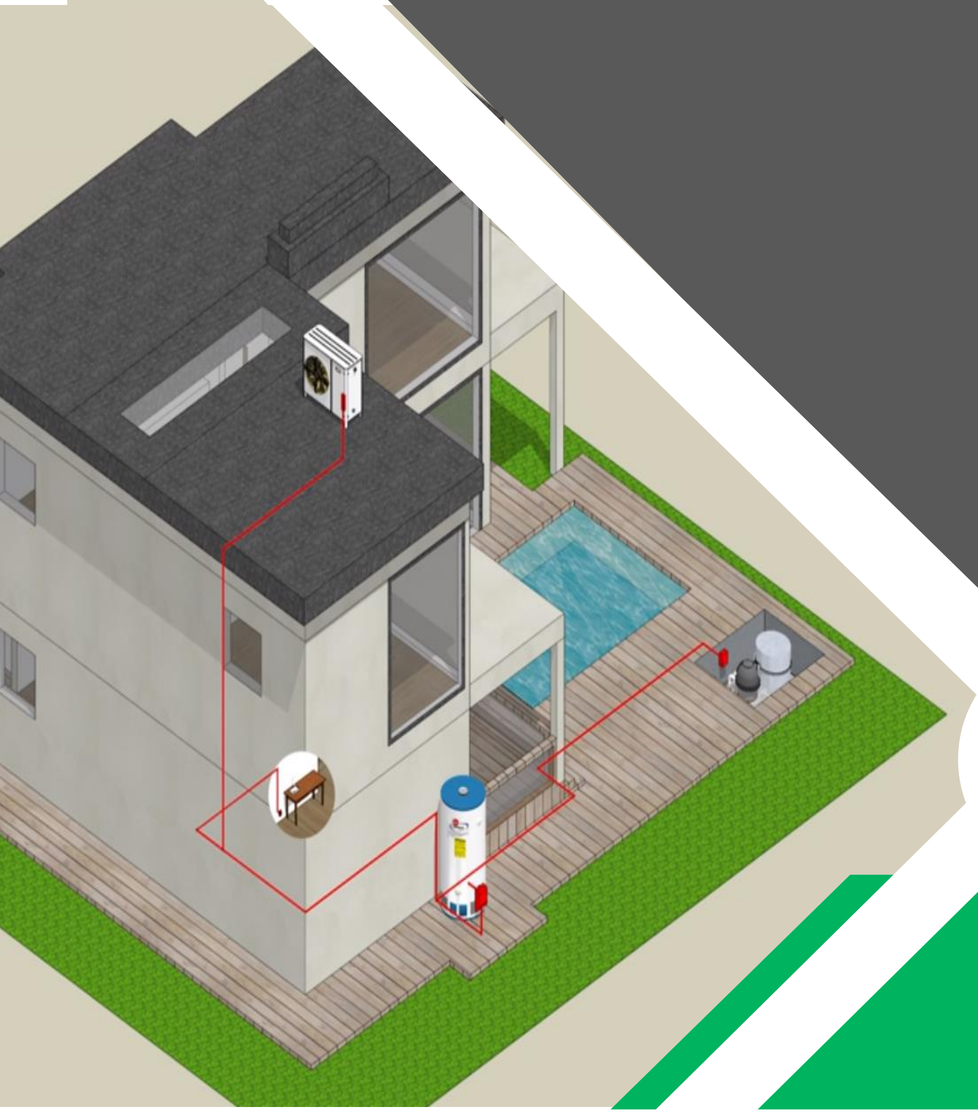
ARENA - ADVANCING RENEWABLES PROGRAM (ARP)

SA SMART NETWORK Project

Performance Report 1

Bringing SA Hot Water Load Under Active Control

November 2021



Rheem Combined Energy Simplyenergy by ENGIE SA Power Networks MARCHMENT HILL CONSULTING

Project Summary	
Project	SA Smart Network Project
Project Numbers	ARENA: 2019ARP023 SA DEM: FA-00181
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Project Control	
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This Project received funding from ARENA as part of ARENA's Advancing Renewables Program and the South Australian Government's Demand Management Trials Program.

