S&C ELECTRIC COMPANY
Excellence Through Innovation

141 Osborne Street
South Yarra VIC 3141
Australia

Ms. Daniela Moraes
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Our Ref: JC 2018-057

05 April 2018

Dear Ms. Moraes,

S&C Electric Company response to the Rule Change – Register of Distributed Energy Resources

S&C Electric Company welcomes the opportunity to provide a response to the Rule Change Request for a Register of Distributed Energy Resources.

S&C Electric Company has been supporting the operation of electricity utilities in Australia for over 60 years, while S&C Electric Company in the USA has been supporting the delivery of secure electricity systems for over 100 years. S&C Electric Company not only supports the "wires and poles" activities of the networks, but has delivered over 8 GW wind, over 1 GW of solar and over 45 MW of electricity storage globally, including several battery projects in Australia.

S&C Electric are particularly interested in facilitating the development of markets and standards that deliver secure, low carbon and low-cost networks and would be very happy to provide further support to the Australian Energy Market Commission on the treatment and potential of emerging technologies and approaches.

Yours Sincerely

Dr. Jill Cainey
Global Applications Director
Email: jill.cainey@sandc.com
Mobile: 0467 001 102

141 Osborne Street
South Yarra VIC 3141
Australia

General Comments

We strongly support the development of a register for connected Distributed Energy Resources (DERs). We believe that AEMO is the responsible party best placed to administer and operate the register. AEMO is also the key beneficiary of the register as will allow for better forecasting of both distributed demand and generation. AEMO, though, are not the only party that would benefit, since DNSPs are likely to benefit from a greater understanding of what is connected and where to their networks.

Compliance

A major challenge will be ensuring that installers notify the DNSP of any new DERs. For DERs in receipt of an incentive, this may be captured by the CER, but in any case, an incentive should not be received unless the DER is registered.

A level of compliance maybe achieved through accreditation and training (an installer might not receive accreditation if they don't comply), but there will always be non-accredited installers.

All of these routes to compliance are probably not within the sector over which the AEMC has jurisdiction, so complicating making a rule around compliance.

Advanced Metering information

Advanced metering data is probably most powerful source of data to allow better management of the system and networks, both for investment decisions and day-to-day operation. However, advanced meters are not deployed fully throughout the NEM and the Power of Choice process may have already limited access to the data for certain industry parties, including those that might be able to generate more efficient investment outcomes if they had access to the data.

There are additional issues around data security with metering data, with an assessment for the Energy Networks Association in the UK indicating that it is possible to disaggregate aggregated anonymised data to reveal electricity use at the individual household level and that aggregated smart meter data considerably reduced the benefits of that data to understanding and managing the networks [Smart Meter Aggregation Assessment Final Report. EA Technology, June 2015. Report 96240 and Smart Meter Aggregation Assessment Final Report - Benefits Reduction, EA Technology, July 2015, 101950 - 1.3].

Future services from DERs

Where a DER is able to provide a service to the System Operator, the DER should be on the Register. In some cases, the owner of the DER may contract direct with AEMO, but it is likely that any service contact will be via a Retailer, Aggregator or other entity in the electricity industry, who may also be the installer. These current or future entities should have an obligation placed on them to ensure that DERs being used to provide a paid for service (to the System Operator or the DNSP/TNSP) or are receiving a tariff benefit (e.g. reduced tariffs for offering to support the system), are on the Register.

Data Management

There are several significant current streams of work on data access and management in the Energy sector:

COAG Energy Council: Facilitating Access to Consumer Energy Data – Consultation Paper

COAG-ESB: National Electricity Market Data Strategy

141 Osborne Street
South Yarra VIC 3141
Australia

Treasury: Review of Open Banking (which will apply to energy in due course, with Chapter 2 setting overarching principles)
Most of this work is not finalized, but any Register for DERs should fit within the approaches being developed and should also provide the necessary consumer protections.

Synergies
AEMO is likely to be the responsible party for the Facilitating Access to Consumer Energy Data scheme and so having AEMO as the administrator of the Register is appropriate.

There have been some concerns expressed that AEMO will have a monopoly on many aspects of the electricity sector. However, at least in the short-term, AEMO is the party that most benefits from access to the data and Register and is best placed to deliver these initiatives efficiently.

Sharing of data, both metering and the static data in the Register will need to be managed carefully and securely, as well as ensuring that other parties, such as DNSPs, who can benefit from the data to deliver cost-effective investment outcomes, have appropriate access.

