Market Active Solar

Ring-fencing Waiver Application

2/1/2024 – Version 0.1

SA Power Networks

Empowering South Australia

Contents

Introduction

Background

South Australia is leading the transition to renewable energy. More than 1 in 3 of our customers have installed solar, and we continue to lead the nation in the uptake of home batteries. We also have a growing number of large-scale wind and solar farms across the state, harnessing South Australia's natural abundance of renewable resources.

Today, more than 68% of South Australia's electricity needs are already met by renewable energy. We forecast that by 2030, the South Australian grid will have reached net-100% renewable generation and South Australia will be a significant exporter of renewable energy to the rest of the nation with more than 60% of homes and businesses having rooftop solar.

Excess solar generation can lead to reverse power flows in the local distribution network that exceed the technical limits of the network, leading to over-voltage issues and even thermal overload of network equipment like local distribution transformers. Distribution Network Service Providers (DNSPs) have made significant progress in the last five years in addressing this issue and are now putting in place several strategies to manage this issue:

- Dynamic Operating Envelopes (DOEs) / flexible export limits have emerged as the definitive long-term means to manage energy inflows into the local distribution network within its technical limits;
- New tariffs and other incentives encourage load shifting to the daytime for flexible loads like hot water and EV charging;
- Networks are deploying more advanced voltage management; and
- The DEIP Access and Pricing review has cleared the way for prudent growth in network export capacity over time.

These efforts have been supported by the Australian Renewable Energy Agency (ARENA) through funding key pilots and trials and through the working groups established under ARENA's Distributed Energy Integration Program (DEIP).

Market Active Solar Trial

In parallel to the introduction of Flexible Exports, energy retailers have been looking to introduce new retail offers that reward customers for curtailing solar during times when the wholesale price of energy is negative. In South Australia, these negative pricing periods occurred for 60% of daylight hours in 2022, resulting in an average daytime wholesale price of -$7/MWh. In practice, this will generally involve retailers limiting residential solar exports to zero during periods of negative pool pricing.

The emergence of these retailer solar management schemes raises the question of whether they are compatible with DNSPs' Flexible Export connection rules and, if so, how the two interact, noting that each involves communication with the customer's solar inverter. Integrating these approaches effectively will be key to maximising future customer benefits from rooftop solar. In combination, they create the opportunity for retailers to activate rooftop solar to respond to wholesale pricing to address periods of energy oversupply in the broader market, while still enabling DNSPs to efficiently manage local network constraints.

The Market Active Solar (MAS) Trial seeks to address this opportunity by demonstrating, in partnership with major energy retailers Simply Energy and AGL, how DNSP 'dynamic operating envelopes' (DOEs) can act in conjunction with retailer-initiated schemes that actively manage the output of a customer's solar inverter in response to market price signals.

In the trial, each retail partner will provide an innovative customer offer wherein the customer receives a financial reward for allowing the output of their inverter to be curtailed occasionally at times of negative wholesale price, reducing cost to the retailer.

The MAS trial will:

(a) develop innovative technical solutions to enable the retailer's solar management system to interoperate with a DNSP DOE in constrained areas of the network. These solutions are expected to inform how retailer-led DER management programs will interact with DNSP-led DOEs for other asset classes (batteries, EV chargers, etc.) in the future;

(b) test and compare two alternative technical solutions, one in which the retailer's system controls the customer inverter and one in which the retailer solar curtailment signal is delivered over the DNSP's existing DOE communications pathway; and

(c) explore customers' understanding of, attitudes towards, acceptance of and benefits from these kinds of offers, and the interplay between voluntary, market-based self-curtailment in response to wholesale price and any constraints on inverter output due to network limits.

These aspects will be explored through a 12-month field trial involving 100 customers in South Australia. The findings will inform future development of the CSIP-Aus standard and how it evolves to accommodate competitive market aggregation offers for customers, demonstrate pathways for retailers and DNSPs to collaborate to activate small-scale solar in the market, and help build social licence for this kind of smart, market-active solar offer.

