

Data Standards Body

Technical Working Group

Decision Proposal 196 - Candidate DER End Points

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Context

This proposal describes the payloads for the Candidate Distributed Energy Resources Data cluster included in the [energy sector designation instrument](#). This data cluster is relatively independent and will be provided by a single designated data holder, the Australian Energy market Operator. This proposal includes feedback obtained in response to the following consultation activities:

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- **Decision Proposal 117 - Distributed Energy Resources Payload**
This consultation proposed the payloads for Distributed Energy Resources data. Feedback provided in response to this consultation can be found at:
<https://github.com/ConsumerDataStandardsAustralia/standards/issues/117>
- **Decision Proposal 149 - Energy Draft Feedback Cycle 1**
This consultation thread raised and allowed for holistic feedback to be provided on the draft energy standards as a whole. Feedback provided in response to this consultation can be found at:
<https://github.com/ConsumerDataStandardsAustralia/standards/issues/149>
- **Decision Proposal 173 - Energy Draft Feedback Cycle 2**
This consultation thread raised and allowed for second round of holistic feedback to be provided on the draft energy standards as a whole. Feedback provided in response to this consultation can be found at:
<https://github.com/ConsumerDataStandardsAustralia/standards/issues/173>
- **Decision Proposal 180 - Energy Draft Feedback Cycle 3**
This consultation thread raised and allowed for third round of holistic feedback to be provided on the draft energy standards as a whole. Feedback provided in response to this consultation can be found at:
<https://github.com/ConsumerDataStandardsAustralia/standards/issues/173>
Note: This consultation is still active

Decision To Be Made

Define the candidate end point URIs and payloads for Distributed Energy Resources Data.

Identified Options

When consulting on payloads each field potentially has multiple options. For this reason, this proposal only presents a single option for consultation with the expectation that all parts of the proposal are subject to change in response to community feedback.

This section therefore includes a series of descriptions of the underlying assumptions and rationale that have led to the specific proposal included in the recommendation section.

Single Data Holder

This data cluster is to be provided only by AEMO as the single designated data holder. As a result this proposal is based on a preliminary consultation with AEMO on the DER data they currently persist in the DER register.

References to External Standards

The current proposal includes references to the external standard, AS4777-1: 2016. This is not a publicly available normative standard so we will need to work through how this standard can be made normative if it is not visible to all participants.

Feedback as to whether referring to a normative standard that is not publicly available is a concern is welcome.

Current Recommendation

The recommended URIs and Payloads for distributed energy resources are presented in the following sections.

DER End Points Summary

A summary of the distributed energy resources end points:

- GET /energy/electricity/servicepoints/{servicePointIdentifier}/der
- GET /energy/electricity/servicepoints/der
- POST /energy/electricity/servicepoints/der

General Notes

Some general notes on the implementation of these end points:

- The data payload is aligned to the source data model held by AEMO which can be found at: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2019/der-register/final/der-register-information-guidelines.pdf?la=en
Any changes to the data model is outside the scope of CDR (e.g. splitting of aggregated attributes to individual DER technology level)

Summary of changes

Endpoints/Payload	Field/Section	Change Type	Comments
• DER Common Type	installedPhasesCount	Modified	Updated description for clarity
	exportLimitkva	Modified	Updated description for clarity
	equipmentType	Modified	Updated description wording to specify valid for the attribute
	manufacturerName	Modified	Changed attribute to be conditional
	inverterSeries	Modified	Changed attribute to be conditional
	inverterModelNumber	Modified	Changed attribute to be conditional
	installationStage	Modified	Changed attribute type to be ENUM and specified valid values
	inverterDeviceCapacity	Modified	Changed attribute to be conditional
	deviceIdentifier	Added	Attribute for unique identifier of a single DER device or a group of DER devices with the same attributes
	installationStage	Modified	Changed attribute type to be ENUM and specified valid values

Endpoints/Payload	Field/Section	Change Type	Comments
	subtype	Modified	Updated description for clarity

Common Object Types

These structures are used multiple times in the usage payloads and are therefore documented separately.