New Technologies
The Register will need to include guidelines on how to determine whether a new DER (e.g. electric vehicle, micro-CHP) is a "notifiable" technology. Will this be capacity-based? Only inverter-based technologies (not electric vehicles), based on import and/or export characteristics? These guidelines may need to be modified in the future, as networks change and as operating the system changes.

Complexity and data requirements
The Register will hold static information, such as this property has rooftop solar PV and a battery. This information alone will not tell AEMO how the DERs interact and their subsequent impact on the system. Export from a property with both solar PV and a battery will be highly dependent on the state of charge of the battery. If the battery is fully charged, export will be immediate, but dependent on other self-consumption. The battery is empty, then it may begin charging and other demand may need to be met via import.

It may be that metering data (import/export with time) will be more useful (see above comments on Advanced Metering).

Retailers
Retailers are currently leading the way in deploying behind-the-meter batteries on customer sites, to create "virtual power plants" (see recent announcements in South Australia). An obligation can be placed on Retailers to register DERs.

S&C ELECTRIC COMPANY
Excellence Through Innovation

141 Osborne Street
South Yarra VIC 3141
Australia

Response to Questions

Issue 1 Assessment framework

1. Is the assessment framework appropriate for considering the proposed rule changes?
   Yes
2. Are there other relevant considerations that should be included in assessing the proposed rule changes?
   See General Comments on current data sharing activities.

Issue 2 Benefits of a register

1. What are the likely uses of a distributed energy resources register?
   The Register will support improved short-term and long-term forecasting by AEMO and the DNSPs, underpinning investment decisions and operational decisions.
   In conjunction with the data access scheme those forecasting goals will be easier to meet, as well as providing information to other parties in the electricity sector (e.g. Retailers), which may well deliver reduced cost outcomes to customers.
   The Register may support better management of peak demand e.g. air conditioning load in extreme heat events.
   Issues around safety for customers and emergency services. The Register will be particularly useful to manage product recall. While it will be useful for emergency services to know that there is a DER at a particular location, this information will need to readily and quickly available to facilitate appropriate responses. See Issue 7 for more detail.

2. How, and to what extent, could the static information provided by a DER register meet the objectives outlined by the COAG Energy Council, namely:
   See comments on static versus time-resolved data (e.g behaviour of DERs).

   (a) more accurate load forecasting?
   (b) improving AEMO's ability to manage power system security during credible contingency, protected and non-credible contingency events?
   (c) improving AEMO's ability to set the bounds of the technical envelope at an efficient level?
   (d) improving efficient market and network investment?

3. Are there any other ways that a distributed energy resources register could benefit the National Electricity Market?
   If the much-mooted role for DERs in providing system support services (via AEMO's ancillary service markets), then the static register would provide evidence of the capacity and location of such services. It would also indicate the potential for such services and the balance between demand management approaches and DERs that can export to support local demand.

4. What features does a register need to have in order to meet the objectives outlined by the COAG Energy Council?
   The inclusion of data that allows sight of the *behaviour* of DERs would be helpful, that is, in addition to the static data of where a DER is located, data on how it is operating (from meters)

141 Osborne Street
South Yarra VIC 3141
Australia

would further support forecasting efforts and the development of novel tariffs to incentivise behaviour that supports the networks and system operation.

Issue 3 Expected costs

The setting up and management of the register will require investment and will have running costs. However, we need to remember that the deployment of DERs has a system impact, including increased costs for managing the system and mitigating the technical issues caused by DERs. A lack of knowledge about DERs connected to the system results in inefficient investment, which end customers also pay for. It is likely that the benefits of a Register will out weight the costs of setting up and running the Register, by avoiding the inefficiencies and current increased costs wrought by a lack of knowledge of DER deployment.

1. What costs do you believe would likely be involved in the collection of useful data about DER?
   No comment
2. Do you agree with the costs identified by Jacobs for different stakeholders? If not, why?
   No Comment
3. Are stakeholders able to provide data or case studies that would support further quantification (in monetary terms) of any of the likely costs?
   No comment
4. How might the nature and magnitude of these potential costs change over time?
   No comment

Issue 4 Governance framework for the register

1. Please comment on the suitability of the following:
   (a) Should 'small scale' systems be limited to generation systems below 5 MW? Should any further limitations be imposed (e.g. a minimum capacity or a threshold in MWh for energy storage)?
   Advice should be taken from AEMO on what is the minimum size they need for effective understanding of DER impact on system operation. Also, the DNSPs may have a view on capacity related to impact.

