <ul style="list-style-type: none"> • A combination of web-interface and smart app for data collection. • Pre-populated and auto populated fields sourced from existing databases and standards where possible.
79.	AusNet Services	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>AusNet Services believes it is reasonable for the installer should have access to the installation information for 20 business days post initial log in. Installers should be provided with a notification email from the AEMO web interface to prompt Installers to provide missing data, manage data exceptions and complete the submission.</p>
80.	CitiPower Powercor and United Energy	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>The 20-business-day period is supported. Please clarify what particular information is used to trigger the start of the 20 business days? Does the 20 business days also include dealing with exceptions? If the installer does not provide all or some of the information within the 20 business days and the NSP then has an obligation to update the information does the 20 business days restart?</p>
81.	CitiPower Powercor and United Energy	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>The 20 business days period only refers to 'installation'. CitiPower Powercor and United Energy suggest this be extended to include for a change and decommission. There should also be a separate process flow for a change and decommission included in the guidelines.</p>
82.	Energy Queensland	<p>Time limits: for data to be submitted to the <i>DER register</i> following the date of installation, change or decommission.</p> <p>The period of 20 business days will place the burden on the DNSP to pursue the installer for outstanding information which will consume DNSP resources.</p>



83.	Energy Queensland	<p>Time limits: automatic submission in absence of installer access to <i>DER register</i>.</p> <p>Energy Queensland highlights that Energex and Ergon Energy Network offer an extension of the original 65-business-day connection window for up to an additional 65 business days (three months). In 10-20 per cent of installations, the period from application to lodgement of an Electrical Work Request denoting that the DER has been installed is longer than three months. On this basis, Energy Queensland recommends that auto-submission not occur until six months after the DNSP submits initial data.</p>	12 months (365 days) will be allowed for. See Section 5.5.2.
84.	Ausgrid	<p>Time limits: automatic submission in absence of installer access to <i>DER register</i>.</p> <p>Ausgrid currently allows a connection offer to be valid for 12 months before it expires. In some instances, the customer may not go ahead with the DER installation associated with an accepted connection application. In addition, there may be multiple connection application submissions and offers for a site and only one of these applications is accessed and the installation completed.</p> <p>Ausgrid would recommend an automatic 'default expiry' after 12 months of details provided to the <i>DER register</i> from the NSP to the AEMO <i>DER register</i> (step 1.4 in the data collection flow process) that is not accessed by an installer in step 1.6 (in its current form).</p>	
85.	AusNet Services	<p>Time limits: automatic submission in absence of installer access to <i>DER register</i>.</p> <p>Timeout functions need to cater for the following scenarios:</p> <ol style="list-style-type: none"> 1) Installer does not proceed with the installation following a connection approval. Recommend 90 days is allowed for as this aligns to connection offer expiry. 2) Cancellation of the installation following a connection approval. Recommend NSP can abolish the DER Record. Future updates can be based on any new connection application. 3) Timeframe for alternative process leading to NSP data entry on behalf of installer. No recommended timeframe. 	
Information Collection Framework: Notifications			
86.	AusNet Services	<p>NSP Receipt of Notifications.</p> <p>AusNet Services would prefer to receive notifications via standard APIs.</p>	Notifications will be created in AEMO's web interface, and available to NSPs via API. See Section 5.6.2.
87.	CitiPower Powercor and United Energy	<p>NSP Receipt of Notifications.</p> <p>Notifications should be received similarly to the communication method employed for updating the register (e.g. replicating the SMP process).</p>	
88.	Energy Queensland	<p>NSP Receipt of Notifications.</p> <p>Without details on the database structure to be used, Energy Queensland cannot comment on the optimal method for DNSPs to receive notifications, however, it suggests there should be a degree of automation between the <i>DER register</i> and our PEACE customer databases.</p>	



89.	Ausgrid	<p>1.6-1.8 Additional Notifications to NSPs.</p> <p>Additional notifications to the DNSP during steps 1.6 to 1.8 when installers access and edit data in the <i>DER register</i> would be advantageous and should be explored, including:</p> <ul style="list-style-type: none"> • Notification of information access after Step 1.6/2.1. • Notification of DER installation data validation submission after Step 1.8/3.1. 	DER Records will be visible to NSPs at all times so additional notifications are not required. See Section 5.6.2.
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D.3 Implementation and Use of the *DER register* summary of submissions and AEMO responses

