S&C ELECTRIC COMPANY
Excellence Through Innovation

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Lily Mitchell
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Our Ref: JC 2017-019 13 July 2017

Dear Lily,

S&C Electric Company response to the Consultation on Request for Rule Change (ERC0215)

S&C Electric Company welcomes the opportunity to provide a response to the request for Rule Change, proposedby Western Power relating to alternatives to grid-supplied network services.

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 "wires and poles" activities but has delivered over 8 GW wind and over 1 GW of solar globally.

Of particular relevance to this consultation is S&C Electric Company's work on microgrids in the USA (e.g. https://www.sandc.com/globalassets/sac-electric/documents/sharepoint/documents---all-documents/case-study-180-1076.pdf). The proposed AEMC definition of a microgrid is very narrow (page 11) and in most other jurisdictions is defined as "a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid *can connect and disconnect from the grid* to enable it to operate in both grid-connected or island mode." (Ton and Smith, The U.S. Department of Energy's Microgrid Initiative, *The Electricity Journal*, 2012: http://energy.gov/sites/prod/files/2016/06/f32/The%20US%20Department%20of%20Energy's%20Microgrid%20Initiative.pdf). Care is needed to ensure that any definitions used in Australia do not have unintended consequences.

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 these technologies.

Yours Sincerely

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Introduction:

Australia's Distribution Network Service Providers (DNSPs) need regulations and rules that best facilitate the transition to low carbon and secure electricity at lowest cost to the end consumer. A Stand-alone Power System (SPS) is one option that can meet the requirements to deliver secure electricity at lowest cost and is one sub-set of an approach that uses microgrids to deliver multiple benefits to customers.

A SPS may cover a reasonable geographic area, that is, the grid may not be "micro" in size and the assets contained within an SPS, including wires, poles, transformers, inverters, storage and generation, are complex to manage and deploy. A DNSP is best placed to deploy, manage and maintain a SPS or microgrid, since the skill requirements are identical to those needed to manage a "traditional" network.

A SPS is necessarily completely isolated from the wider networks and markets and this creates complications in managing a monopoly and ensuring competition. However, these complications can be resolved and should not be a barrier to innovative approaches that will deliver secure electricity supplies at lowest cost.

There are a variety of different business models that may support the fair operation of a SPS (e.g. the DNSP manages and maintains the "system", while a separate entity manages the retail aspects, with periodic review of the network costs and the energy costs). If a DNSP can demonstrate and continue to demonstrate that the particular approach to operating any single SPS delivers secure electricity at lowest cost to the connected customers, then that approach should be allowed.

General Points

The AEMC definition of microgrid is very narrow, requiring the microgrid to be separated from the National Electricity System (page 11), so disconnected from any other distribution or transmission system. Elsewhere the definition of a microgrid (e.g. USA Department of Energy) is: "a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid *can connect and disconnect from the grid* to enable it to operate *in both grid-connected or island mode*." We would suggest that a SPS is a sub-set of microgrids and that the ability to have microgrids offers benefits around resilience and security of supply.

Definition of a "distribution system" appears to currently require a connection to "another transmission or distribution system" (page 5), would appear to be a significant barrier to a SPS, but not necessarily to a microgrid as defined internationally (see above).

Western Power seek to restrict the rule change to transitioning communities that are currently connected to the network to a SPS (not connected to the network). A DNSP should have the option to provide a SPS to a new community (never connected to the network), where to do so, results in a secure supply at lowest cost to those customers.

Additionally, provision of a microgrid (under the broader international definition above), should be an option available to the DNSP for existing connected communities or new, never connected, communities, if it can be demonstrated that a microgrid delivers a secure supply at lowest cost to the connected customers.

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In terms of competition, the broader definition of a microgrid (where there is still a connection to a wider network) would facilitate competitive supply, expect under islanded situations and the later may need assessment for regulatory approaches, although any (new) regulations that would apply to a SPS may be appropriate for an islanded microgrid, accepting that islanding would normally be a temporary state.

Response to Questions

Question 1 Nature of issues

a. Do Western Power's concerns, as described in section 2.2, accurately identify the nature of any problems associated with distributor-led transitions from grid supply to off-grid supply in the jurisdictions that are part of the national electricity market?

   No comment.

   As Western Australia is not currently covered by the Law and Rules, any change to the Rules will not affect it (at least in the short term). The consumers and market participants who would be affected by the proposed change are those in the other states and territories of Australia, which are covered by the Law and Rules. Responses to the questions in this paper should be in relation to parties in Queensland, New South Wales, the Australian Capital Territory, Victoria, Tasmania, South Australia and the Northern Territory.

b. In relation to customers who currently have a grid connection, is there workable competition for off-grid supply systems, or are there barriers that significantly impede businesses that are not economically regulated (non-distribution businesses) from providing off-grid supply to these customers?

