Market Active Solar (MAS) Trial Ring-fencing Report

1 July 2024 to 31 December 2025

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SA Power Networks

Empowering South Australia

Contents

1. Introduction

Across the National Electricity Market (NEM), the transition to renewable energy continues to accelerate, with approximately 30% of South Australian customers now equipped with rooftop solar systems. In the first quarter of 2024, rooftop solar alone contributed more energy to the grid than grid-scale solar, wind, hydro, or gas generation.

In the most recent Australian Energy Market Operator (AEMO) Quarterly Energy Dynamics Report for Quarter 4 of 2025, South Australia experienced a new minimum demand record of -263 MW and the average spot price during midday hours (10:00 to 16:00) was -$29. These significant minimum demand and negative spot prices are resulting in energy retailers seeking new ways to reward customers to curtail solar during the times when the wholesale price of energy is negative.

To support effective management of this transition, SA Power Networks was granted a waiver on 16 April 2024, to undertake a Market Active Solar (MAS) trial. This initiative was co-funded by the Australian Renewable Energy Agency (ARENA) and delivered in partnership with Engie (formerly Simply Energy) and AGL.

The ring-fencing waiver for the MAS trial allowed SA Power Networks to test and compare three different integration models of blending retailer and network-led export signals to customer's inverters with rooftop solar exporting to the network.

The waiver applied to integration model 3 for clause 4.2 of the Ring-fencing Guideline concerning functional separation. The initial waiver expired on 31 December 2025, with a new interim wavier approved until 31 December 2026 or until replaced by a new long-term waiver covering these services. This report details the outcomes of the MAS trial as required in the ring-fencing waiver for the period of 1 July 2024 to 31 December 2025.

2. How the Market Active Solar trial has been implemented

In the MAS trial retailers provided innovative customer offers where the customers received a financial reward for allowing the output of their inverter and consequently rooftop solar to be curtailed occasionally at times of negative wholesale prices. This then reduces costs to retailers.

The MAS trial currently has and continues to:

- develop innovative technical solutions to enable the retailer's solar management system to interoperate with a distributor's Dynamic Operating Envelope (DOE) in constrained areas of the network. These solutions have assisted SA Power Networks in informing how retailer-led customer energy resources management programs interact with distributor-led DOEs for other asset classes (batteries, Electric Vehicle chargers, etc.) for future projects;

- tested and compared 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 distributor's existing DOE communications pathway; and

- explored 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.

2.1. Integration Models

SA Power Networks is assessing three integration models as part of the MAS trial. Model 1 serves as a control, drawing on outcomes from the ARENA funded Advanced Virtual Power Plant (VPP) grid integration project. Models 2 and 3 are being compared against each other and the outcomes from the previous Model 1 project. The ring-fencing waiver only applies to integration model 3.

Model 1

In integration model 1, SA Power Networks' DOE was 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 previously tested by SA Power Networks and Tesla under the ARENA Advanced VPP grid integration project, using a pre-Common Smart Invertor Profile-Australia (CSIP-Aus) communication protocol and a DOE that ranged between 5-10kW. This model is acting as a control in the MAS trial with learnings compared against the two new models being tested in the MAS trial.

Model 2

Under integration model 2, both SA Power Networks' 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 has been tested by AGL, 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 distributor and the retailer's commands to the device, AGL has been able to ensure that limits around retail control of the customer's device are respected, and that customers are provided visibility of both SA Power Networks and AGL's control signals.

Model 3

In integration model 3, the retailer control signal is provided to SA Power Networks and blended 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.

This model has been tested by Engie in the trial, leveraging SA Power Networks' existing CSIP-AUS interface to avoid the need to build additional integrations to the customer's site.

Engie have provided 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 SA Power Networks is only focusing on the pieces which are out of scope of the existing Flexible Exports infrastructure and processes:

- Engie's technology platform – [redacted].
- 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 Engie [redacted]

3. Total Costs

Total costs from 1 July 2024 to 30 June 2025 were [redacted] and total costs from 1 July 2025 to 31 December 2025 were [redacted].