Implementation and Use: Data Editing and Access Limitations			
90.	AusNet Services	<p>Mandatory data fields.</p> <p>AusNet Services' interpretation is that all fields that are not prescribed as part of the DNSP's connection offer and agreement are not mandatory, and that DNSPs will provide data for these fields (a set of read-only fields are noted).</p>	All fields are mandatory of available Appendix C provides an overview of the requirements as DER Records are created.
91.	AusNet Services	<p>NSP editing rights.</p> <p>The <i>DER register</i> rule provides that DNSPs are responsible for providing DER information to the <i>DER register</i>. Financial incentives (Small Technology Certificates) are likely to decline for installers to use the register, leaving only the connection agreement as the lever for data to be provided and from which DNSPs can approach compliance. DNSPs must be able to enter data independently of installers where this is necessary.</p>	Appendix C provides an overview of the editing rights and requirements as DER Records are created.
92.	CitiPower Powercor and United Energy	<p>Controlling read and write access.</p> <p>CitiPower Powercor and United Energy recommend that the designation of fields as editable or read-only should be determined by the DNSP. There may be varying circumstances per installation or network that will be require different data updates. How is it expected that DNSPs will be able to provide/not provide update access for installers to update specific fields in the register?</p>	See Section 6.2.2.
93.	Jemena	<p>Controlling read and write access.</p> <p>NSP's should have control of which fields are mandatory and editable for each installation (case by case basis).</p>	See Section 6.2.2.
94.	Energy Queensland	<p>Controlling read and write access.</p> <p>Energy Queensland would prefer for fields to be editable by DNSPs. However, there are concerns about the level of effort required to validate data (end-to-end process).</p>	Appendix C provides an overview of the editing rights and requirements as DER Records are created.
95.	SAPN	<p>Read and write access by NSPs.</p> <p>DNSPs should have access to input, edit, and correct any data fields they are responsible for. If DNSPs are to be held accountable for data placed in the register by other parties they should have</p>	Appendix C provides an overview of the editing rights and requirements as DER Records are created.



		the opportunity to make or suggest corrections to the data fields. The source of inputted data should also be available.	
Implementation and Use: User Access and Data Submission			
96.	CitiPower Powercor and United Energy	Frequency of updates. CitiPower Powercor and United Energy seek clarification that they will have access to their customer DER information on a daily basis in order to update their systems.	AEMO will provide access to the <i>DER register</i> via web interface and API. See Section 6.3.2.
97.	Jemena	Access formats. Jemena requires the ability to electronically access a report with a full dataset (all fields from all three tables) for reconciliation purposes, for all NMI.	
98.	Jemena	Format of data submission. Jemena is supportive of an API-based submission mechanism.	
99.	CitiPower Powercor and United Energy	Format of data submission. CitiPower Powercor and United Energy currently doesn't use APIs to interact with AEMO. To simplify the implementation of the necessary system changes, they recommend the use of FTP. Currently, some participants that transact with AEMO do so via FTP and this should also be extended for the submission to the <i>DER register</i> .	
Implementation and Use: Third Party Access			
100.	EnergyAustralia	Allowing for future access by retailers. It should be clarified with the AEMC if the intention was to expressly prohibit retailers (as third parties) from accessing the <i>DER register</i> . The ACCC's work on the Consumer Data Right in the energy sector may make <i>DER register</i> data available to retailers and/or third parties with customer consent. EnergyAustralia recommends consideration be given now to future proofing the DER dataset and APIs for retailer or third party access. This might require AEMO to reconsider whether this database should sit in MSATS or at least have future portability into MSATS if a separate solution is chosen now. Further, AEMO should consider a database design that enables coupling with MSATS and the potential future costs of this integration.	AEMO is aware of this potential future use of the data.
101.	Jemena	Access to Manage Installer Compliance. Jemena has significant concerns on the uplift in operational effort required to manage exceptions (Task 1.14). It sees the NSPs obligation fulfilled in task 1.4; any additional effort to validate any exceptions are above and beyond the scope of what is required. The additional cost of high volumes of exceptions, or an onerous resolution process would be passed onto the customer.	The <i>DER register</i> will be enabled by an account-based system. Account-holders will be able to log electrical contractor, electrical tradesperson and accredited installer licence



		<p>Given that, without a strong compliance framework, installers are unlikely to meet data entry requirements, Jemena endorse the use of the CEC's existing Accredited Installer compliance framework.</p> <p>Given that a compliance scheme is necessary, Jemena believes the scheme should be delivered with maximum efficiency and minimum burden. AEMO's database will be made available for input and output by third parties and therefore Jemena endorses the CEC to develop a digital solution that integrates with AEMO's database to provide an efficient and easy to use interface for installers, inspectors, and NSPs.</p>	<p>details (or equivalent) which will be associated with DER Record submission. AEMO will not be conducting any form of identity verification against these details.</p>
102.	CEC	<p>Identification of third parties to enable access.</p> <p>For enabling user log-in the only nationally recognised identifier that covers both electricians and non-electricians is CEC's existing Accredited Installer and Accredited Designer identification system. CEC's Accreditation system is currently mandatory for designers and installers of systems under 100 kW, and further covers the large majority of designers and installers of larger systems.</p> <p>If CEC's identification system is adopted by AEMO, it would be a relatively simple matter for CEC to formally expand its accreditation system to include, for example, engineers, data managers, or other parties who would need to access AEMO's Register.</p> <p>Given this, there is support by a number of NSPs for use of CEC's identification system for the purpose of authentication and <i>DER register</i> access.</p>	
Implementation and Use: Post-installation setting changes			
103.	AusNet Services	<p>Identifying inverter setting changes.</p> <p>When Installers/Customers amend setting within the inverters without approval from the DNSP, it becomes difficult for the DNSP to determine whether the information is correct.</p>	<p>This is not a new challenge. Installer compliance with connection agreement parameters is an NSP issue. The <i>DER register</i> creates a nationally consistent approach to gathering DER data, including device serial numbers which may enable auditing of settings in the future. Compliance is further supported by linking accredited persons to DER installation details. See Section 6.5.2.</p>
104.	EnergyAustralia	<p>Remote inverter settings changes post-installation.</p> <p>EnergyAustralia agrees that inverter manufacturers or installers should support the customer to meet their contractual obligations to the DNSP through clear, easily available, and stable information on the obligations published by the DNSP.</p>	
105.	Energy Queensland	<p>Remote inverter settings changes post-installation.</p> <p>Energy Queensland cannot envisage a workable model that would allow the multiple inverter OEMs to transfer data to multiple DNSPs, or for DNSPs to use OEM software to check settings.</p>	
106.	SAPN	<p>Remote inverter settings changes post-installation.</p> <p>SAPN believes sourcing inverter settings from OEMs may be an effective method to improve integrity of data however we believe provision and enforcement will be an issue. SAPN has recently issued a consultation paper via the CEC to OEMs to seek feedback on region-specific inverter settings as well as the availability and acceptability of remotely reading and changing inverter settings.</p>	