   If by "off-grid supply systems" the question means a SPS, then there may be barriers to ensuring access to the SPS from suppliers (retailers), but there are business models and businesses active in this space and there are various approaches (which would likely need to be regulated) to ensure that the DNSP provided access to non-regulated entities, which could include their own non-regulated businesses and care would be need to ensure liquidity and transparency in any process to engage a supplier for a SPS (e.g. the supply side of any SPS must be regularly reviewed/retendered).

c. Does the issue identified by Western Power, and any barriers from (b), indicate that it may be appropriate to allow distributors to provide off-grid supply as a regulated service, in certain circumstances?

   If the DNSP can deliver network and supply services to the SPS at demonstrated lowest cost, then it may be appropriate to allow the DNSP to offer both. Circumstances may include the absence of any entity prepared to offer supply to that specific SPS or only to offer it at high cost. A process to monitor and assess these arrangements is likely needed.

d. Other than concerns as to whether off-grid supply would constitute a distribution service, what barriers (such as other regulatory barriers or licence requirements) prevent distributors from seeking customers' agreement to move off-grid where it would be cost effective?

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Reliability standards, supply standards and whether a SPS, as defined meet any regulated standards. It is likely that this rule change may require adjustments in other instruments.

Question 2 Costs and benefits of moving to off-grid supply

a. Do you agree with Western Power's description of the costs and benefits of transitioning from grid supply to off-grid supply? What other costs and benefits should be considered?

No Comment.

b. What credible estimates are there of the current costs to procure, install and maintain (i) microgrids and (ii) individual power systems in fringe of grid areas of Australia? How are those costs broken down between electricity generation, network provision and retail costs/billing? How do these costs compare to the costs of providing electricity to such customers through the national grid?

We are not aware of any specific work in Australia on SPS costs and benefits (bar the CSIRO and ENA Electricity Network Transformation Roadmap 2017: http://www.energynetworks.com.au/electricity-network-transformation-roadmap, but that does not cover the specific scenario envisaged by this rule change. Internationally microgrids are taken as part of the wider "smart grid" agenda and there are many reports on the cost savings arising from "smarter" approaches (e.g. UK National Infrastructure Commission 2016: https://www.gov.uk/government/publications/smart-power-a-national-infrastructure-commission-report).

c. Distributors, please provide information (to the extent you have any) on the number of your customers who are currently grid-connected but who you consider may be more cost-effectively served by (i) microgrids and (ii) individual power systems. Consider current and projected costs of those systems. List of questions for consultation

Not applicable

d. What are the key factors that make customers candidates for off-grid supply? For example, upcoming line replacements, local reliability or congestion issues, safety standards, line undergrounding requirements, declining costs of off-grid supply, presence of existing distributed generation?

Bushfire mitigation, where a community's supply may pass through an area that is high risk, which typically results in the DNSP either completely or partially suspending reclosing to reduce the risk of reclosing (arcing) starting a fire. This mitigation approach means that what would be transient faults, become permanent, leaving a community without power to manage an approach bushfire (communications, pumps etc.) and has significant health effects, if there is no power for air conditioning, since high fire danger days, are typically high temperature days. See Broome and Smith, The definite health risks from cutting power outweigh possible bushfire prevention benefits, *Med J Aust*, 197 (8), 440-441, 2012.

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e. Distributors, if you were permitted to supply the customers identified in question (c) through off-grid supply, please provide an estimate of your annual savings (if any). Please state any critical assumptions such as pricing approaches to be applied to off-grid customers.

Not applicable

f. Other than the costs of the off-grid supply itself, what costs and benefits are likely to arise from moving certain customers off-grid, for the customer, the distributor, the customers remaining on the grid, retailers, local generators, or any other parties? How could any costs be mitigated?

No comment.

Question 3 Potential alternatives to the proposed rule

a. If a rule change is considered necessary, are there alternatives to the proposed rule which relate to the issues raised in the request and:
   i. are consistent with the Law;
   ii. would allow all customers to benefit from lower costs by enabling electricity to be supplied in the most efficient way in each area; and
   iii. would result in customers who move to off-grid supply receiving electricity supply with appropriate reliability, quality, safety and other relevant consumer protections?

No comment.

b. Would the alternatives in (a) be able to be achieved through changes to the Rules alone, or would changes to other instruments, such as the Retail Rules or other laws, regulations or licences (jurisdictional or national) be required or desirable?

Broader changes are likely to be required and should be changed if this facilitate the ability of a DNSP to provide a secure supply at lowest cost to the end customer.