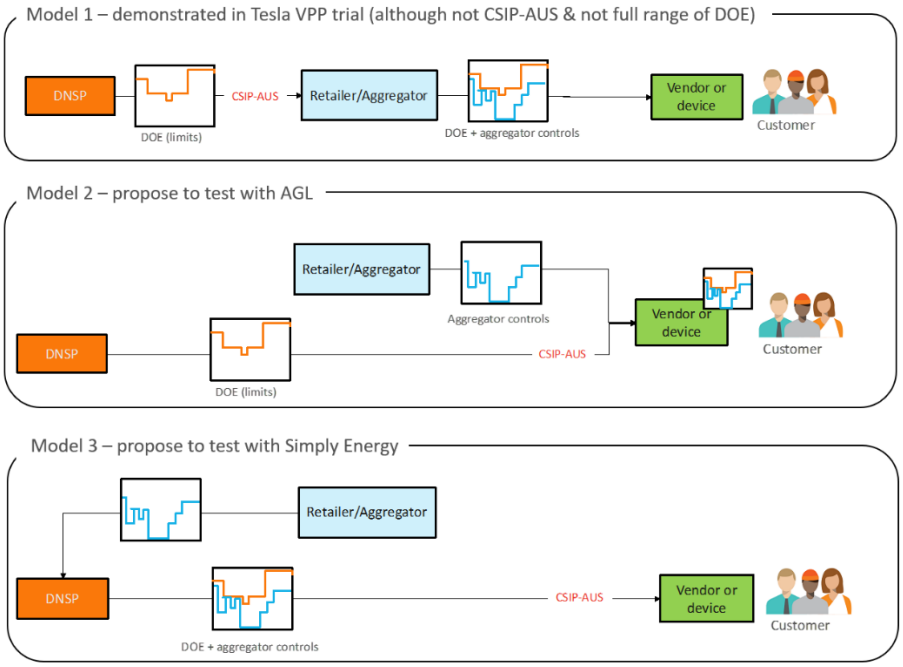
[redacted]

Models applicable under the trial

There are three main integration models that could be deployed to combine retailer solar management offers with a flexible export limit or DOE. SA Power Networks has partnered with two leading energy retailers, Simply Energy and AGL Energy, to test and demonstrate two of these approaches.

These models are shown conceptually in Figure 1 and further described below.

Figure 1 - MAS Integration Models



Model 1:

In integration model 1, the DNSP DOE is published to a retailer's or aggregator's control platform and combined with the retailer control signal and the resulting control envelope is sent to the customer's site.

This model was tested by SA Power Networks and Tesla in the ARENA funded Advanced VPP grid integration project, albeit using a pre-CSIP-AUS communication protocol and a DOE that ranged between 5-10kW rather than one that allows for the full range of export level from 0-10kW. Learnings from this implementation will be compared to the two new models under test in this trial.

Model 2:

In integration model 2, both the DNSP DOE signal and retailer curtailment signal are sent directly to a customer's site (or via a vendor cloud) and the blending of the signals is performed downstream of both parties.

This model will be tested by AGL in this trial, leveraging the existing pathway AGL has built to selected inverters and the CSIP-AUS DOE interface SA Power Networks has established.

In retaining visibility of the DNSP and retailer commands to the device, AGL will be able to ensure that limits around retail control of the customer's device are respected, and that customers can be provided visibility of both the DNSP and retailer control signals.

Model 3:

In integration model 3, the retailer control signal is provided to the DNSP and blended with the DOE within the DNSP systems and the resulting control signal is published to the customer's site over the existing CSIP-AUS interface.

This model will be tested by Simply Energy in this trial, leveraging SA Power Networks' existing CSIP-AUS interface to avoid the need to build additional integrations to the customer's site.