Implementation and Use: Privacy			
107.	AusNet Services	<p>Privacy Act Compliance.</p> <p>AusNet Services considers solely relying on privacy by design is not adequate in meeting privacy act obligations. AEMO should conduct or commission a risk assessment prior to go-live.</p>	<p>AEMO has taken measures to manage privacy in the design of the <i>DER register</i> and will continue to actively manage privacy and confidentiality related risks in the operation of the <i>DER register</i> and preparation of associated reports. See Section 6.6.2.</p>
108.	EnergyAustralia	<p><i>DER register</i> Reports and Privacy.</p> <p>EnergyAustralia agrees that privacy is a substantial concern, however as noted by AEMO, DNSPs already have information on feeder level constraints. EnergyAustralia encourages AEMO to look further into this and providing a <i>DER register</i> report at feeder level (or substation) where installations can be sufficiently aggregated for better understanding of constraints to make the report more useful.</p>	
Implementation and Use: Supporting information			
109.	CitiPower Powercor	<p>Guides to the <i>DER register</i>.</p> <p>What is AEMO's timing for release of the "plain language" guideline "Guide to the <i>DER register</i> – how to submit and receive information" (Draft Determination Report 4.5.3)?</p> <p>This is required by the CitiPower Powercor business by mid-May, at the latest, to assist with design and development of system changes and ensure readiness for 1 December 2019.</p>	<p>AEMO will be releasing a first technical guide to be released for implementation. See Section 6.7.</p>
110.	Jemena	<p>Guides to the <i>DER register</i>.</p> <p>AEMO to confirm timing of the release of the companion guide "Guide to the <i>DER register</i> – how to submit and receive information".</p> <p>Jemena would like to see this released as early as possible, otherwise late technical/process detail changes could delay IT system readiness for 1 December 2019.</p>	
111.	AusNet Services	<p>Guides to the <i>DER register</i>.</p> <p>The AEMC's determination did not envisage that further process design and system requirements could also be specified in a document referred to in the <i>DER register</i> Information Guideline. The referred document – "Guide to the <i>DER register</i> – how to submit and receive information" – must not introduce new requirements after the 1 June 2019 date, as this will compromise DNSP implementation efforts and may not be enforceable under the NER.</p> <p>AusNet Services strongly recommends that the <i>DER register</i> Information Guideline is drafted to provide DNSPs with enough information to complete process design and system builds. However, if this isn't possible, the "Guide to the <i>DER register</i> – how to submit and receive information" must also be completed by 1 June 2019.</p>	
112.	EnergyAustralia	<p>Guidelines Inclusions.</p> <p>Any reporting obligation on the DNSP will have a flow on effect to the installers through DNSP policy and procedures. It might also be prudent to include in the guidelines that amendments to</p>	

		DNSP policy, procedures and model standing offers as a result of the <i>DER register</i> Information Guideline must be consistent with the obligations imposed by the guideline.	
113.	CitiPower Powercor and United Energy	Guidelines Inclusions. CitiPower Powercor and United Energy recommend the following is included in the <i>DER register</i> [Information] Guidelines: <ul style="list-style-type: none"> • The process flow, supporting information and validation/data management expectations on NSPs and AEMO. • How NSPs are to be advised of data validation failures (from step 1.12), and what the NSP expected to validate at this step? • Clear definitions of the data the NSP is to provide at step 1.4. 	
114.	Jemena	Timeframes for implementation. The current Guidelines are not sufficiently detailed for Jemena to commence system changes from 1 June 2019. Even with IT working groups commencing in May, it is not expected that technical process and details will be sufficiently matured and understood for Jemena and other industry participants to be ready for 1 December 2019. Simplification of the data collection process would focus the IT working group on the interaction between NSP and AEMO – and allow NSPs to modify existing interactions with installers to capture AEMO’s DERR information.	
Implementation and Use: DER eligibility			
115.	APA	Transmission Network Service Provider Obligations. APA is seeking clarity on obligations arising from the DER Information Guidelines with regard to initial and ongoing reporting requirements for NSPs with no DER connected to their network.	NER obligations to provide <i>DER generation information</i> only apply where an NSP has eligible <i>small generating units</i> connected to its network.
116.	Energy Queensland	Generator Registration Status. Energy Queensland considers that if the registered status of a generating system 5-30 MW is not resolved at the time of network connection application, it should be assumed that the DNSP will treat the DER installation as non-registered and submit data to the <i>DER register</i> . Energy Queensland is unclear as to how the registered status of the DER installation will be advised to the DNSP.	Inclusion in the <i>DER register</i> has no impact on Market Registration as a Generator, The DNSP will receive separate notifications that the small generating unit has been captured in the <i>DER register</i> , and a subsequent notification in terms of its Market registration.
Implementation and Use: DER register Report			
117.	EnergyAustralia	<i>DER register</i> Reports and Privacy. EnergyAustralia agrees that privacy is a substantial concern, however as noted by AEMO, DNSPs already have information on feeder level constraints. EnergyAustralia encourages AEMO to look further into this and providing a <i>DER register</i> report at feeder level (or substation) where	See Section 6.9.

