ELECTRIC VEHICLE SUPPLY EQUIPMENT STANDING DATA

– ESB

PURPOSE

To provide an overview of the rationale and options for capturing ‘standing data’ for new EVSE installations and to provide stakeholders with an opportunity for open Q&A.

BACKGROUND

- Electric vehicle (EV) charging is set to transform our electricity systems.
- While there is some uncertainty regarding the exact pace of adoption of EVs and the technology and charging choices of EV owners (including the use of public charging infrastructure), there is broad consensus that EV integration presents both major opportunities and challenges for the electricity grid.
- Currently, networks and AEMO do not have access to reliable data on the size, location, and characteristics of electric vehicle supply equipment (EVSE) to enable them to determine and manage these opportunities and challenges effectively.
- EV standing data has been defined as data concerning the *location and characteristics of EVSE to inform network modelling and forecasting*[1] necessary to guide planning processes of the energy sector and the planning of EV infrastructure.

[1] DEIP EV Data Availability Taskforce, *Electric Vehicles Grid Integration Recommendations*, February 2021, p.16.

WHY IS REFORM NEEDED?

- There is currently no systematic collection of EVSE standing data, to inform network modelling and load planning at a national or regional level.
- EVSE standing data can improve the accuracy of network and market planning and operational decisions. This will result in:
  - Greater utilisation of network and generation infrastructure
  - Lower costs and for consumers

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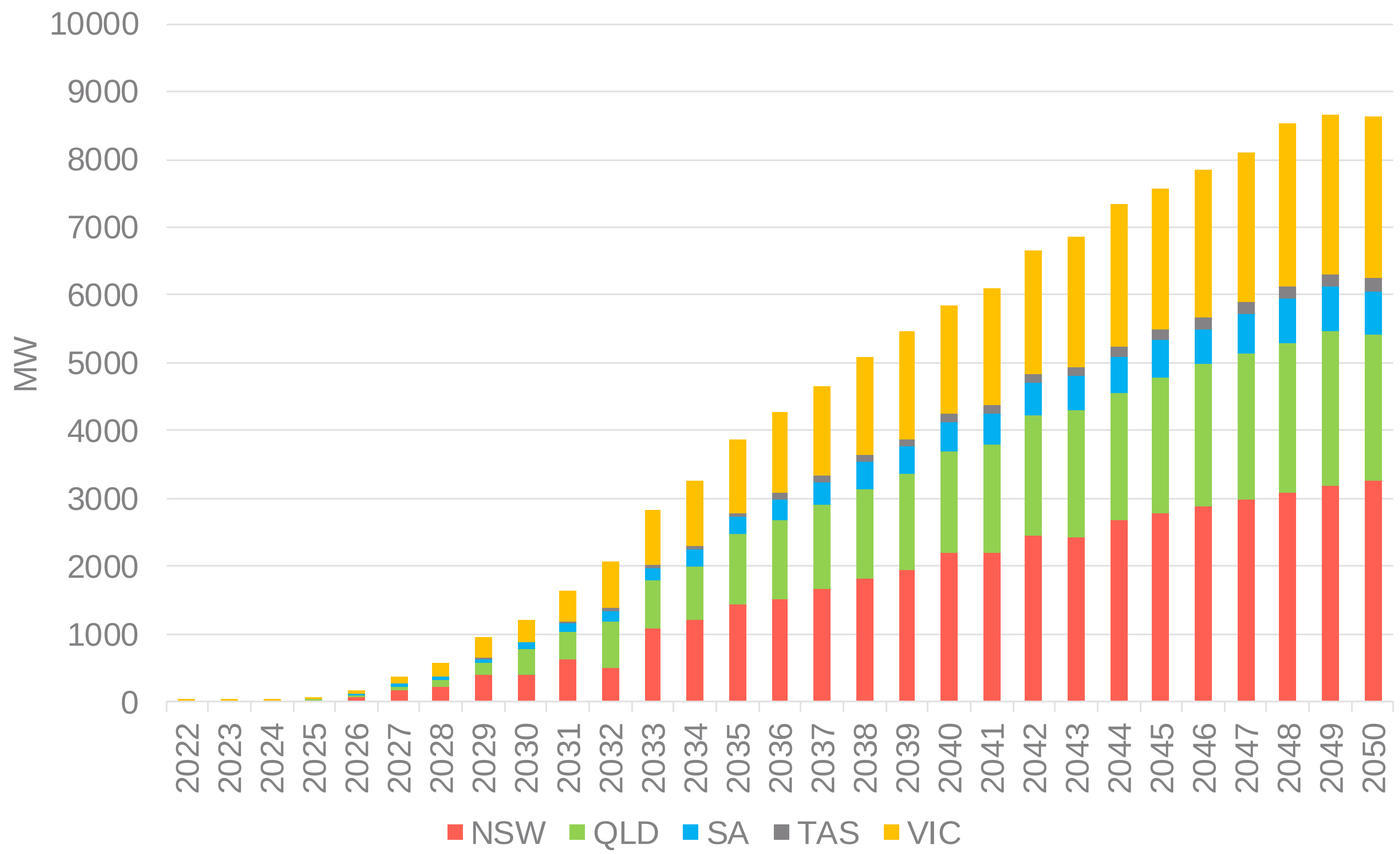
EV charging summer peak demand in each NEM region - ISP 2022 Step Change Scenario (POE 10)

