July 10, 2020

Energy and Technical Regulation
Department of Energy and Mining
Government of South Australia

Energy and Technical Regulation Administrators,

Clipsal Solar, a Schneider Electric venture based in Adelaide and Sydney, is pleased to present our responses to the proposed regulatory changes for smarter homes. Clipsal Solar is both a solar and battery installation company and a software technology company. Our technology connects to new and existing batteries, solar inverters, loads, and individual circuits in the switchboard. This data in addition to a tariff model allows us to make recommendations to homeowners to reduce their electricity bills and provides an aggregation platform to control these assets for the benefit of the grid.

As part of Schneider Electric, Clipsal Solar has access to resources in other markets with high penetration of solar such as Hawaii and California and would like to convene a discussion with the Department of Energy and Mining to discuss areas of collaboration and our ideas and experiences for stabilizing the grid while enabling more renewable energy generation.

Our responses to each of the five Consultations are in the following pages. Our overall goal is to enable SAPN to gain more control over the DER assets on the low voltage network through appropriate financial incentives for homeowners. At the same time, we can preserve the thousands of jobs in the solar and battery industry while moving South Australia closer towards its goal of 100% renewable energy by 2030[1].

Thank you for considering our response.

Neil Maguire

Chief Technology Officer

Clipsal Solar

[1] https://reneweconomy.com.au/south-australia-minister-aiming-for-100-per-cent-renewables-before-2030-2030/

I. Remote Disconnection and Reconnection Requirements

Since 2015, all PV inverters, battery inverters, air conditioners, pool pumps, and hot water heaters feature remote disconnect functionality through the AS4755 DRED standard. Furthermore, by virtue of the SA Battery Storage Scheme, all battery inverters are VPP ready. The infrastructure is already in place for remote disconnect, however a receiver needs to be installed to initiate the signal to the inverter and other equipment. Additionally, remote disconnection/reconnection of solar/battery systems is not recommended as a ON/OFF state control feature due to potential impact on relay life of inverters and other high load equipment. Instead, a better option would be to enable an appropriate ramp of inverter/battery systems output power over a designated period of time. This is similar to how all generators throttle power output in the national electricity market.

A better choice than the DRED standard, which is unique to Australia, is to support global standards for demand response including OpenADR and IEEE 2030.5. By doing so, energy aggregators will be able to control devices based on signals from SAPN or AEMO. Communication to the inverter/battery systems via its Wi-Fi/LAN communication ports from a hardware-agnostic software energy management platform is our recommended approach and should be trialed. For example, Clipsal Solar's Pulse Platform has API connections to 8 different devices so one signal from the network can be relayed to 8 models of inverters and loads. Cloud-based communication is already accepted as the common approach to meet the earth fault alarm requirement in AS5033.2014 Section 3.4.3. This energy management platform also enables customer assets to participate in other grid service opportunities such as dynamic export limiting as suggested in Attachment 2 Export Limit.

In a small number of homes, where a direct internet connection to the inverter is not possible, an external form of control could be incorporated to provide the ramping of the power output in the specified time. This could be achieved through installing a local controller (typically through a Modbus communication to the inverter). However, the installation of a local controller is expensive (our estimate is $1200 AUD per site) so preference should be given to software-based approaches which do have a communications and data cost but this is far less than sending electricians out to install a complicated local controller.

It is further recommended that customers receive alert notifications through a mobile device to make them aware of the events and to have information on the impact on their daily savings from solar during these events.

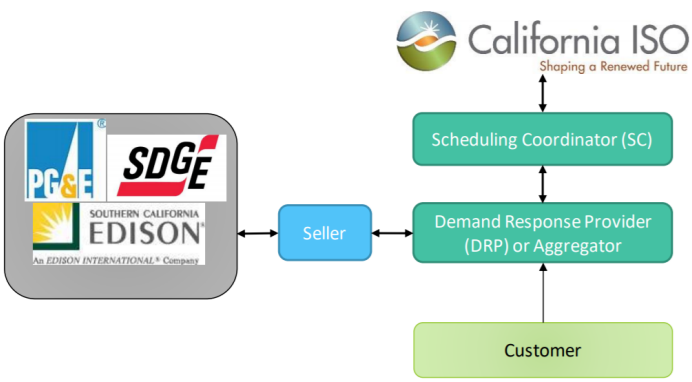
II. Export Limit Requirements

Dynamic Export Limits are an excellent approach to limit the impact of reverse power flow on a low voltage network under the suggested scenario (low demand days). The control concept would complement the recommendation in the first consultation response. Once again, a managed ramp of these export limitations is required in order to maintain a proper control over the power system. This ultimately, enables the residential solar/battery systems to behave like other AEMO market participants.

Many states have export limits to support a limited number of peak days. A better approach is to allow full export on normal days and completely curtail the solar energy during peak times.

Additionally, a software platform that enables remote control of large deferrable loads through cloud-based API connections would enable consumers to utilize solar power during the low demand days while limiting export beyond the meter.

A market-based approach is recommended with DER aggregators managing commitments of export limiting capacity from their fleets. Financial compensation should be structured so that the homeowner and aggregator are meaningfully compensated. Clipsal Solar recommends monthly capacity payments to DER aggregators based on committed capacity and a level of resource availability to handle the small percentage of thee fleet that may be off-line at any given moment. This requirement will increase the adoption of batteries which are assets that can be utilized for other grid services. The individual site should be measured at the point of interconnection and it should be independent of the hardware on-site. Clipsal Solar suggests a program similar to the California Demand Response Auction Mechanism (DRAM) which has broad applicability to energy storage and load control solutions. Part of the payment is for reserved capacity and part is for the individual DR events. See DRAM.