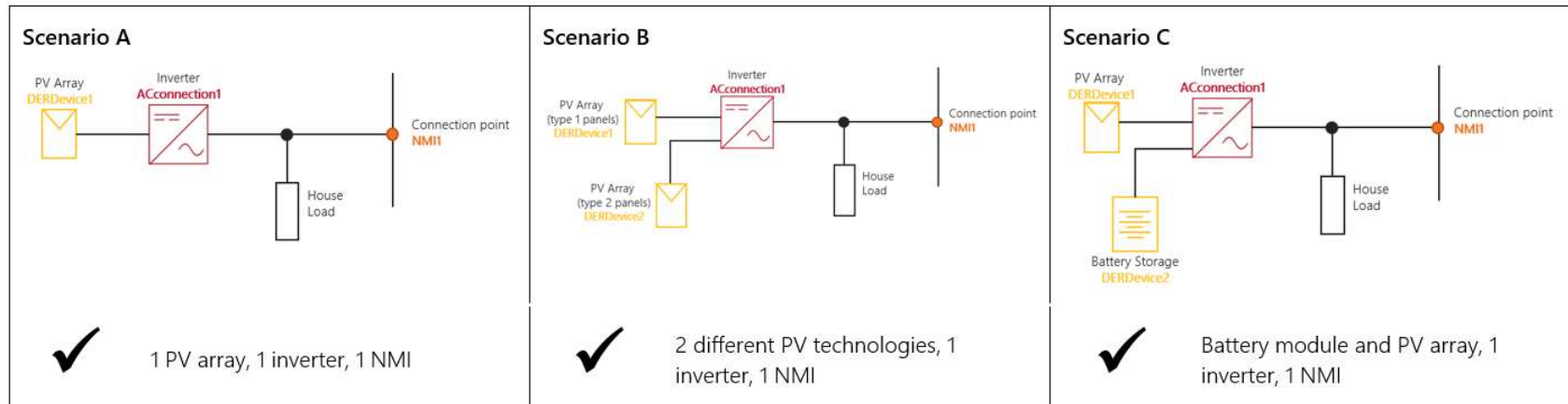
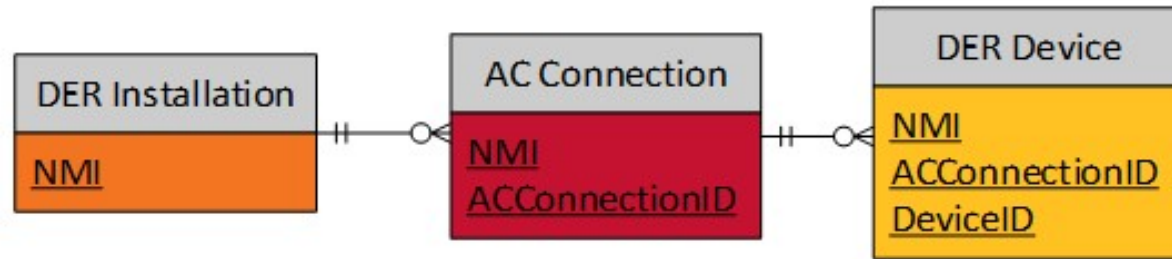
		installations can be sufficiently aggregated for better understanding of constraints to make the report more useful.	
118.	EnergyAustralia	<i>DER register</i> Reports File Formats. EnergyAustralia agrees and supports providing the data in CSV file format.	
119.	TasNetworks	<i>DER register</i> Reports and Other Regulatory Obligations. The format of the aggregated, regional <i>DER register</i> report is appropriate. However, TasNetworks contends the information contained within it might be supplemented to align with the AER's Regulatory Information Notice (RIN) requirements on DER. Such duplication should be minimised. TasNetworks agrees with AEMO that pre-packaged NSP reports would also be useful. In this respect, allowing each network to customise report outputs for their own needs would seem to promote the maximum reporting value to be extracted.	