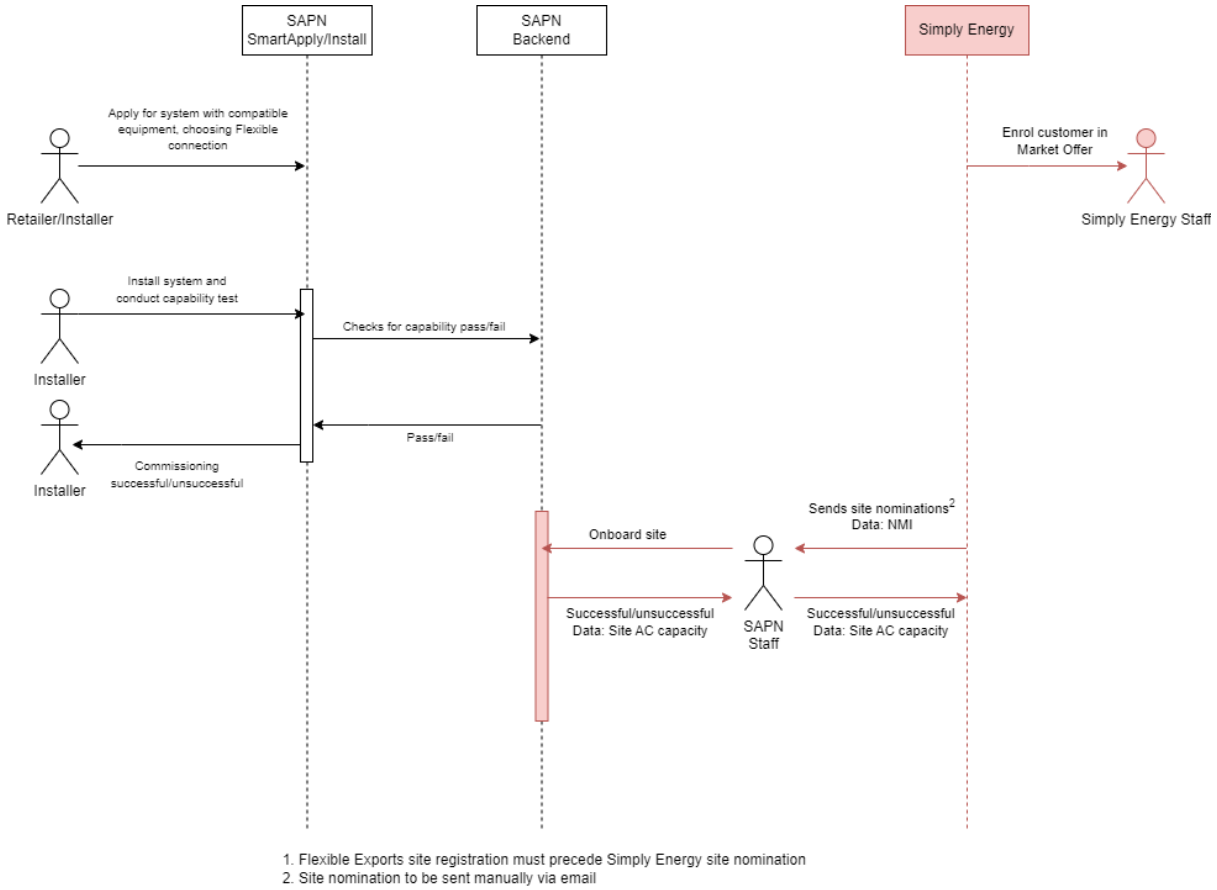
Simply Energy will provide their customers visibility of both the DNSP and retailer control signals through their customer monitoring application.

Model 3 consists of the following pieces of technology, noting that we are only focusing on the pieces which are out of scope of the existing Flexible Exports infrastructure and processes:

- Simply Energy's technology platform – This is provided by SwitchDin's 'Stormcloud' platform.
- SA Power Networks' backend systems – This includes the 'Grid of the Future' IT system, as well as the Utility Server to communicate to devices.
- API hosted by SA Power Networks to facilitate communication between SA Power Networks' backend systems and Simply Energy (Stormcloud)

The onboarding process is provided in Figure 2 below. The onboarding process has been designed to minimise development effort for the trial, given the model will only support the provision of retail control signals to 50 customers.