Table 1. Monthly Costs from 1 July 2024 to 30 June 2025

Month	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25
Monthly Costs ($)	[redacted]											

Table 2. Monthly Costs from 1 July 2025 to 31 December 2025

Month	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25
Monthly Costs ($)	[redacted]					

4. Customer enrolment data

Total customer enrolments [redacted] over the trial being 83. [redacted]

Table 3. Customer Enrolments from 1 July 2024 to 30 June 2025

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

Table 4. Customer Enrolments from 1 July 2025 to 31 December 2025

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

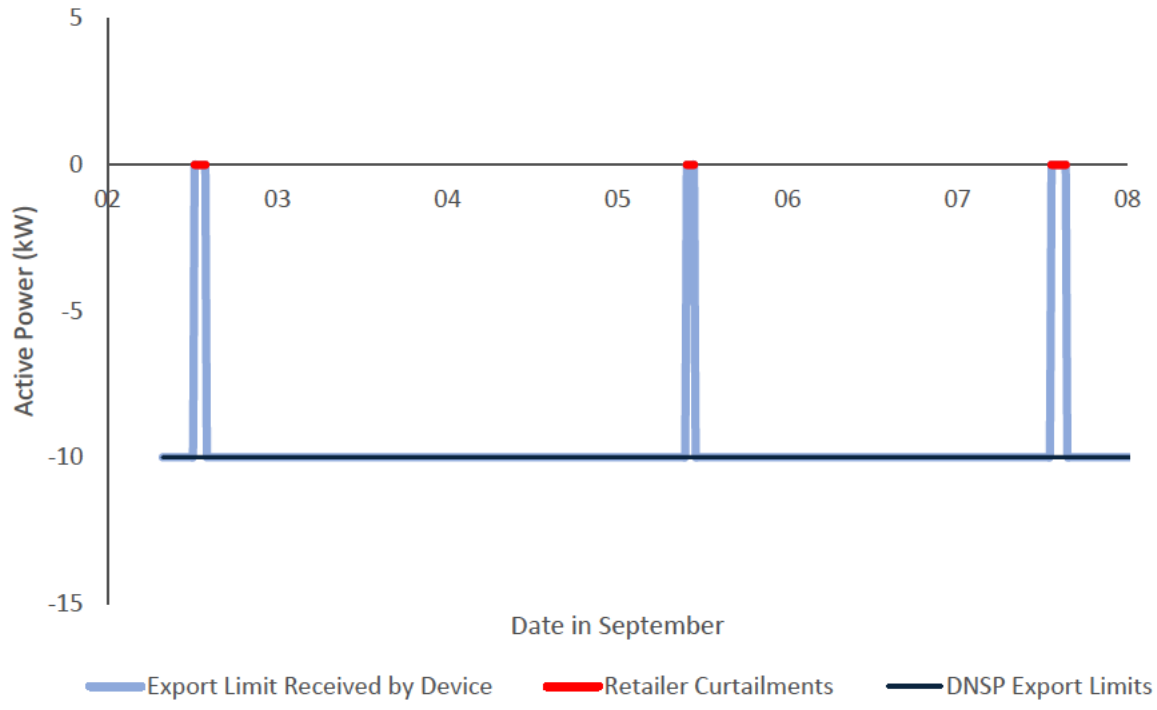
5. Correlation of Network and Retailer Drivers for Solar Curtailment

While the trial is still ongoing, analysis has shown there are alignments between retailer driven MAS curtailments and DNSP export limits in constrained areas of the low voltage network. However, there has been no alignment observed in unconstrained locations, this reflects the fundamental difference between the signals driving each type of curtailment.

The wholesale market price is a statewide signal, meaning all MAS customers across South Australia receive the same price incentive regardless of their local network conditions. In contrast, DNSP export limits are highly localised and apply only where voltage or thermal constraints exist on specific feeders or transformers.