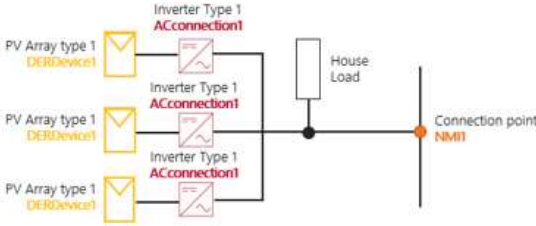
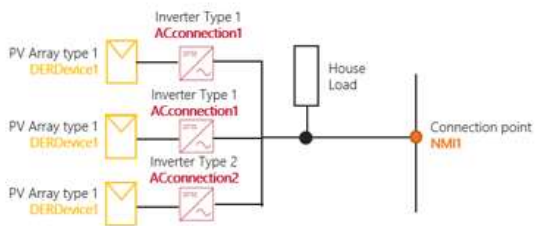
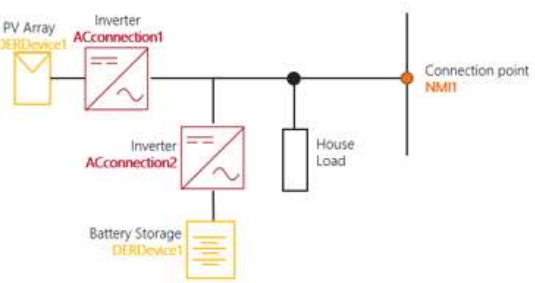
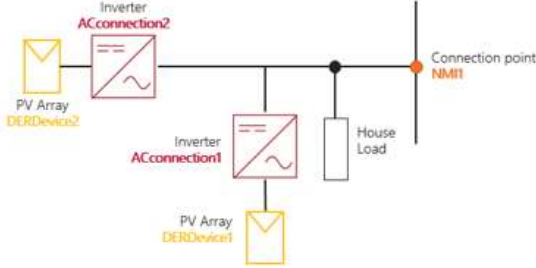
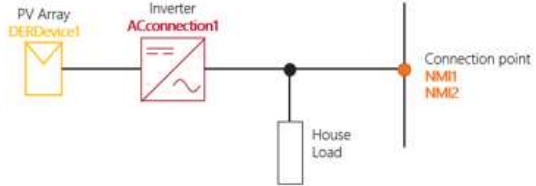
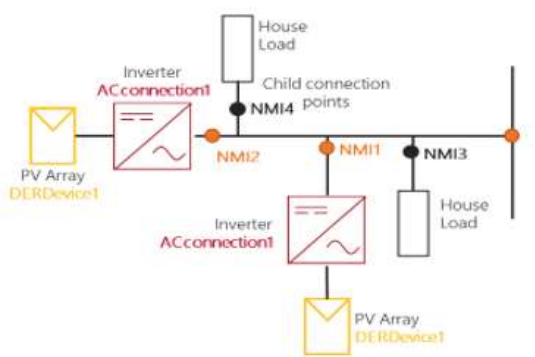


APPENDIX E. DATA MODEL CONFIGURATIONS

The following scenarios are indicative of those which the final Data Model (Guidelines Appendix A) can (✓) and cannot (x) accommodate in the data model structure (Figure 1).

Figure 1: Data Model structure



<p>Scenario D</p>  <p>✓ Identical PV arrays, 3 microinverters of the same type (manufacturer and model), 1 NMI</p>	<p>Scenario E</p>  <p>✓ Identical PV arrays, 3 microinverters of 2 different types (manufacturer and model), 1 NMI</p>	<p>Scenario F</p>  <p>✓ Battery module and PV array with different inverters (manufacturer and model), 1 NMI</p>
<p>Scenario G</p>  <p>✓ 2 PV arrays of different types (manufacturer and model) attached to different/separate inverters, 1 NMI</p>	<p>Scenario H</p>  <p>X 1 PV array, 1 inverter, 2 NMIs</p>	<p>Scenario I</p>  <p>✓ Embedded Network: 2 PV arrays and inverters attached to separate child NMIs, 1 parent NMI</p>

APPENDIX F. DER INSTALLATION USE CASES

The following diagrams provide an overview of use cases AEMO has considered in the *DER register* design and how the *DER register* would manage these.

Use Case	Initial state	Final state	Description
New installation			Existing household with no DER installation. The new installation comprises of 1 PV Array (DERDevice1), 1 inverter (ACconnection1) and 1 NMI (NMI1)
Modify installation			An existing DER installation is retrofitted with a battery module to form a DC coupled solar battery system. The only change to the NMI will be the details of the new connection approval. The make and model of the inverter at the AC Connection level (ACconnection1) will be changed to match the new inverter. Device level data is updated to reflect the additional storage device (DERDevice2).
Add installation			A new DER installation is added to the NMI where there is an existing installation. This installation has a separate inverter and DER device requiring the creation of an additional AC Connection level data set (ACconnection2) and associated DER Device level data.

<p>Decommission installation</p>		<p>ACconnection1 is decommissioned, including the solar PV array and battery system and associated inverter. There is no change to the ACConnection2 or the NMI.</p>
<p>Knock down and replace</p>		<p>The site is knocked down and replaced. The original NMI is made extinct. All ACconnectionIDs associated with the original installation have their status changed to 'decommissioned'. A new NMI is established at the site and a new DER Record is required. The ACconnectionID and DERDeviceID will be created with respect to the new DER Record.</p>
<p>NMI extinction</p>		<p>Site is demolished and NMI extinct. DER installation no longer exists. All ACconnectionIDs associated with the original installation have their status changed to 'decommissioned'.</p>