Figure 2 - Model 3 onboarding process



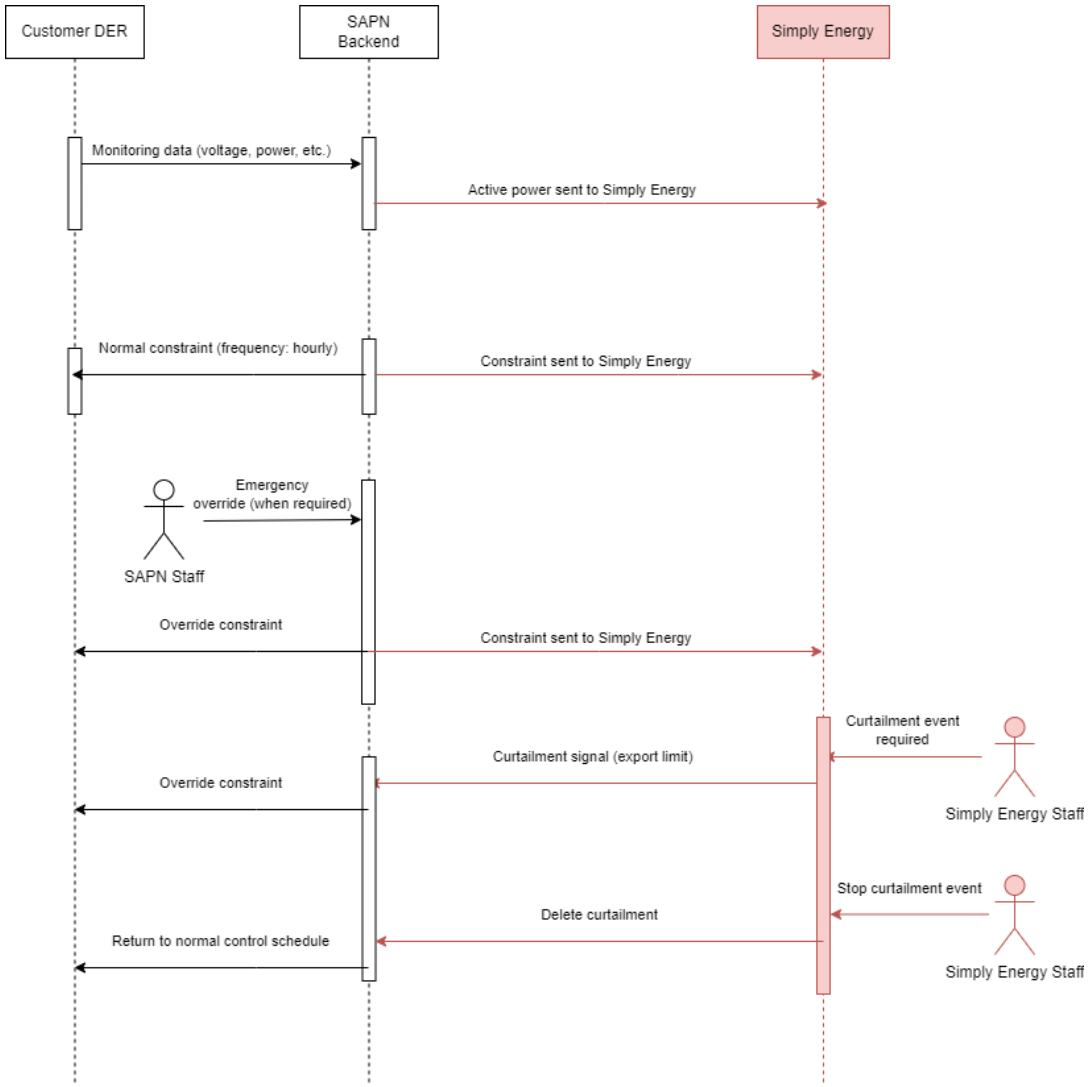
When Simply Energy wants to nominate a Flexible Exports site to start being controlled as part of the trial, they tell SA Power Networks (via email) which National Metering Identifier (NMI) to onboard. SA Power Networks then validates that the customer requesting to be added by Simply Energy has a flexible exports registration and the site is online. In SA Power Networks' Grid of the Future Database (GOTF DB), a separate table will be created to identify sites that belong to the Simply Energy MAS trial.

Once the site is onboarded, communication between Simply Energy and SA Power Networks will be through a purpose-built application programming interface (API).

SA Power Networks receives monitoring data every 5 minutes, with constraints sent to the customer's inverter every hour. Where a site is listed within the MAS trial, this data is also provided to Simply Energy through the API. SA Power Networks will override existing export limits as required to manage the stability of the network. Simply Energy curtailment signals will be sent to SA Power Networks via the API. These will be validated against the existing constraints. If Simply Energy's signal does not breach the network constraints it will be dispatched through SA Power Networks systems to the customers equipment.

As demonstrated in Figure 3 below, the API will automate the flow of transactions between SA Power Networks and Simply Energy once the onboarding process is complete.

Figure 3 - Interaction between SA Power Networks and Simply Energy after onboarding



MAS trial funding arrangements

The MAS trial is partially funded by an ARENA grant and trial partners, including SA Power Networks, Simply Energy and AGL. Table 1 below, details the contributions by each participant.

Table 1 - MAS trial funding

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

SA Power Networks' contribution is further broken down across the various integration models in Table 2 below. Project management, design, planning and knowledge sharing costs are shared across the entire MAS trial, these costs will be allocated to the integration models on a proportionate basis in accordance with estimated effort.

Table 2 – SA Power Networks' funding by integration model

	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Details of waiver application

Scope of Waiver

This ring-fencing waiver request is limited to the provision of services under integration model 3, where the retailer control signal is sent to SA Power Networks and blended with flexible export DOE and published to the customer's inverter using SA Power Networks' existing infrastructure. Model 1 and model 2 are considered direct control services, therefore there are no ring-fencing implications with these integration models.