Question 4 Assessment framework

Do you agree with the approach set out in section 3.3 to assessing whether the rule change request will, or is likely to, contribute to the achievement of the national electricity objective? If not, how should it be assessed?

Yes.

Question 5 Competition issues relating to moving from grid supply to off-grid supply

a. To what extent do you consider that distributors' ability to average the costs of grid-connected distribution services across their customer base inhibits the development of competition in off-grid supply as an alternative to grid connection?

Will customers on a SPS pay use of system charges based on their import or will a new method of funding the network (not based on import, perhaps like a standing charge) need to be developed?

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b. If the proposed rule (or a more preferable rule) is made, and the AER classifies off-grid supply as a standard control service, would distributors' ability to offer below-cost off-grid supply hamper the development of competition in the off-grid supply market, as costs of off-grid supply fall in the future?

There are other approaches to delivering supply than via a standard control service and the cost and benefits of various approaches should be assessed (e.g. community supply company, commercial supplier specialising in off-grid approaches). However, if there is no willing and cost-effective alternative to the DNSP managing supply, then the DNSP would need to be obliged to manage supply. That is, a customer in a SPS should have access to electricity at a fair and reasonable cost. Determining what that fair cost would be in the absence of a market, would require significant work to develop a methodology to ensure that customers in a SPS are receiving a service (network and supply) that is at lowest cost and a reasonable cost in relation to "traditional" network connected customers.

c. In addition to the issues discussed in chapter 4, what other factors affect competition for providing off-grid supply in place of grid supply?

No comment

d. Would the AER's process for classifying distribution services, including considering the potential for the development of competition, provide an adequate way in which to address these competition issues in practice?

Regulation needs to reflect the changing design and use of the network (e.g. import based use of network charges).

Question 6 Competition issues arising after moving to off-grid supply

a. Should a monopoly provider of a service in one area of the supply chain for off-grid services be able to provide an integrated service whereby it provides all the services forming part of off-grid supply, in circumstances where competition is limited?

Yes, subject to certain conditions, such as regular reviews to ensure the model provides lowest cost to the customer.

b. If a customer moves to off-grid supply where one entity is the monopoly off-grid retailer, generator and distributor, what disadvantages are they likely to face due to the lack of ability to change retailers?

In the absence of regulation to monitor and review charges, a customer in a SPS may not enjoy access to electricity at lowest cost.

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One approach is to make the DNSP the "supplier of last resort", that is, in the absence of another regulated party to provide supply, the DNSP would do so, but only after a competitive process to secure an external supplier.

One concern is that the number of customers in a SPS may be below a threshold for regulation, particularly for a third party (external, non-DNSP supplier), so care is needed to ensure that supply is appropriately regulated even if customer numbers are low.

c. Do the extent of any disadvantages under (b) depend on which entity provides the monopoly services (e.g. a licensed, regulated distributor, compared to an entity that is exempt from registration and licensing provisions under the Rules and state laws)?

See above comment.

d. How can any disadvantages under (b) be mitigated?

Effective regulation, plus perhaps ensuring that the "first choice" for a supplier is a non-DNSP party (secured competitively and reviewed regularly and perhaps SPS communities should have a role in that review), with the DNSP acting as the supplier if there is no other viable/cost effective option.

e. Is it desirable (in light of the long-term interests of consumers) that customers being moved to off-grid supply would be offered, or would be able to access, competitive offers for each component of off-grid supply (for example, provision of generating plant, maintenance of the plant, billing)? If so, what circumstances or policies would encourage this?

The DNSP should have the responsibility for managing "network elements", with supply being competitively sourced, where possible. This is analogous to the current situation for the majority of network connected customers. Most domestic customers do not need to seek competitive tenders for the generation and maintenance of plant, as part of the normal connection.

How many customers in a SPS would have the knowledge and ability to assess tenders for services and generation? And to ensure security of supply?

Question 7 Appropriate regulation of reliability of off-grid supply

In light of the varying reliability requirements that may apply to off-grid supply under the current arrangements, are specific consumer protections regarding the reliability of off-grid supply required before the Rules should allow distributor-led transition to off-grid supply?

Potentially.

Question 8 Impacts on consumers of moving to off-grid supply – general questions

a. Chapter 5 discusses various regulatory issues and considers the potential impacts of moving to off-grid supply under the current regulations. If you have further information on, or a different analysis of, any of these issues, please provide details.

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No comment.

b. What are the impacts on off-grid customers of ceasing to be covered by the protections in the Retail Law and Retail Rules, bearing in mind the protections provided by the Australian Consumer Law and by state laws?

No comment.

c. To what extent are customers who move to off-grid supply likely to face additional risks relating to electricity supply not faced by grid supplied customers? If additional risks arise, what is the nature of these risks and how material are they?

No comment.