S&C ELECTRIC COMPANY
Excellence Through Innovation

141 Osborne Street
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Australia

Sarah-Jane Derby
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Our Ref: JC 2018-068

21 May 2018

Dear Ms. Derby,

S&C Electric Company response to the AEMC Directions Paper – Reliability Frameworks Review

S&C Electric Company welcomes the opportunity to provide a response to the Directions Paper covering the Reliability Frameworks Review. Our views have not substantially changed since February 2018.

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 batteries in Australia and New Zealand. We have also deployed over 30 microgrids combining renewable generation, storage and conventional generation to deliver improved reliability to customers.

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 Market Energy Commission on the treatment and potential of emerging technologies and approaches.

Yours Sincerely

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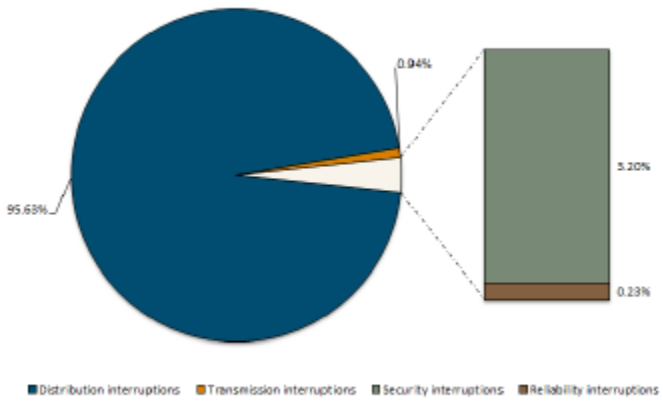
General Comments

Figure 2.1 (page 13) is very interesting. The Discussion Paper is largely focused on the 0.23 % of reliability issues (failure of generation to meet demand), however reliability (service interruptions or "security") as monitored by the AER via the Service Target Performance Incentive Scheme (STPIS) for the Distribution Network Service Providers (DNSPs) suggests some significant effort is needed here.

Figure 2.1 Sources of supply interruptions in the NEM: 2007-08 to 2016-17



Source: AEMC analysis and estimates based on publicly available information from: AEMO's extreme weather event and incident reports and the AER's RIN economic benchmarking spreadsheets.

Figure 2.1 illustrates the very real issues of the reliability provided by DNSPs, with over 95 % of outages resulting from issues on the distribution network. Relying on the demand-side or DERs connected at the distribution level, to provide services and support to AEMO, will not be successful, if those assets are disconnected due to an outage on the distribution network. That is, hoping to address the 0.23 % using assets connected to the network that is out of action for over 95 % of the time, seems doomed to failure.

Inverter connected assets are required to disconnect during an outage, even an outage of less than a minute (so shorter than the proposed new definition for a momentary outage in the STPIS), which will render them unavailable. Issue with voltage quality (not even an outage) may also result in the disconnection of inverters. Any hope that DERs will support the system in the future will not be met, fi reliability on the distribution network is not radically improved.

The AEMC is not responsible for the STPIS, but it would seem that *appropriate* incentives are needed to encourage DNSPs to improve reliability ahead of any desire for DERs to deliver system support. Recent reports suggest "gold plating" (capex bias), but this doesn't seem to have resulted in improved performance. Given we have very little understanding of the value that end customers place on reliability, it is difficult to gauge whether customers feel the cost of the networks is appropriate. We do welcome the current rule change request to place the responsibility for determining the Value of Customer Reliability on the AER, particularly if this then flows into DNSP operation and standards. It is likely that customers will place a high value on reliability, but equally, will not want to pay increased network charges to deliver the required reliability (see https://www.enwl.co.uk/voll for a UK innovation project on the Value of Lost Load to different customers).

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1: Forecasting

Accurate and precise forecasting of generation and demand obviously supports reliability and we would support all measures that enable AEMO to better forecast demand and generation.

In the UK, Retailers (Suppliers) are required to provide a demand forecast to the System Operator. They are also subject to "imbalance" assessments to ensure that purchased generation matches demand. Mismatches are subject to cost-reflective "imbalance" charges. The suggestion that Retailers to contribute to AEMO's forecasting by providing forecasts of demand is a good one that should be developed further.

Both generators (of all types) and Retailers will be undertaking their own forecasting to manage their positions and it would seem sensible to share those forecasts (or some elements of that forecasting) with AEMO to facilitate better management of the system and market.