The period of the waiver sought for Model 3 is limited to the MAS Trial period, which will involve 50 customers with services provided over a 12-month period. We are requesting this waiver to apply from 1 July 2024 to 31 December 2025.

While the trial is only intended to run for a 12-month period, an 18-month waiver period is proposed to provide time for project completion and wrap up.

Compliance with the AER's Ring-fencing Guideline

Under the Australian Energy Regulator's (AER's) Ring-fencing Guideline (Guideline), a DNSP may provide distribution services and transmission services, but must not provide other services[2].

Distribution services are defined in the National Electricity Rules (NER) as services provided by means of, or in connection with, the distribution system. The use of SA Power Networks systems to provide a retailer's control signal under model 3 of the MAS trial is therefore a distribution service and would be further considered an unregulated distribution service in accordance with the Guideline. The AER's Ring-fencing guideline explanatory statement[3], describes unregulated distribution services as distribution services the AER has not classified as direct control or negotiated services. The provision of a retailer's control signal under model 3 is not a direct control service or negotiated service.

[1] No cost associated with model 1 which will be reviewing data and findings from a previous ARENA funded trial to compare with model 2 and 3 in reporting.
[2] AER, Ring-fencing guideline, Electricity Distribution, version 3, November 2021, clause 3.1 (b), p. 7
[3] AER, Electricity distribution ring-fencing guideline explanatory statement, November 2016, p. 13

Furthermore, unregulated distribution services are considered other distribution services in accordance with the Guideline, which defines 'other distribution services' as distribution services other than direct control services.[4] Other distribution services are further considered 'contestable electricity services' under the Guideline.

The Guideline requires DNSPs to functionally separate its direct control services from its affiliated entities providing other electricity services, but also to separate the DNSP's provision of direct control services from its own business units providing other distribution services.

Cost allocation and attribution

While the Guideline does not require legal separation of regulated distribution services from other distribution services, DNSPs are required to comply with the cost allocation and attribution requirements as detailed in section 3.2.2.

SA Power Networks will comply with the accounting separation obligations in implementing the proposed arrangement. All costs will be allocated in accordance with SA Power Networks' AER approved Cost Allocation Method.

Model 1 and Model 2 are considered direct control services.

While we do not expect material incremental costs associated with the provision of model 3 services, this arrangement will be structured as a specific project within SA Power Networks' financial system to ensure separation of accounts, cost allocation and attribution related to the project. This will provide transparency that the costs associated with the proposed model 3 arrangement are not funded by regulated customers.

Functional separation obligations

The functional separation obligations in section 4 of the Guideline will apply to the arrangement as the provision of a retailer's control signal under model 3 of the MAS trial is a contestable electricity service.

The relevant functional separation obligations in clause 4 of the Guideline include:

- **Discrimination** – The obligations in clause 4.1(d) to not discriminate (directly or indirectly) between any two legal entities in connection with the supply of 'contestable services' by those two entities, on the basis of the use by one or both of those legal entities of assets owned, operated or controlled (in whole or in party) by SA Power Networks.

- **Separate offices and staff** – The obligations in clause 4.2.1 and 4.2.2 to have separate offices and staff for the provision of 'contestable services' unless an exception applies.

- **Separate branding** – The obligation in clause 4.2.3(a)(i) to have separate branding for the provision of 'contestable services'.

- **Cross-promotion** – The obligations in clauses 4.2.3(a)(ii) and (iii) to not promote SA Power Networks' 'direct control services' and 'contestable services' together.

SA Power Networks will comply with the discrimination and cross-promotion obligation for the MAS trial. There are no opportunities for SA Power Networks to discriminate (either directly or indirectly) in the provision of a retailer's control signal under model 3.

[4] AER, Ring-fencing guideline, Electricity Distribution, version 3, November 2021, p. 4

We also note, that while the SA Power Networks staff operating the system used to transfer a retailer's control signal are likely to have access to electricity information, they will not, in performing their roles, have the opportunity to use that information to engage in conduct contrary to the discrimination obligations in clause 4.1(d). Therefore, the exceptions for physical separation and staff sharing in clauses 4.2.1(b)(i) and 4.2.2(b)(i) apply.