Acronyms

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
API	Application Programming Interface
ARENA	Australian Renewable Energy Agency
CET	Combined Energy Technologies
DER	Distributed Energy Resources
DNSP	Distribution Network Service Provider
DRSP	Demand Response Service Provider
FCAS	Frequency Control Ancillary Services
HWS	Hot Water Systems
HEMS	Home Energy Management System
kW	Kilowatt
kWh	Kilowatt Hour
MW	Megawatt
NEM	National Energy Market
PV	Photovoltaic
OPCL	Off Peak Controlled Load
SA	South Australia
SAPN	South Australia Power Networks
VPP	Virtual Power Plant

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Executive Summary

Rheem has commenced a multi-year project with support from the Australian Renewable Energy Agency (ARENA) and the Government of South Australia under its Demand Management Trials program. The project seeks to demonstrate that hot water systems can provide aggregated demand response within a Virtual Power Plant (VPP) and deliver wholesale market value and potential Frequency Control Ancillary Services (FCAS) value to participating customers, supporting stabilisation efforts on the South Australian grid and enabling load shifting to reduce the solar duck curve.

The focus for this first Performance Report will be the methodologies and data that will be employed in measuring the following 'Outcomes':

- **Outcome A: Network value (see Section 2)**
- **Outcome B: Customer value (see Section 3)**
- **Outcome C / D: Aggregator value (see Section 4)**
- **Outcome E: Supplier value (see Section 5)**

Where applicable, this will include the setup of baseline data against which test data will be compared to gauge performance.

Rheem is delighted by the level of industry support exhibited for the project to date and looks forward to further progressing this ARENA and Government of South Australia supported project.

1 Purpose of this Report

This is the first of two Performance Reports to be provided as part of this project. Given that the timing of this report is prior to sales reaching a volume required to perform meaningful analysis, the focus for this first Performance report is on the methodologies and data that will be employed by the project team in measuring the project's 'Outcomes' A-E, as per the Knowledge Sharing Plan[1]:

Outcome		Description
A	**Network value**	Testing the feasibility of different approaches for shifting hot water load to provide network value in South Australia.
B	**Customer value**	Testing the incorporation of hot water load within a broader demand management package (through inclusion of other household controllable loads or DER types) as well as assessing customer preferences to different incentives.
C / D	**Aggregator value**	Test the value of aggregated hot water Demand Response as part of a VPP with visibility for SAPN and AEMO.
E	**Supplier value**	Advancing the commercialisation of a locally manufactured retrofit device to control hot water load.

Table 1: Knowledge Sharing Plan Outcomes A – E.

Where applicable, the methodologies described include the approach to 'baselining' against which test data will be compared and performance will be measured.

Finally, this first Performance Report will also describe how all project participants (Rheem, retailers, SA Power Networks and CET) are collecting data, as well as identify any potential risks (with mitigation steps) regarding the data collection approach.

Further background information on the Project is provided in Appendix A.

[1] Knowledge Sharing Plan, Item 1.2(b).

2 Outcome A: Network value

What is Outcome A aiming to measure?

OBJECTIVE

To test the feasibility of different approaches for shifting hot water load to provide network value in South Australia.

This outcome is focussed on measuring the benefits to the South Australian electricity network. For clarity, the scope of the network is SA Power Networks' distribution network.

The premise of the value to electricity networks is the ability of smart electric water heaters to address the challenges presented by the issue of minimum demand (previously referred to as the "duck curve"), i.e. the significant volumes of electricity being generated in the middle of the day from rooftop PV. By **shifting the timing of water heating to consume excess solar PV generation during the day**, smart electric water heaters can help to reduce the power quality issues that can be caused by increased variability in the range of power flows when PV systems are at peak output – for example, high voltages which can limit the energy hosting capacity of networks – and thereby avoid the need for costly network solutions (e.g. transformer taps, voltage regulators, load compensators). Further detail on this is provided in Appendix A.