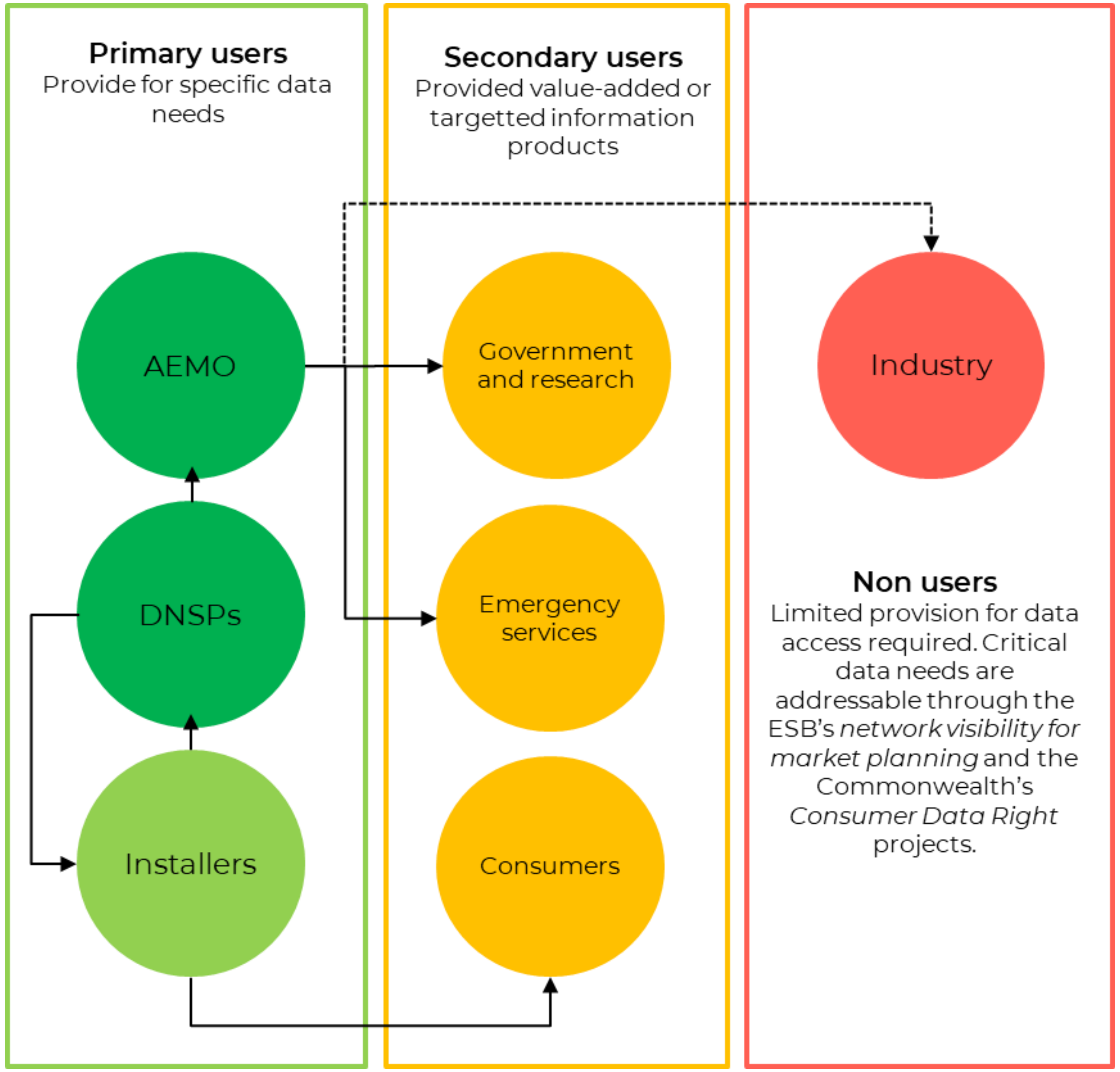


In any plausible scenario, EV charging will have a growing impact on grid planning, investment and operational decisions

EVSE STANDING DATA USERS

DNSPS - EVSE standing data provides an input into EV load modelling at the local network and bulk system level. Knowing the EVSE location will allow network businesses and AEMO to cross-reference EVSE standing data with meter data to develop load profiles associated with different EV installation types.

AEMO - Understanding the size and type of charger, and its performance characteristics, provides a basis for assessing the real-time and forecast impacts of EV charging on the power system, and large-scale disturbances that can impact power system voltage and frequency.



DNSP DATA USE-CASES

N1. Network planning
The uptake of EVs is expected to bring forward the requirement for network augmentation in some areas and anecdotally, EV load forecasts are among the most significant factors influencing network expenditure decision in the current round of regulatory determinations. Standing data can be combined with load profile models to estimate the likely future load on specific network assets, and the requirement to build out network capacity to ensure sufficient hosting capacity.

N2. Regulatory Compliance
Forecasts of EV uptake in a network area are a key input into network expenditure proposals and Distribution Annual Planning Reporting (DAPR) processes. More accurate forecasts of EV load growth will reduce uncertainty in investment proposals thereby supporting more accurate network pricing determinations, and transparency for stakeholders, promoting efficient expenditure of revenues recovered from consumers.

N3. Real time network operations