2: Day-ahead Markets

The AEMC argues that there is already an ad hoc day-ahead solution and that there is not convincing evidence that a day-ahead market is needed. If there already an ad hoc day-ahead process, then clearly there is a need and it should be properly formalised and the only discussion should be the format of the day-ahead market.

If the US-model, Participant-SO, will improve reliability and support AEMO to deliver reliability at a lower cost, then this should be the preferred option. It also has the benefit of promoting demand side response and other sources of rapidly responding flexibility.

3: Role of DSR

Demand response, through load shedding, is currently an *emergency* action in response to a contingency. We need to move away from demand response as a "last resort" and it needs to be a standard approach to providing flexibility in the NEM.

Aggregation is underdeveloped in Australia and in other locations, such as the UK, the Transmission System Operator (TSO), National Grid, is actively facilitating the participation of the Commercial and Industrial (C&I) Demand Side: http://powerresponsive.com/. National Grid as the TSO has always used C&I demand response, particularly for Short-Term Operating Reserve (STOR) and there is a Frequency Control by Demand Management (FCDM) product. Even so, National Grid has had to review its contract arrangements and service definitions (technical and minimum size) to better engage with Aggregators and C&I customers. This demonstrates that even in an environment where demand response is facilitated, improvements to markets and contracts are required.

In the GB system demand response can be contracted direct with National Grid, if a large C&I provider (based on metering type) or Aggregators will pull together smaller loads, typically form C&I customers, to meet minimum capacity requirements.

Domestic-scale demand response, outside the tariff-based Economy 7 and 10, is not yet broadly utiltised. This is because the loads are currently small and there are issues with engagement, retention and supply of enabling equipment that makes the costs of developing domestic-scale demand response uneconomic.

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The Low Carbon London project (see final report: http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-2-projects/Low-Carbon-London-(LCL)/) describes the issues od domestic-scale demand response to deliver a 1 MW service. Clearly it is much easier to engage with a single users or one or two large users, who understand the energy market (probably have a dedicated energy manager) to deliver 1 MW, than place a mandated requirement on all ~20,000 customers on a feeder to deliver 1 MW of response when required.

The Low Carbon London project estimated the cost of securing domestic-scale demand response as GBP2,000-4,000 per kW of response, due to the costs of engagement, retention, enabling technology (to communicated with load) and incentives. A diesel generation set (typically providing back-up to a C&I provider) is GBP1,00 per kW. A utility-scale battery would be GBP1,000 per kW. The cost for the domestic-scale response does not include the investment required by the householder in enabled technology, such as heat pumps, EVs etc.

Aggregators in the UK have the option of delivering demand side response to many participants in the electricity system, not just the System Operator. In the UK, Distribution Networks may use an Aggregator to help manage network constraints through demand response and as the AEMC points out, Aggregators tend to be specialists who can help customers, particularly C&I, manage their demand and energy use to deliver cost savings.

We would strongly support the development of markets, contracts and arrangements that facilitate the participation of C&I providers in demand response programmes in the NEM and that support the development and participation of Aggregators in the NEM.

4: Reserves

AEMO and the AEMC agree that a specific range of "RERT" products should be developed to ensure the service is better standardized and we support this approach.

The longer-term procurement of RERT is entirely reasonable when compared with the approach taken for the UK Capacity Market, which procures (via a reverse auction) reserves for winter evening peak 3-4 years ahead of the delivery year. The UK Capacity Market, also has a specific category for demand side response (to allow for specific capacities and technical requirements), that has been suggested to have facilitated the growth and participation of the demand side and batteries in the Capacity Market and in wider services (providers can combine a variety of income streams to make a project economic, as long as the additional income streams do not impinge on the ability of the provider to meet the terms of the Capacity Obligation).

AEMO is likely to procure reserves for summer and so it is reasonable to have a longer-term procurement process. 9-10 months is short in comparison to the UK model. The actual process of procurement should be short, but AEMO should have the ability to secure the contracts well in advance of delivery. In the UK the 3-4 year time span between securing a contract and delivery of the service allows demand-side response providers and Aggregators to build their portfolios, with an established price for the service making discussions with potential providers easier. Obviously, the contractual terms for a UK Capacity

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Obligation cover failure to deliver or develop a project and so care would be needed to ensure the appropriate contracts and obligations were developed for the NEM.