Third Party Direct Participation

- Seller aggregates customers for DRAM Resource
- Seller participates (bids) directly in the CAISO market through SC
- Dispatches and settlements are between the CAISO and Seller's SC
- All earnings in the CAISO markets go to Seller and Seller's customers; no IOU involvement

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- Seller provides Supply Plan to IOU 60 days prior to month
- Seller provides Qualifying Capacity information to IOU roughly 75 days prior to month
- Seller provides demonstrated capacity through SC to IOU at end of the month

III. New Low Voltage Ride-Through Requirements for Smart Inverters

Changes to the voltage-ride through specifications should be reflected as updates to the existing AS4777 smart inverter standard. Our Solar Business Unit manufacturers products that are compliant to these standards. Clipsal Solar supports efforts to reduce the cascading effect of solar inverters tripping by having a more accommodating voltage/frequency ride-through standard.

IV. Smart Meter Minimum Technical Standards

Clipsal Solar supports the roll-out of the existing smart meter technology for granular measurement of consumption but implementing a requirement for smart meters to measure and control (On/Off) several elements would be not recommended since there are possible impacts on equipment life from hard cycling. Most sophisticated electronic devices have power-up and power-down sequences that protect the equipment so a communication signal to ramp down or turn on is preferred versus simply opening a contactor. Furthermore, the cost and time involved in replacing existing smart meters with new meter technology is very high.

Clipsal Solar proposes an alternative to the high cost, smart meter replacement method in favor of a software-based approach to manage controlled loads, flexible loads, solar and battery consumption through remote connectivity to a hardware-agnostic energy management platform. Inverters and batteries are already connected through a cloud interface and the addition of contactors and a gateway in the main switchboard allows solutions such as Clipsal Solar's Pulse Platform to respond to market signals that benefit both the grid and the consumer. If the smart meter solution proceeds, it must accommodate grid-tied solar and battery back-up systems that enable a protected loads panel in the house to be islanded. Today's solar and battery systems are able to run a back-up load panel for many days where the battery, solar, and protected loads are all isolated via an automatic transfer switch. This must be preserved to ensure resiliency options for customers.

V. Tariffs to Incentivise Energy Use in Low Demand Periods

The implementation of TOU rates will provide a significant customer incentive to control energy use and store solar generation on site provided the differential between on-peak and off-peak is > $0.20/kWh for 365 days per year. Clipsal Solar recommends that the tariffs do not include a demand charge at residences as it is very difficult to predict and control the peak power output in a short timeframe. A preferred operating method is to store excess solar during the peak period to reduce overgeneration and to discharge this during high evening and nighttime consumption. When averaged over a fleet of DERs, solar peak-shifting results in a peak demand (kW) reduction without the added complexity of trying to predict and control short term behavior at individual homes.

Hawaii's Smart Export tariff may be considered a best practice in one of the few areas of the world that are similar to SA in the relative amount of roof-top solar penetration. Hawaii initially implemented a

zero export requirement under the Customer Self-Supply interconnection that reduced solar installations by over 50% and decimated the industry leading to large job losses. Hawaii has since changed to a market-driven Smart Export tariff where a consumer receives no compensation for solar exports in peak periods but is allowed to export and receives compensation in shoulder and off-peak periods.

Time of use, cost reflective pricing is an excellent way to provide consumers with a price signal to change their behaviour with respect to their electricity consumption. However, ToU residential tariff structures are a new concept to all South Australian's. Therefore, this type of tariff structure change would only be successful from a regulation point of view if there is an educational campaign enabling customers to understand the proposed tariff structure changes. Furthermore, a tool in the hands of the customers which can aid the customers to understand when they are using power will also ensure a successful mandate of the proposed tariff structure changes. Clipsal Solar has a consumer facing app, Pulse, which uses customers data (solar generation, energy consumption as well as tariffs) to help them make better energy choices.

About Clipsal Solar

Clipsal Solar is a Schneider Electric venture dedicated to reducing the cost and impact of electricity bills in Australian homes. By working with you to better understand your energy needs today and in the future, we can design a smart solar solution that manages and maximises the use of solar energy, resulting in even greater energy and cost savings. At the same time, we do not comprise of product quality and warranty and carefully match the performance of the grid inverter for optimum performance and reliability.

We use the highest-grade components including premium European made inverters, solar panels from the Silicon Module Super League of solar PV manufacturers and circuit protection equipment by Clipsal, in Australia since 1920.

Clipsal Solar's technology and R&D team delivers software products for the homeowner, fleet manager and grid operators to connect from plug to grid for the benefit of all Australians not just the owners of rooftop solar.

Awards, Endorsements and Certifications

Clipsal Solar is a CEC Certified Retailer, and a platinum member of the Australian Solar Council and advocate for renewable energy in Australia, Tesla and LG Chem certified retailer and installer. Clipsal Solar is one of a limited number of solar companies that are Preferred Suppliers to the Local Government Association.

Clipsal Solar Key Personnel

Neil Maguire - CTO
Neil is Clipsal Solar's Chief Technology Officer. A leading renewable energy, automotive, software and energy storage executive, he is known for leading digital transformations, developing products focused on solving the world's biggest challenges in energy, transportation and sustainability.

Mitch Eadie - Head of Product & Customer Experience
With over ten years of engineering expertise in customer development, solar PV, storage, power systems and grid connection, Mitch's passion is to disrupt the industry, allowing consumers to take control of their electricity costs through innovation.

Stace Tzamtzidis - Head of Business Development and Partnerships
An Adelaide-based smart inverter and solar expert, Stace has a proven track record and more than 20 years of experience in strategic planning, engineering, business planning, marketing and P&L management across Australia, South East Asia and the Middle East.