More accurate forecasting will enable more targeted and confident procurement and dispatch of network support services from third parties (e.g. active power dispatch, or load curtailment during system peaks).

N4. Dynamic operating envelopes
Dynamic operating envelopes (including flexible export limits) rely on networks being able to accurately estimate the state of voltage and load across its network (including potentially to a feeder level where direct network state visibility may be limited). Accurate network load models can improve network state estimation and increase the ability of networks to more fully allocate available capacity (and reduce buffers required to manage uncertainties).

N5. Tariff and incentive design
Understanding what EVSE assets customers have, allows for more targeted experimentation with tariffs and incentives aimed at improving the efficiency of EV charging while ensuring customers are not adversely impacted. For example, a network could directly target customers with a specified EVSE type, having some confidence that those customers have the technical capacity to respond.

N6. Mandatory tariff assignment
EVSE standing data can support mandatory tariff assignment (such as in Victoria), to benefit consumers. This policy is intended to encourage efficient EV charging and thereby reduce costs for all electricity consumers.

AEMO DATA USE-CASES

A1. Stability analysis and emergency planning
Operating the power system requires an understanding of how CER would respond to changes in system voltage and frequency that may could occur due to a sudden loss in generation or load. This is particularly relevant for inverter-based CER, including EVSE enabled for vehicle to grid, and aggregated (or otherwise coincident) loads. Understanding the performance characteristics of EVSE is also a critical input into emergency response planning, such as in the event of a 'system black'.