   However, behaviour or operation of the DER may have more impact on management of the network or NEM and this would need time resolved data to understand or manage. “Appropriate” behaviour could be incentivized with tariffs and if the Retailer’s pass through DNSP charges, a time-based charge could also encourage “appropriate” behaviour.

   The capacity that may be critical now, is likely to change in the future, so there needs to be a process for modifying the minimum size.

   Care is needed with electricity storage since it can swing from full import to full export rapidly, which would be seen as a loss of load, followed by increase in export (if directly connected to the network). Even behind the meter (no connection to the network), the behaviour of the electricity storage will have an impact on forecasting.

141 Osborne Street
South Yarra VIC 3141
Australia

May need to consider other technologies besides generation and inverter-based technologies. Large loads and CHP will also impact on the operation of the network and wider system. Large loads can still provide system support services, through demand management.

NOTE: Electricity storage is: electricity in, storage, electricity out.
Energy storage is: electricity in, storage, other vector out, such as heat, cold or hydrogen. Energy storage is only a load on the system, since the electricity is transformed to another energy vector. This load may have an impact on system operation, e.g. a hot water tank.

An electric vehicle could be classed as a load only, unless it is able to export to the network, when it would then be both a load and export.

(b) Is the NER definition of 'connection point' an appropriate spatial demarcation for 'behind the meter' DER? If not, what is an appropriate spatial demarcation for 'behind the meter' DER?
Care is needed here, since a DER that is not capable of export to the wider network (so not “connected” to the system) may still have a significant impact on network and market operation. Anything that modifies load/demand will impact on the ability to forecast demand.

(c) Is a 'distributed energy resource' "an integrated system of energy equipment co-located with consumer load"? If not, what else could it be characterised as?
A DER could also just be a “significant” load. A DER could be entirely behind-the-meter (no export possible) or interconnected (export possible).

2. Regarding the management of a DER register:
   (a) To what extent should the types and capacity of DER eligible for inclusion in the register be defined in the NER or in an AEMO guideline?
   It is unclear where the definition of what constitutes a DER should sit and where the technical parameters of and DER should be detailed. Other current consultations may capture this information, but where-ever the definitions are laid out, they should be relatively easy to modify to allow the addition of new technologies and new technical requirements.

   (b) Should the nature of the information being collected and recorded in the register and any other requirements, such as how often parties need to report the data, be determined in an AEMO guideline?
   This may be covered through other instruments (e.g. Open Banking).

   (c) What types of principles, factors or other criteria should AEMO be required to consider when developing guidelines on the collection and recording of information on DER?
   Data security and who can access the data. A key issue is that some DERs may be located at a property address (solar PV, battery) and are highly unlikely to move with the customer. Some DERs (electric vehicle) will move with the customer and change location.

   Changes to the DER, location and technology (brand, capacity) should be notified to the Register, when they occur. See Issue 5.

141 Osborne Street
South Yarra VIC 3141
Australia

Issue 5 Data collection and compliance

1. How often does the data need to be collected and updated to achieve the objectives of a DER register?
   The data needs to be collected at connection and updated whenever there is a change to the DER (brand, type, capacity).

2. Do you agree that there is a need for consistency across network regions in what data should be collected?
   Yes, there should be national (NEM-wide) consistent requirements for the type of data recorded in the Register.

3. If DNSPs' connection application processes are considered a good method of collecting data, what changes are needed to existing processes?
   The connection process is certainly one avenue to collect data and the ENA is currently developing nationally consistent connection criteria, so collection of data for the Register needs to link up with the Technical Guidelines for the ENA process.

4. Should obligations on parties other than DNSPs be considered to support data collection? If yes, which parties are best placed to collect and report this data?
   Installers, Retailers (currently initiating installation); the connectee (the customer); Sellers of DERs (retailers and manufacturers).

5. How would an obligation on the parties identified above best be applied and enforced? Please provide details.
   There are multiple parties, and those that do not fall under the jurisdiction of the Rules will be difficult to motivate. Retailers are one entity that do come under the Rules.

6. Will a register be beneficial if the levels of compliance in relation to providing information are similar to the low levels of compliance with the DNSP connection application processes? What levels of compliance are needed?
   Levels of compliance are currently low. Low compliance will limit the effectiveness of the Register to support forecasting. However, some of the low compliance may be due to complexity of the connection process and lack of awareness as to why DNSPs and AEMO need to know where DERs are located.