DER Common Type

Field	Type	Mandatory	Description
{			
servicePointId	String	Mandatory	Tokenised ID of the service point to be used for referring to the service point in the CDR API suite. To be created in accordance with CDR ID permanence requirements
approvedCapacity	Number	Mandatory	Approved small generating unit capacity as agreed with NSP in the connection agreement, expressed in kVA.
availablePhasesCount	Number	Mandatory	The number of phases available for the installation of DER
installedPhasesCount	Number	Mandatory	The number of phases that DER is connected to.
islandableInstallation	String	Mandatory	For identification of small generating units designed with the ability to operate in an islanded mode
hasCentralProtectionControl	Boolean	Optional	For DER installations where NSPs specify the need for additional forms of protection above those inbuilt in an inverter. If absent then assumed to be false
protectionMode	Object	Conditional	Required only when the hasCentralProtectionAndControl flag is set to true
{			
exportLimitkva	Number	Optional	Maximum amount of power (kVA) that may be exported from a connection point to the grid, as monitored by a control / relay function. An absent value indicates no limit
underFrequencyProtection	Number	Optional	Protective function limit. Default value 47 Hz according to AS4777-1: 2016 Table 2.
underFrequencyProtectionDelay	Number	Optional	Trip delay time in seconds. Default value 2 seconds according to AS4777-1: 2016 Table 2.
overFrequencyProtection	Number	Optional	Protective function limit. Default value 52 Hz according to AS4777-1: 2016 Table 2.
overFrequencyProtectionDelay	Number	Optional	Trip delay time in seconds. Default value 2 seconds according to AS4777-1: 2016 Table 2.

Field	Type	Mandatory	Description
underVoltageProtection	Number	Optional	Protective function limit. Default value 180V according to AS4777-1: 2016 Table 2.
underVoltageProtectionDelay	Number	Optional	Trip delay time in seconds. Default value 2 seconds according to AS4777-1: 2016 Table 2.
overVoltageProtection	Number	Optional	Protective function limit. Default value 260 V according to AS4777-1: 2016 Table 2.
overVoltageProtectionDelay	Number	Optional	Trip delay time in seconds. Default value 2 seconds according to AS4777-1: 2016 Table 2.
sustainedOverVoltage	Number	Optional	Sustained over voltage
sustainedOverVoltageDelay	Number	Optional	Trip delay time in seconds.
frequencyRateOfChange	Number	Optional	Rate of change of frequency trip point (Hz/s).
voltageVectorShift	Number	Optional	Trip angle in degrees
interTripScheme	String	Optional	Description of the form of inter-trip (e.g. "from local substation").
neutralVoltageDisplacement	Number	Optional	Trip voltage
}			
acConnections	Array of Objects	Optional	
{			
connectionIdentifier	Number	Mandatory	AC Connection ID as defined in the DER register. Does not align with CDR ID permanence standards
count	PostiveInteger	Mandatory	Number of AC Connections in the group. For the suite of AC Connections to be considered as a group, all of the AC Connections included must have the same attributes.
equipmentType	String	Optional	Indicates whether the DER device is connected via an inverter (and what category of inverter it is) or not (e.g. rotating machine). Valid values are: <ul style="list-style-type: none"> • INVERTER • OTHER If absent, assume equipment type to be "OTHER".
manufacturerName	String	Conditional	The name of the inverter manufacturer. Mandatory if equipmentType is INVERTER
inverterSeries	String	Conditional	The inverter series. Mandatory if equipmentType is INVERTER

Field	Type	Mandatory	Description
inverterModelNumber	String	Conditional	The inverter model number. Mandatory if equipmentType is INVERTER
commissioningDate	DateString	Optional	The date that the DER installation is commissioned
installationStage	Enum	Optional	Description of the installation stage of the AC connection. Valid values are: <ul style="list-style-type: none"> INITIAL CONDITIONAL CONFIRMED IDLE
status	Enum	Optional	Code used to indicate the status of the Inverter. This will be used to identify if an inverter is active or inactive or decommissioned. Valid values are: <ul style="list-style-type: none"> ACTIVE INACTIVE DECOMMISSIONED
inverterDeviceCapacity	Number	Conditional	The rated AC output power that is listed in the product specified by the manufacturer. Mandatory if equipmentType is INVERTER
derDevices	Array of Objects	Optional	
{{			
deviceIdentifier	Number	Mandatory	Unique identifier for a single DER device or a group of DER devices with the same attributes. Does not align with CDR ID permanence standards
count	Number	Mandatory	Number of devices in the group of DER devices
manufacturer	String	Optional	The name of the device manufacturer
modelName	String	Optional	The model number of the device
status	Enum	Optional	Code used to indicate the status of the device. This will be used to identify if an inverter is active or inactive or decommissioned. Valid values are: <ul style="list-style-type: none"> ACTIVE INACTIVE DECOMMISSIONED
installationStage	Enum	Optional	Description of the device installation stage. . Valid values are: <ul style="list-style-type: none"> INITIAL CONDITIONAL CONFIRMED IDLE