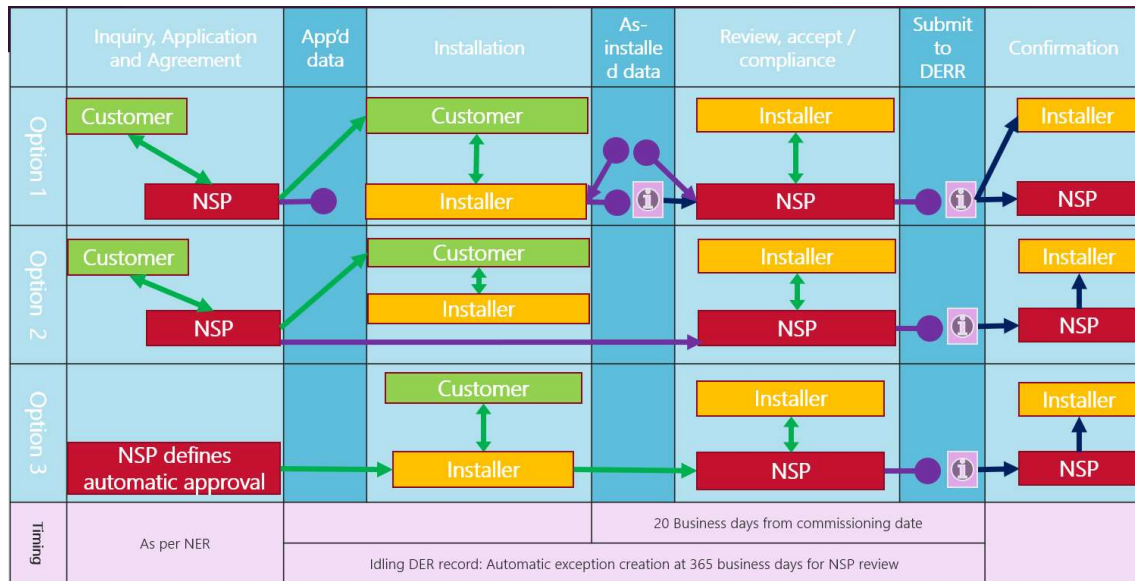
F.1 DER connection and installation use cases

The following discussion provides an overview of how the *DER register* system will manage some of the use cases raised in stakeholder discussions to date.

F.1.1 DER connection processes and the *DER register*

AEMO has identified three forms of DER connection process, and potential interaction with the *DER register*, as presented in Figure 2 below. AEMO understands that these three use cases cover off the range of connection process AEMO has been made aware of by stakeholders and through review of NER Chapters 5 and 5A for basic, standard, and negotiated connections.

Figure 2 Comparison of DER connection processes and how they could interact with the *DER register*



Use Case 1: NSP and account-holder collaboration (Figure 1, Option 1)

In this case the NSP is calling upon an account-holder (for example, a DER installation business) to confirm the DER Record, for review and confirmation by the NSP. The NSP is accessing the system via AEMO’s web interface.

- **Step 1: Connection approval.** The NSP approves a *small generating unit* connection (connection offer) based on a customer or DER sales business/contractor request, which includes the *DER register* related requirements. Concurrently, the NSP’s data entry must include the mandatory requirements for the *DER register* system to create an ‘initial’ DER Record.
- **Step 2: Installation commences.** Customer proceeds with the installation using contractor of their choice.
- **Step 3: As-installed data confirmed.** The DER contractor completes installation and logs into AEMO’s *DER register* system with their account details. This account-holder then enters the NMI and connection agreement/offer number (‘job number’) to access the ‘initial’ DER Record. The NSP’s default data is accessible for confirmation and they are expected to confirm or update the NSP-entered default data and provide additional information about the installation including the device manufacturer, model numbers, serial numbers and the generating system data (AC connection and device level).

- **Step 4: Pre-submission validation check.** Once satisfied the account-holder will be required to check that the 'initial' DER Record passes Stage 1 validation checks and resolve any failed data fields. Account-holders will also be notified of any exceptions created by Stage 2 checks and given the opportunity to resolve these exceptions prior to submission. When satisfied the account-holder will submit the DER Record:
 - for review by the NSP if there are a) exceptions associated with the record, b) the NSP has set the 'review all' flag for this *small generating unit* type and/or if AEMO's post-submission validation identifies and creates an exception ('conditional' DER Record), or
 - directly to the register if there are no exceptions associated with the record and the NSP permits this action for this *small generating unit* type (Step 4 is skipped).
- **Step 5: NSP confirmation.** The NSP identifies that an 'conditional' DER Record has been submitted for confirmation. It reviews the record and takes the appropriate action to manage exceptions (for example, update the data, contact the customer, or pursue compliance action with a licencing body). Once satisfied, the NSP confirms that the record reflects the characteristics of the *small generating unit* installation as installed for that connection point, and exceptions have been managed satisfactorily. These DER Records then repeat the validation checks in Step 4.
- **Step 6: DER Record confirmation.** The *DER register* system generates a receipt of the 'confirmed' DER Record and makes this available for the NSP and the account-holder (different details in each receipt).

Use Case 2: Connection process with NSP-managed data collection and submission via API (Figure 1, Option 2)

In this case, the NSP is using their own information collection systems which are collecting information consistent with AEMO's Guidelines and submits data to the *DER register* via API.