A2. Congestion management
AEMO uses load models, along with generation forecasts, as an input into transmission congestion models. Accurate CER generation and load forecasting can improve the efficiency of curtailment decisions, reducing these costs. As EV penetration grows, it is expected that EV load modelling will become increasingly material to AEMO's congestion models and curtailment/mitigation decisions. This includes the identification of optimal solutions to alleviate congestion.

A3. Generator performance standards
A better understanding of the potential changes in load on the transmission network, and how load may respond to different conditions or events, can assist AEMO develop and apply technical performance requirements for large-scale generators in a manner that reduces generator costs and the complexity of grid connection processes that arises from uncertainty in load characteristics.

A4. Longer term planning
The extent, location and timing of EV charging load is a major input into AEMO's longer-term planning functions, including the Integrated System Plan and the Electricity Statement of Opportunities. These models underpin the investment case for new large-scale generators and transmission infrastructure. Improving the accuracy of these models can have material implications for resource adequacy planning and market intervention decisions, which ultimately effect long-run electricity prices for consumers.

OTHER DATA USE-CASES

O1. Government and researcher use-cases

Other parties, such as governments and researchers and emergency services agencies, also have an interest in EVSE standing data. AEMO provides a dashboard by which third parties can view and download summary data from the current DER Register. These are provided to the postcode level and updated quarterly.

O2. Emergency services use-cases

Emergency services agencies have demonstrated an interest in DER Register data and report that EVSE standing data can enhance their capacity to provide an efficient and effective emergency response. DER Register data can be integrated into information systems used by emergency responders. While this use case is considered a relatively low priority for EVSE standing data, fire services organisations are an existing user of the DER Register and should continue to be supported if they have an interest in EVSE standing data.

O3. Installer update/delete CER use-case

To ensure CER/EVSE data remains accurate over time, provision should be provided, such as through the DER portal interface, for installers to update or amend EVSE data in the register when undertaking a new or replacement installation.

O4. Industry use cases

Initial consultations with EVSE OEMs, and EV industry representatives, indicates there is limited benefit in providing industry access to EVSE standing data, outside of satisfying personal or narrow commercial interests. The primary, and separate, reported interest of industry is in obtaining information on local network congestion to assist with the siting of charging infrastructure. This data use case is being separately explored through the ESB's Priority Project: Network visibility for market planning.

O5. Consumer use cases

Details of the history of CER in a particular premise may be used by the original or subsequent owners of the premises. This may assist consumers and their agents in scheduling maintenance, in making warranty claims, or in establishing the history of installations, and changes in technology uses. This information can be accessed by an installer and shared with the relevant customer.

QUESTION: USES OF EVSE DATA

Planning for the collection of EVSE standing data requires prospective data users and use-cases to be considered.

Is the current characterisation of the EVSE standing data users and use-cases sufficient?

Yes / No

If not, what else should be considered?

Test	Description
1. **Clear purpose**	Data should only be collected where there is a link to a clear purpose or use-case that is of substantial value to electricity consumers (i.e. consistent with the National Electricity Objective) and where that cannot be satisfied by an existing data collection method.
2. **Validity**	Not to be confused with 'validation', validity can be considered as the degree to which the data being collected is a reasonable indicator of what it is intended to represent. For example, the sum of max load capacity of EVSE at a site may not be a valid measure of the total load that can be expected at a site. This may be more validly measured via the power circuit rating of all EVSE at site.
3. **Data minimisation**	EVSE standing data collection adds cost and complexity to installation processes and contributes to data management and processing costs and risks. Data collection should therefore be kept to the minimum level necessary to achieve the stated purpose. Cyber risk means that private or commercially sensitive data collection should be avoided where suitable alternatives are present. Automated data collection from centralised sources can reduce time and effort and reduce data entry errors.
4. **Internal and external consistency**	The utility of data sets can be enhanced when standardised fields are used. This supports more efficient data processing efforts and supports analysis across alternative data sets (and data holders).
5. **Maintainability**	Data should be structured to minimise the need for changes over time. This can be achieved by providing flexible data entry (balanced against *Test 4*) and by not collecting data that is likely to be highly dynamic in its scope and structure over time. Maintainability is especially important when multiple data applications are connected (e.g. DNSP installer apps, AEMO DER Register Portal, CEC Product Database). Changing one system can have material implications for another, increasing costs and undermining data quality and completeness.
6. **Role alignment**	Data collection should be limited to the specific, and generally accepted, roles and functions of data users (e.g. for AEMO, power system planning and market operation). This can justify and improve the 'social licence' for data collection, management, and reporting processes and reduce legal risk.