Field	Type	Mandatory	Description
type	Enum	Optional	Used to indicate the primary technology used in the DER device. Valid values are: <ul style="list-style-type: none"> FOSSIL HYDRO WIND SOLAR_PV RENEWABLE GEOHERMAL STORAGE OTHER
subtype	String	Optional	Used to indicate the primary technology used in the DER device. This field is also used to record for example the battery chemistry, or the type of PV panel. It is also used to record if a battery is contained in an electric vehicle connected in a vehicle-to-grid arrangement
nominalRatedCapacity	Number	Optional	Maximum output in kVA that is listed in the product specification by the manufacturer. This refers to the capacity of each unit within the device group
nominalStorageCapacity	Number	Optional	Maximum storage capacity in kVAh. This refers to the capacity of each storage module within the device group
}}			
}}			
}			

DER Data For A Specific Service Point

High Level Information

Title	Obtain a list of DER data from a particular service point
HTTP Method	GET
URI	/energy/electricity/servicepoints/{servicePointIdentifier}/der
Security Scope	energy:electricity.der:read
Pagination	Not Supported
Path Parameters	servicePointIdentifier ID of the specific service point requested. This is a tokenised ID previous obtained from the Standing Data Service Point List Data end point. Note that it is not a nationalMeteringId.
Query Parameters	None

Request Payload

Not applicable

Response Payloads

HTTP Response Code: 200 OK

Field	Type	Mandatory	Description
data	DER Data Object	Mandatory	The DER data for the requested service point
links	Object	Mandatory	
{			
self	URIStrng	Mandatory	Fully qualified link to this API call
}			
meta	Object	Mandatory	
{			
}			

Bulk DER Data

High Level Information

Title	Obtain DER data for all service points associated with the consumer
HTTP Method	GET
URI	/energy/electricity/servicepoints/der
Security Scope	energy:electricity.der:read
Pagination	Supported
Path Parameters	None
Query Parameters	page Page of results to request (standard pagination) page-size Page size to request. Default is 25 (standard pagination)

Request Payload

Not applicable

Response Payloads

HTTP Response Code: 200 OK

Field	Type	Mandatory	Description
data	Object	Mandatory	
{			
derRecords	Array of DER Data objects	Mandatory	Array of DER objects
}			
links	Object	Mandatory	
{			
self	URIStrng	Mandatory	Fully qualified link to this API call
first	URI	Conditional	URI to the first page of this set. Mandatory if this response is not the first page
prev	URI	Conditional	URI to the previous page of this set. Mandatory if this response is not the first page
next	URI	Conditional	URI to the next page of this set. Mandatory if this response is not the last page

Field	Type	Mandatory	Description
last	URI	Conditional	URI to the last page of this set. Mandatory if this response is not the last page
}			
meta	Object	Mandatory	
{			
totalRecords	PositiveInteger	Mandatory	The total number of records in the full set
totalPages	PositiveInteger	Mandatory	The total number of pages in the full set
}			

DER Data For Specific Service Points

High Level Information

Title	Obtain DER data for a specific set of service points
HTTP Method	POST
URI	/energy/electricity/servicepoints/der
Security Scope	energy:electricity.der:read
Pagination	Supported
Path Parameters	None
Query Parameters	<p>page Page of results to request (standard pagination)</p> <p>page-size Page size to request. Default is 25 (standard pagination)</p>

Request Payload

Field	Type	Mandatory	Description
data	Object	Mandatory	
{			
servicePointIds	Array[String]	Mandatory	Array of specific servicePointIds to obtain DER data for
}			
meta	Object	Mandatory	
{			
}			

Response Payloads

HTTP Response Code: 200 OK

Field	Type	Mandatory	Description
data	Object	Mandatory	
{			
derRecords	Array of DER Data objects	Mandatory	Array of DER objects
}			

Field	Type	Mandatory	Description
links	Object	Mandatory	
{			
self	URIString	Mandatory	Fully qualified link to this API call
first	URI	Conditional	URI to the first page of this set. Mandatory if this response is not the first page
prev	URI	Conditional	URI to the previous page of this set. Mandatory if this response is not the first page
next	URI	Conditional	URI to the next page of this set. Mandatory if this response is not the last page
last	URI	Conditional	URI to the last page of this set. Mandatory if this response is not the last page
}			
meta	Object	Mandatory	
{			
totalRecords	PositiveInteger	Mandatory	The total number of records in the full set
totalPages	PositiveInteger	Mandatory	The total number of pages in the full set
}			

HTTP Response Code: 422 Unprocessable Entity

If one of the specified accountIds is invalid or inaccessible then a 422 response should be returned with an error payload. The structure of this error payload will be aligned to the equivalent error for the bank account end points.

This is currently under review as part of another consultation.

Implementation Considerations

A full binding standard applicable to the energy designation has not yet been defined and there is no existing implementation that could be impacted by this proposal. As a result there are no implementation or transition considerations to explore.