- **Step 1: Connection approval.** NSP approves a *small generating unit* connection based on a customer or DER sales business/contractor request. The connection offer contains *DER register* related requirements.
- **Step 2: Installation commences.** Customer proceeds with the installation using contractor of their choice.
- **Step 3: As-installed data confirmed.** The DER contractor completes installation and provides information to NSP-defined system, consistent with the Guidelines. Validation is by NSP.
- **Step 4: NSP submission.** NSP system data entry must include the mandatory requirements and pass the *DER register* validation checks to create an 'initial' DER Record in the *DER register* system via API. AEMO's validation considers Stage 1, Stage 2 (see Section 6.2.2), and post-submission validation checks:
 - Stage 1 checks for all data resulting in:
 - Rejection and notification generation for those data fields that fail, or
 - If all mandatory data passes create 'initial' DER Record and commence Stage 2 checks.
 - Stage 2 and post-submission validation checks resulting in:
 - Generation of 'conditional' DER Records where exceptions are identified, or
 - Generation of 'confirmed' DER Records where no exceptions are identified (Step 5 is skipped).
- **Step 5: NSP confirmation.** The NSP receives notifications via API from the *DER register* systems (See Section 5.3.2) showing the NSP notices associated with rejected DER Records and 'conditional' DER Records. The NSP takes the appropriate action to manage these issues (for example, update the data, contact the customer, or pursue compliance action with a licencing body), then confirms that the record reflects the characteristics of the DER installation as installed for that connection point, and exceptions have been managed satisfactorily. These records then repeat Step 4.



- **Step 6: DER Record confirmation.** The *DER register* system creates a receipt of the 'confirmed' DER Record and makes this available for the NSP.
- **Step 7: NSP notifies DER installer.** The NSP notifies the DER installer that the DER Record has been successfully confirmed in AEMO's *DER register*.

Use Case 3: Connection of pre-approved DER types (Figure 1, Option 3)

In this case, the NSP has established an automatic approval for a certain *small generating unit* category and is only made aware of the *small generating unit* following its installation.

- **Step 1: Connection approval.** The NSP establishes the parameters and terms for automatic approval and communicates these to DER retailers/contractors, including the requirements to provide *DER generation information* to the NSP for the *DER register*.
- **Step 2: Installation commences.** The customer proceeds with a *small generating unit* installation that complies with the automatic acceptance criteria using a contractor of their choice.
- **Step 3: NSP is notified of DER installation.** NSP is notified of the *small generating unit* installation via existing procedures and systems, including the collection of information consistent with the Guidelines.
- **Step 4: NSP updates the *DER register*.** The NSP updates the *DER register* in the same manner as Use Case 2.

OR

- **Step 4: NSP supplies a job number to the DER contractor.** The NSP provides unique job numbers for DER retailers to use. This could be through a manual process, or via a system that generates the job numbers and creates the initial DER Record concurrently. In this case the system can proceed as per Use Case 1.

Use case 4: Connection offer not accepted by the customer (idling DER Records)

In this case, the NSP has approved an application for a customer, who has then decided to not proceed with the *small generating unit* installation (or accepted the offer).

- **Step 1: Connection approval.** The NSP approves a *small generating unit* connection (connection offer) based on each customer or DER sales business/contractor request, which includes the *DER register* related requirements. Concurrently, the NSP's data entry must include the mandatory requirements for the *DER register* system to create an 'initial' DER Record.
- **Step 2: Idle DER Record management.** Any 'initial' DER Records associated with connection offers that are not accepted are left for a period of 365 days (see Section 5.5.2), at which time they automatically generate an exception for the NSP to manage with the appropriate course of action (for example, contacting the customer). Alternatively, the NSP can manage these records manually if it is aware the offer will not be accepted. Note that Stage 1 validation checks will be ignored for this case.

Use case 5: Account-holder leaves DER Record in idle state (accessed and idling DER Records)

In this case, the NSP has approved an application for a customer, who proceeded with the *small generating unit* installation, but the account-holder has not fully completed the data entry within 5 business days.

- **Step 1: Connection approval.** The NSP approves a *small generating unit* connection (connection offer) based on each customer or DER sales business/contractor request, which includes the *DER*

register related requirements. Concurrently, the NSP's data entry must include the mandatory requirements for the *DER register* system to create an 'initial' DER Record.

- **Step 2: Installation commences.** Customer proceeds with the installation using contractor of their choice.
- **Step 3: As-installed data confirmed.** The DER contractor completes installation and logs into AEMO's *DER register* system with their account details. This account-holder then enters the NMI and connection agreement/offer number ('job number') to access the DER Record. They do not submit this record to the NSP within 5 business days.
- **Step 4: Idle DER Record management.** Any 'initial' DER Records that have been accessed and left as idling DER Records (see Section 5.5.2) automatically generate an exception. The DER Record is transitioned to a 'conditional' state by the *DER register* system and the NSP is expected to take appropriate course of action (for example, contacting the customer or reinstating the account-holder access). Note that Stage 1 validation checks will be ignored for this case.
- **Step 5: Process proceeds.** Either as per Use Case 1 or Use Case 2.

Use Case 6: Multiple DER approvals for one NMI

In this case, the customer has sought quotes from multiple DER contractors, who have all submitted applications for a *small generating unit* approval to the NSP and the NSP has provided multiple offers (in accordance with the NER).

- **Step 1: Connection approval.** The NSP approves a *small generating unit* connection (connection offer) based on each customer or DER sales business/contractor request, which includes the *DER register* related requirements. Concurrently, the NSP's data entry must include the mandatory requirements for the *DER register* system to create an 'initial' DER Record. Each 'initial' DER Record has the same NMI but is identified by the combination of NMI and unique job number. Default data fields are populated for each DER Record based on NSP's defined default data.
- **Step 2: Process proceeds.** Either proceed based on Use Case 1 or Use Case 2 to create a single 'confirmed' DER Record.
- **Step 3: Idle DER Record management.** Any 'initial' DER Records associated with connection offers that are not accepted are left for a period of 365 days (see Section 5.5.2), at which time they automatically generate an exception for the NSP to manage with the appropriate course of action (for example, contacting the customer). Alternatively, the NSP can manage these records manually if it is aware the offer will not be accepted.