BIASING TOWARD NON-COLLECTION

- Collecting data has a cost, ultimately borne by consumers
- Data collection should be minimised, and where required: streamlined

DRAFT DATA SPECIFICATION

Draft EVSE data specification fields can be grouped into two categories:

- **Installation data** – information that is only created at the time of installation
- **EVSE data –** information that is linked to a specific make and model of EVSE. This information can be stored in a central database and auto-populated based on the installers selection of the EVSE make/model.

#	Data source	Field	Value options	Purpose
1	Installer	Installer ID	[ID Code]	Compliance monitoring
2	Installer	NMI	[Number]	Location / site lookup
3	Installer	Circuit rating (Amps) of all EVSE at NMI	[Number]	Physical capability
4	Installer	EVSE connection type	Standalone/BTM	Identify mixed loads
5	Installer	EVSE type/make/model	[Select from list]	EVSE Database (DB) lookup
6	Installer	Phases	Single/Two/Three	Physical capability
7	Installer	Local energy management	Yes/No	Communications capability
8	Installer	Remote energy management	Yes/No	Communications capability
9	Installer	Internet connected	Yes/No	Communications capability
10	Installer	Ownership status	Private/Public/Fleet	Collect for transport planning
11	Installer	Commissioning date	[Date]	Time series analysis
12	EVSE DB	AC V2x capable	Yes/No	Physical capability
13	EVSE DB	DC V2x capable	Yes/No	Physical capability
14	EVSE DB	Max power import rating (A/C, kW)	[Number]	Physical capability
15	EVSE DB	Max power export rating (A/C, kW)	[N/A or Number]	Physical capability
16	EVSE DB	ISO/DIS 15118 version	[N/A or select from list]	Interoperability capability
17	EVSE DB	OCPP version	[N/A or select from list]	Interoperability capability
18	EVSE DB	IEEE 2030.5 client version	[N/A or select from list]	Interoperability capability
19	EVSE DB	CSIP-Aus client version	[N/A or select from list]	Interoperability capability
20	EVSE DB	Other comms protocol	[Text]	Interoperability capability
21	EVSE DB	Remote firmware upgradeable	Yes/No	Interoperability capability
22	EVSE DB	AS4777.2 version	[N/A or select from list]	Performance characteristics
23	EVSE DB	Energy metering specification	[N/A or select from list]	Market capability
24	EVSE DB	FCAS metering specification	[N/A or select from list]	Market capability

Not included

Data source	Field	Value options	Reason for not including / test	DEIP Req.
Installer	EVSE product serial numbers	[Number]	Purpose, minimisation, maintainability	No
Installer	Firmware version	[Text]	Maintainability	No
Installer	Controlled load circuit	Yes/No	Minimisation, can infer from NMI	No
Installer	Circuit rating (Amps) per EVSE	[Number]	Purpose, minimisation, validity	No
EVSE DB	EVSE connector type	[E.g. CCS / CHAdeMO]	Purpose, minimisation	No
EVSE DB	AS/NZS 4755 version	[N/A or select from list]	Purpose, minimisation	No
Installer	GPS location	[Number]	Minimisation, role, can derive from NMI	Yes
Installer	No. chargers per station	{Number]	Purpose, minimisation	Yes

QUESTION: DATA COLLECTION CONSIDERATIONS

The paper favours collecting the minimal possible to meet data user requirements.

Looking at the previous slides, are there any other important considerations in deciding what data to collect?

Yes / No

If “no”, what are those considerations?