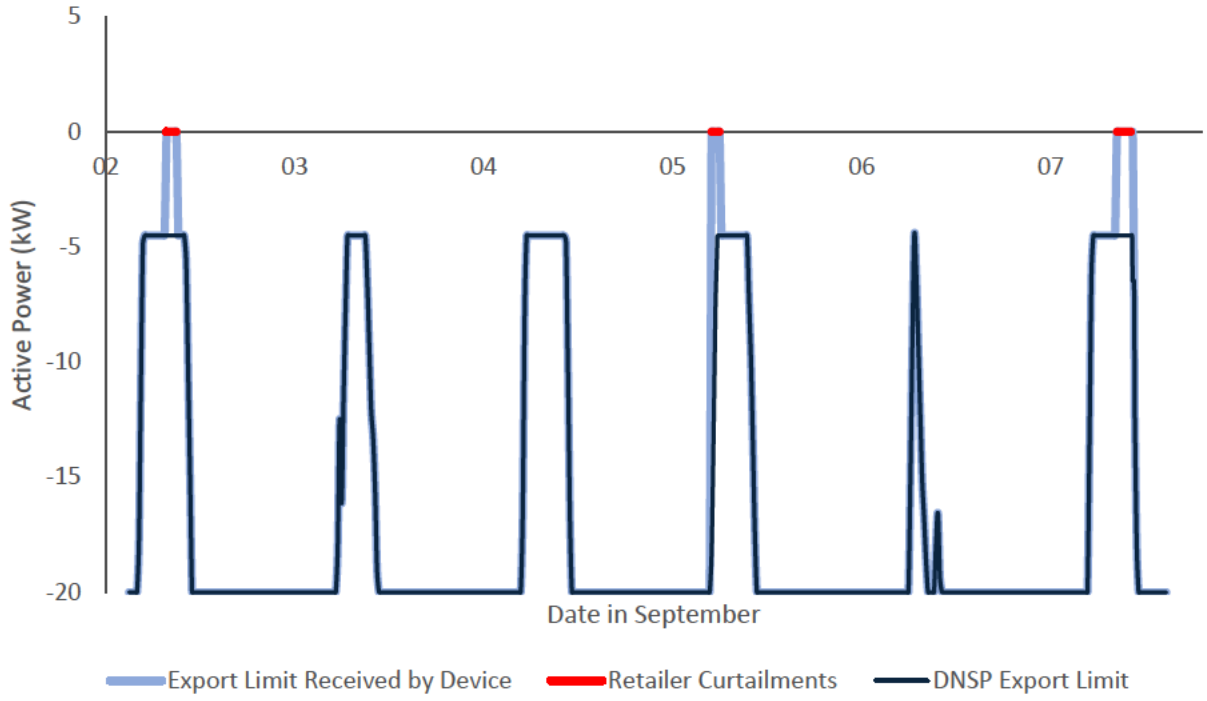
When examining Engie customer data located in unconstrained parts of the LV network, around 80% of sites showed no correlation between retailer curtailments and DNSP export limits. Therefore, for these sites there were no instances during the trial that DNSP export limits coincided with a negative wholesale market price event (below Engie's curtailment threshold). This is seen in Figure 1 that illustrates this pattern in an area with minimal network constraints, with no correlation identified between Engie and SAPN curtailments over that period.

Figure 1. DNSP Export Limits versus Retailer Curtailments - Site with Low Network Constraints and a Capacity of 10kWs



However, in areas where there are network constraints, a correlation was observed. This occurred as customers in these locations were already subject to DNSP export limits during sunny periods, which often coincided with negative wholesale market prices. Therefore, wholesale market driven and DNSP driven curtailments were more likely to occur at the same time. Figure 2 shows how a customer's exports were curtailed at the same time by both the retailer and DNSP when located in a network constrained area.

Figure 2. DNSP Export Limits versus Retailer Curtailments - Site with High Network Constraints and a Capacity of 20kW



Overall, the trial demonstrates that while market active solar responds uniformly to statewide price signals, the underlying network impacts remain local. MAS does not inherently target low voltage congestion. Instead, any alignment with DNSP curtailments emerge only where local constraints coincide with broader system level oversupply conditions.

6. Customer information on capacity allocations

[redacted] The information detailed that Engie will adjust the amount of energy exported from the customer's solar system.

During the trial Engie's control signal was provided to SA Power Networks and blended with the DOE within SA Power Networks' systems to publish the control signal to the customer's site over the existing CSIP-AUS interface.

Engie provided visibility to customers of curtailment hours and exports through emails and a customer monitoring application portal.

This enabled customers to maintain tracking of how often Engie curtails as well as their exports and credits. The emails provided visibility to customers, with an example excerpt from one of these emails in Figure 3. The portal enabled customers to review more granular details including their imports and exports providing customers the ability to assess if the trial was beneficial.

Figure 3. Example of weekly email

7. Customer consent arrangements

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Glossary

Abbreviation	Definition or description
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
CSIP-Aus	Common Smart Inverter Profile – Australia, a national standard for communication between customer energy resources like solar power and distribution networks. It enables dynamic real time control of energy exports to the distribution network.
DOE	Dynamic Operating Envelope
kW	kilowatt (=1000 watts)
MAS	Market Active Solar
MW	megawatt (=1,000,000 watts)
VPP	Virtual Power Plant