Information access and disclosure obligations

The information access and disclosure obligations in clause 4.3 will apply, where SA Power Networks must keep 'ring-fenced information' confidential and only use 'ring-fenced information' for the purpose for which it was acquired or generated. SA Power Networks will comply with this obligation, as we will be receiving retailer control signals and blending these with the DOE within SA Power Networks' systems, with the resulting control signal published to the customer's site over the existing CSIP-AUS interface. We will not be providing SA Power Networks data to the retailer. Any data provided as part of the outcomes of the trial will not include any confidential or 'ring-fenced information'.

Obligations sought to be waived

A waiver for the functional separation obligations (section 4.2), is required to enable SA Power Networks to provide the services under Model 3 of the MAS trial. We note, in practicality this waiver is limited to the branding obligations as detailed within section 4.2.3, as the exemptions in clause 4.2.1 and 4.2.2 noted above permit the staff and office sharing arrangements.

SA Power Networks considers the benefits outweigh any risks in undertaking this trial, with the outcomes shared across the industry. The waiver will only apply for the period of the trial, with services limited to 50 installations across one retailer.

Trial benefits

The MAS trial is investigating the efficiency of making solar systems market responsive using alternate models. The primary beneficiaries of this trial, if proven viable, are all energy customers, including solar and non-solar customers. Consistent with the National Electricity Objective (NEO), the trial is exploring efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers.

Model 2 and Model 3 represent two alternative means to actively integrate rooftop solar with both the wholesale market and the network. A key goal of each model is to achieve this at least cost to customers by avoiding duplication of communications infrastructure. Each model has specific benefits. Model 3 creates greater value from existing DNSP investments in DOE infrastructure and also creates opportunities for smaller retailers who may not have their own communications capabilities to provide solar management offers, potentially increasing customer choice. Model 2, on the other hand, may suit retailers that have already invested in communications capabilities.

If successful and implemented more widely, the MAS trial is expected to deliver the following long-term customer benefits:

- Addressing market inefficiency will reduce costs to customers in the long term.

  Costs to customers ultimately rise when the market cannot efficiently match renewable supply to demand and off-market interventions are required. Activating rooftop solar to respond to market price signals and voluntarily reduce output when the price is negative is a key step in the evolution of the NEM to support very high levels of renewables.

Doing this in a way that interoperates seamlessly with DNSP DOEs is a key missing piece of the DER integration puzzle. This trial aims to show not just that this is possible, but that there is the opportunity for retailers to leverage DNSP investments in DOE infrastructure for communication with customer inverters or, conversely, for DNSPs to leverage retailer and aggregator investments in communications capabilities to enable DOEs, creating even greater value for customers.

- The learnings from this trial will inform the lowest-cost approach for aggregators to develop a range of DER management schemes.

  The trial will test and demonstrate multiple pathways for competitive market aggregation offers to be provided to customers alongside a DNSP's DOE signal. The learnings will inform the lowest-cost approach for other retailers and aggregators in future, reducing barriers to entry and supporting the development of a diverse and competitive market. This will ultimately benefit all customers by providing low-cost DER solutions.

- The MAS trial will inform the approach to consumer protections.

  The trial will develop of a set of principles that should govern aggregation offers for consumers which will inform the parallel development of a fit-for-purpose consumer protections framework for the solar management market.

- Activating rooftop solar to be responsive to both price and network limits will facilitate continued growth in the solar market.

  The inability of rooftop PV to respond to wholesale price is a barrier to further growth because there is a limit to how much un-controlled generation the electricity system can accommodate. Activating small-scale solar to respond to market price in a way that is also cognisant of local distribution network constraints removes this barrier and will be essential in enabling the level of 'overbuild' of rooftop PV required to efficiently decarbonise the electricity system.

Information sharing

The MAS trial will explore the economic outcomes from both wholesale market and customer bill impact perspectives, and examine the correlation of network and retailer drivers for solar curtailment. SA Power Networks is committed to sharing learnings from this trial in accordance with the ARENA funding arrangements to benefit internal and external stakeholders.

As part of this waiver application, SA Power Networks proposes to share with the AER, and other stakeholders where appropriate, the following information in relation to Model 3 of the trial:

- Distribution costing information, detailing the total costs SA Power Networks incurred, aggregated on a monthly basis over the trial period;

- Customer enrolments volumes, detailing monthly additions and removals over the course of the trial; and

- Analysis in line with the ARENA trial requirements which examines the correlation of network and retailer drivers for solar curtailment.

This information would be made available at the completion of the trial period.