POTENTIAL DATA REPOSITORIES

	System	Scope	Limitation	EVSE standing data candidate assessment
1	Clean Energy Regulator, Small-scale Renewable Energy Scheme (SRES) data	Comprehensive CER product and installation details, confirmed by the accredited system installer.	Does not cover systems installed outside the operation of the SRES Scheme (i.e. limited to solar and solar/heat pump water heaters).	Would require the establishment of a reconstituted version of the Clean Energy Regulator, with national regulatory powers that extend beyond SRES operation.
2	Clean Energy Council, Product listing data	Lists product and product details, including inverter model numbers, and compliance-related features.	Only provides details provided voluntarily by manufacturers and does not include installation details. This is a voluntary industry program, operated on a cost-recovery basis, without statutory duties.	Would require the development statutory powers and duties for the CEC. Program operates outside of established data protection frameworks that apply to government. CEC product listing processes could be leveraged as a source of EVSE model data.
3	SAPN EVSE data capture	Comprehensive installation and product data is captured via an online portal.	Only covers South Australia.	Only applies to South Australian installations of L2 chargers >20A. EVSE standing data specifications and collection system could be leveraged.
4	Electrical Equipment Safety System Database	A national register of electrical equipment, mandated by ERAC members.	Relates to electrical safety standards, and is not mandated in NSW, the ACT, or SA. Does not include installation details.	Registration is based on three levels of safety to increase consumer safety. The registration obligation is with OEMs and does not include installer obligations. The EESS could be leveraged as a source of EVSE model data.
5	AEMO DER Register	Comprehensive CER product and installation details, confirmed by the responsible installer.	Does not cover new systems that are not embedded generators. Would need to be extended to EVSE.	The existing national regulatory framework makes this option the most viable, however there are underlying operational and regulatory issues that need to be addressed to ensure data quality and completeness.

AEMO’s DER Register is considered the only suitable existing national repository that could be readily extended for the purpose of EVSE standing data collection.

QUESTION: DATA REPOSITORY

AEMO's DER Register database is considered the logical place to store EVSE standing data.

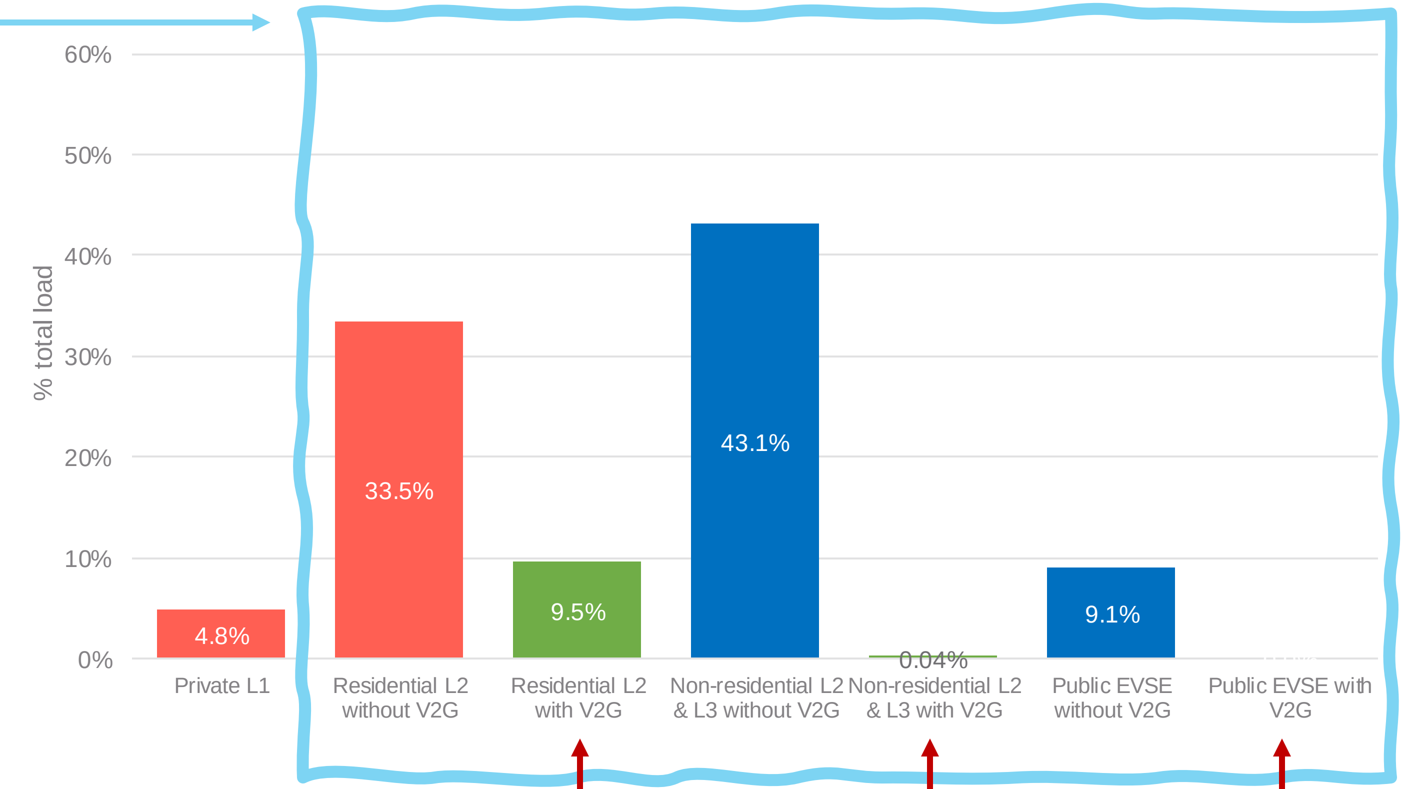
What is the most the logical place to store EVSE standing data?