Use Case 7: Change to an existing small generating unit

In this case, the NSP has approved an alteration to an existing *small generating unit*. The customer's connection offer relates to the combined *small generating unit* installations as approved by the NSP. AEMO's web interface is used by a DER contractor (to illustrate this case).

- **Step 1: Connection approval.** The NSP approves a *small generating unit* connection (connection offer) based on the customer's request and the existing *small generating unit*. The NSP accesses the existing 'confirmed' DER Record for this NMI, allocates a new job number to it, and makes the appropriate changes to the new connection offer.
- **Step 2: Installation commences.** Customer proceeds with the installation using contractor of their choice.
- **Step 3: As-installed data confirmed.** The DER contractor completes the installation and logs into AEMO's *DER register* system with their account details. This account-holder then enters the NMI and connection agreement/offer number ('job number') to access the DER Record. The NSP's default data is accessible for confirmation and they are expected to confirm or update the NSP-entered



default data and provide additional information about the installation including the device manufacturer, model numbers, serial numbers, and the generating system data (AC connection and device level). The account-holder can see the existing/approved information and can add additional equipment at the AC Connection level in line with the as-installed information.

- **Step 4: Process proceeds.** Proceed based on Use Case 1 to create a 'confirmed' DER Record that reflects the updated DER installation.

Use Case 8: Decommissioning a small generating unit

In this case, the NSP has become aware that an existing *small generating unit* has been or is going to be decommissioned.

- **Option 1: NSP changes status.** The NSP identifies that the decommissioning has occurred and needs to access this by searching the 'confirmed' DER Records. Once the right 'confirmed' DER Record has been identified the NSP can alter the status of the equipment at the AC connection level to 'decommissioned'.
- **Option 2: Account-holder updating augmented *small generating unit*.** The account-holder is already updating the DER Record based on an approved *small generating unit*, and the augmentation includes the decommissioning of existing equipment at the AC connection level. The account-holder only must change the status of this existing equipment, while creating a new AC connection data set to provide the updated approved *DER generation information*.
- **Option 3: NMI extinction triggers change of status.** The NMI status in AEMO's MSATS systems is changed to extinct. AEMO's systems then integrate the *DER register* data with this status change and automatically change the status of AC connection level equipment to decommissioned.



APPENDIX G. INFORMATION COLLECTION FRAMEWORK

AEMO has been working with stakeholders and technology architects to refine the information collection framework. The key elements of the collection framework provided in this section reflect the final Information Collection Framework that will be supporting the system build.

G.1 Assessment of draft Information Collection Framework against *DER register* principles

The *DER register* Issues Paper outlined the principles AEMO would apply in the development of the *DER register* and the associated collection process. These principles were discussed and developed during initial stakeholder engagement in November 2018 and submissions to the Issues Paper and Draft Report did not provide any further comment on them.

Below, AEMO has outlined how the characteristics of the draft Information Collection Framework supports the achievement of these principles:

1. The Information Collection Framework supports that data collected should comprise of the statically configured, physical DER system at the time of installation by:
 - Creating an avenue for confirmation of as-installed data by the installer.
 - Creating opportunities for application developers to provide services to DER installers that facilitate data submission to the register by installers at the time of installation.
 - Applying time limitations to ensure DER information is not left in an idle and unsubmitted state.
 - Allow account-holders to edit data while alerting the NSP and seeking confirmation from the account-holders where changes have occurred.
2. The Information Collection Framework will have regard to reasonable costs of efficient compliance compared to the likely benefits from the use of *DER generation information* by:
 - Aligning to the existing DER connection and installation processes as closely as possible.
 - Enabling optionality for NSPs and account-holders to use AEMO's system, NSPs to use their own system, and application developers to support data collection.
 - Allowing NSPs to define default settings based on preferences such as DER technology and size ranges.
 - Drawing on existing databases wherever possible to autocomplete data.
 - Collecting information that balances the needs of NSPs and the *DER register* while accommodating varying levels of sophistication across NSPs in the NEM.
 - Creates an opportunity for post-installation data validation.
 - Establishing a consistent approach to recording the identity of the person responsible for the DER installation against each DER Record.
3. The Information Collection Framework will support best-practice data collection by:
 - Allowing DNSPs to establish and control default *DER generation information* in line with relevant Australian and DNSP-specific standards.
 - Incorporating a range of data validation steps that support account-holders and NSPs to provide the data.
 - Drawing on data from existing databases to support auto-population of data.
 - Creating an opportunity for application developers to utilise their existing databases to support data entry, while providing streamlining service to DER installers.
4. The Information Collection Framework will balance information and transparency by being accessible and easy to use, while protecting confidentiality and privacy by:
 - Embedding 'privacy by design' approaches into the framework.



- Ensuring accounts hold the appropriate level of identifying information.
- Enabling access to data by account-holders where they require two unique identifiers to access a DER Record, as defined by the NSP.
- Physically separating databases for the *DER register* and user accounts to prevent personal information being associated with the *DER register*.

G.2 Overview of DER register Information Collection Framework

The following process diagram reflects the final information collection framework, as reflected in this document. AEMO will also provide the capability for NSPs to comply with the information collection framework via API.