7. How else can compliance levels be improved?
   Why can't the owner of the DER (customer e.g. home-owner, landlord etc.) be required to report their DERs to the DNSP/Register?

   Insurance. How do insurers monitor the installation of DERs to insured properties?
   If the DER is being offered to AEMO or the DNSP to provide a service, whether remuneration is a fee for the service or a tariff that is designed around providing a service, then that DER should be registered before receiving any financial benefit.
   If there is a benefit to registering the DER either directly to the connectee or the party providing the DER (installer, retailer), such as accreditation or on-going accreditation, or access to special tariffs and/or markets, then this may incentivise registration.

141 Osborne Street
South Yarra VIC 3141
Australia

8. How can compliance best be maintained over time as technology changes?
   It needs to be a requirement on the connectee.

Issue 6 Sharing data and privacy issues

Data sharing and privacy are addressed under the application of the Open Banking proposals to the energy sector.

1. Given the nature of information that may be required to be provided by registered participants under the proposed rule change, are existing regulatory arrangements (such as the protected information provisions under the NEL and Privacy Act 1988) regarding the collection and disclosure of information adequate to protect market participants and consumers whose DER systems are included in the register?
   No further comment.

2. If not:
   (a) What are the likely nature, and magnitude, of potential consequences of insufficient protection of such information?
   (b) Should the NER limit, on the basis of confidentiality concerns, the information that registered participants or others would be required to provide to AEMO under the DER Register Guidelines? If yes, how?
   (c) Should the NER limit, on the basis of confidentiality concerns, how AEMO may use or disclose information provided to it under the DER Register Guidelines? If yes, how?
   No further comment.

3. Are there any competition concerns raised by the establishment of the register?
   We are comfortable with AEMO having the responsibility for the Register and the data sharing.

Issue 7 Safety issues and emergency response

The draft Australian Standard AS5139, “Electrical installations - Safety of battery systems for use with power conversion equipment” detailed the necessary signage for properties with a battery, to alert emergency services. A Register of DERs would need to be easily and quickly accessible (a map?).

The same draft standard set installation guidelines that would provide protection to both emergency services and customers (home owners).

However, the small-scale battery industry has been resistant to this standard. Although, it should be noted that established (international) manufacturers, particularly that sell products into the US market, already meet safety requirements that are more stringent than those proposed in AS5139 (e.g. UL 1973). While an internal fire (battery initiates the fire) is rare, engagement of a battery in a fire started from other sources is more likely (house fires, bushfires etc.). Some manufacturers deliver their systems in an enclosure that protects the batteries within from an external fire. Where this is not the case, the batteries should be located in a purpose-built enclosure to ensure a property is protected from both an internal and external fire.

141 Osborne Street
South Yarra VIC 3141
Australia

The requirement to deploy certain battery chemistries outside a building in an appropriately fire-rated enclosure particularly troubled the local industry, but batteries are energy dense, there is an arc flash risk and an issue of toxic fumes during combustion (Hydrogen Fluoride for Li-ion batteries), so some battery chemistries do need to be appropriately installed to protect both the owner, neighbours and the emergency services.

Presumably, the emergency services are able to manage generation assets (solar PV, but also batteries), which may still be exporting electricity? What are the guidelines and information requirements for this?

1. Would the sharing of data collected under a DER register be useful to emergency services, and if so, how?
   Yes, knowledge of where a DER is located and its hazard rating (toxic gas, explosion, fire risk etc.) would allow the emergency services to respond appropriately.

   This is no different to making emergency services aware of hazardous materials (chemicals, gas cylinders etc.) for larger facilities in Australia.

2. Are there existing mechanisms currently in place (e.g. requisite IT systems) that could facilitate the practical sharing of data with emergency responders on a real-time basis?
   Not known

3. Is the proposed DER register the most practical mechanism to provide emergency services with the required information?
   Signage on a property is probably the most effective approach (when it is actually used) to inform emergency services of the hazards on a particular site. But currently there is no requirement for signs related to DERs.

4. What important features does a register need to have in order to meet the needs of emergency services?
   The additional information required to make the Register useful to the emergency services would be detail on the hazards associated with a particular DER.

5. To what extent is energy related information already shared between relevant bodies (e.g. AEMO/CER) to emergency services for safety reasons?
   Not known.