1 – 5 or "Other"

Why?

Potentially required to support the full range of potential data use-cases

Estimated breakdown of load by EVSE charger type, ***2036-2037*** *(ISP 2022 Step Change scenario)*



Able to be captured under the current DER Register reporting arrangements

POTENTIAL REPORTING TRIGGERS

An obligation to report EVSE standing data to the DER Register during the installation of EVSE can be attached to a range of reporting triggers. These are:

1. On revision of a customer connection agreement (e.g. V2G or 3-phase)
2. When certification of electrical safety is required by a jurisdictional safety regulator
3. Upon installation of a smart meter
4. Upon installation of specified EVSE Type/Mode
5. Upon installation of EVSE with a particular electricity circuit rating (e.g. 15 or 20 Amps).
6. <u>Upon installation of any EVSE by an electrician</u>

Each reporting trigger has advantages and disadvantages.

POTENTIAL REPORTING TRIGGERS

Greatest coverage (>95% of future EV charger load) will come from requiring **any EVSE that is installed by a licensed electrician** to be reported.

This may also be the ‘simplest requirement’ for customers and installers to understand.

Reporting trigger	How the requirement would apply	Advantages	Disadvantages
6. Upon installation of any EVSE by an electrician.	Requiring an electrician to enter EVSE standing data in the DER Register, as a requirement under DNSP service and installation rules, whenever an electrician installs an EVSE.	Would ensure consistent national coverage, an extension of the existing DER Register. Would maximise capture of EVSE data.	Would require an extension of the DNSP service and installation rules, involving varying operational issues across DNSP regions.

QUESTION: EVSE REPORTING TRIGGER

Reporting triggers will have implications for data completeness, as well as installation processes.

Balancing all considerations, what is the most preferable reporting trigger?

1 - 6 or “other”

Why?

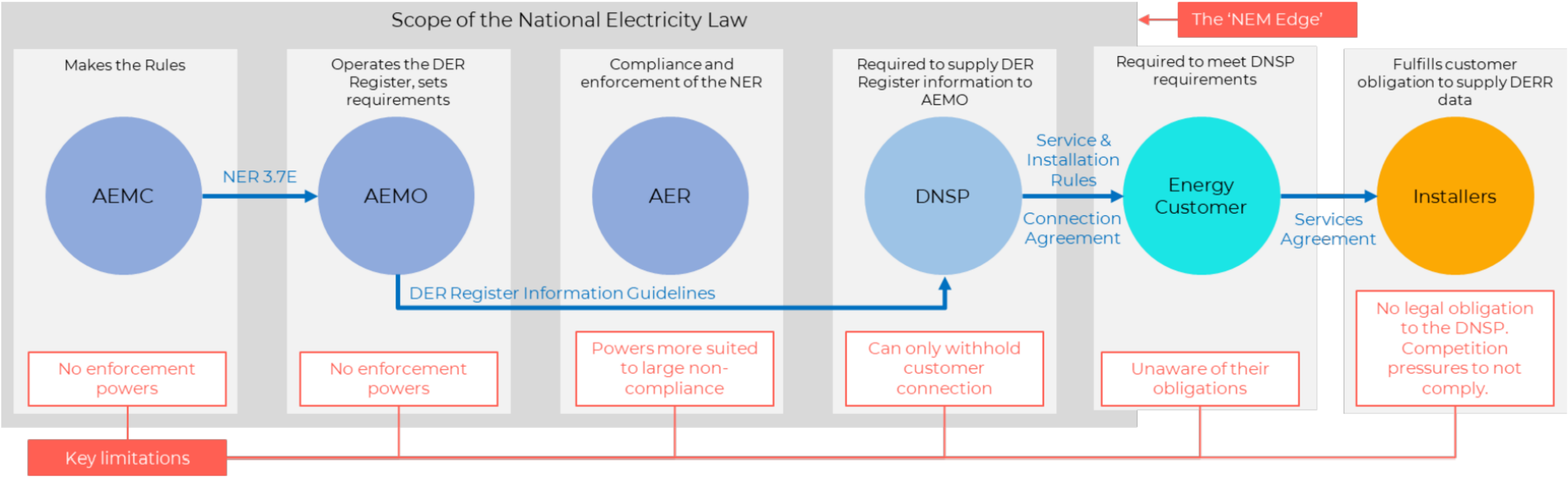
Summary of alternative regulatory frameworks to enable EVSE standing data reporting to the DER Register.

While the DER Register Guidelines are an appropriate tool, existing reporting frameworks are subject to limitations that could undermine compliance by installers.

Name	Legislative Instrument	Obligated party	Enforcement mechanism	Key limitations
A. Extend DER Register Information Guidelines	DER Register Information Guidelines (potential amendment to NER 3.7E)[40]	DNSP	Requirement passed onto customers and installers under DNSP service and installation rules and/or the connection agreement.	Limited incentives for, and oversight of, installer compliance.
B. State-based implementation	State Safety Legislation	Electrician	Extension to existing electrical licencing and inspection regimes	Fragments regulatory landscape. Substantial policy decision/change
C. National CER Regulator	Commonwealth legislation or NEL amendment	Electrician	New technical inspectorate	Substantial policy decision/change
D. Incentives to report	N/A	Electricians provided incentives to report	Program management and compliance framework.	Unlikely to achieve compliance without substantial new funding.
E. Industry self-regulation	N/A	Electrician under installer accreditation	Program management and compliance framework.	Unlikely to achieve broad coverage

BROADER REGULATORY CONTEXT

The DNSP's obligation to collect DER Register data is formally allocated to the energy customer. The primary remedy for non-compliance lies against the customer in the form of delaying or refusing connection. The DNSP has no 'formal' mechanism to compel compliance by the installer. Compliance may be worse for EVSE than for solar/batteries as they are not subject to SRES installer training requirements or connection agreement processes.



QUESTION: IMPLEMENTATION

The paper considers that the most immediately viable regulatory framework to support implementation is extending the regulatory framework that supports the DER Register.

Which regulatory implementation option is your preferred approach to implementing EVSE standing data collection?

A – E or “other”

Why?

NEXT STEPS

The ESB invites comments from interested parties in response to the consultation paper by **10 February 2023**.

All submissions should be sent to info@esb.org.au