Performance measurement methodology and comparative baselines

The data we will capture to **assess the ability of the trialled water heating technologies to shift customer load** are shown following in Table 2.

This also includes the approach to baselining we will employ, that baseline to serve as the 'control' data against which the test data will be compared to measure project performance. It is important to note that because many customers of Rheem's smart electric water heaters will be new customers to the retailers, historical energy consumption data will be largely unavailable. For this reason, baselining will involve measuring load for a homogenous population of customers to serve as the baseline.

The comparison of baseline load data to the 'test' (i.e. with smart electric water heaters) load data will allow us to measure the impact that smart electric water heaters have on shifting hot water load, and thereby provide value through flexibility to the electricity network.

Metric	Unit	'Baseline' data	'Test' data
A1. Customer load	MWh	Assessment of baseline hot water load consumed by equivalent number of customers on traditional off-peak controlled load tariff. Sample size (n) of 50 customers with electric resistive heaters on OPCL.	Assessment of actual hot water load consumed by customers on solar sponge tariff, smart hot water heating split by solar/non-solar.

Table 2: Outcome A: Network value - Key performance metric.

To support the richness of the customer load performance metric, further data points will also be captured and provided as shown in Table 3:

Metric	Data
A2. **Tariffs**	• Retail tariff rates that project customers are charged and an example tariff for OPCL customers • Details of standard project customer offers, including any changes over the life of the project
A3. **Number and type of installation**	• Type of installation (PowerStore, PowerStore Lite, Retrofit) • Type of home (solar, non-solar) • Customer retail tariff • Additional HEMS-controlled devices (e.g. pool pumps and air conditioners)
A4. **Grid load**	• SA regional grid load, 30-minute and 5-minute resolution
A5. **Grid value**	• SA regional price and regional grid load, 30-minute and 5-minute resolution

Table 3: Outcome A: Network value - Additional performance metrics.

Data collection frequency, source and responsible party / parties

The approach to ensuring data is collected and provided to Rheem to enable the performance to be measured is summarised in Table 4.

Metric	Data sampling frequency	Data source(s)	Responsible party / parties
A1. Customer load - BASELINE DATA	Once off	Anonymised interval data for homogenous customer population (without smart hot water heaters)	Project retailers/Trial customers
A1. Customer load - TEST DATA	Quarterly	Interval data for each project customer with relevant project retailer.	CET
A2. **Tariffs**	Quarterly	Project retailers	Project retailers
A3. **Number and type of installation**	Quarterly	Rheem, CET	Rheem, CET
A4. **Grid load**	Quarterly	AEMO public data	Rheem
A5. **Grid value**	Quarterly	AEMO public data	Rheem

Table 4: Outcome A: Network value - Data collection approach and responsible party / parties.

Data risks and mitigation

Customer data privacy considerations

Some retailers have raised potential barriers to sharing customer load data due to privacy considerations. This will be mitigated by working with retailers and CET to ensure that data is only captured to the level of granularity required and that all data is anonymous with no identifiers such as account numbers.

3 Outcome B: Customer value

What is Outcome B aiming to measure?

OBJECTIVE

To test the incorporation of hot water load within a broader demand management package (through inclusion of other household controllable loads or DER types), as well as assessing customer preferences to different incentives.

The focus of Outcome B is to **assess customer preferences** on the range of hot water product/service offerings provided by Rheem and the project retailer partners (e.g. Simply Energy).

Gauging customer preferences and overall levels of customer appetite for smart electric water heaters is important given the relative newness of this type product within a wider (and more established) suite of DER products. While significant market research has been conducted by Rheem prior to launch (see previous Milestone 2 report), the degree of innovation in the product means that market elements such as price points, sales channels, rebate structures and target markets have yet to be tested at scale in real-world environments until now.

While being mindful of some commercial-in-confidence limitations, Rheem is committed to sharing as much market-related learnings as possible with a view to advancing the maturity of the market.

Performance measurement methodology and comparative baselines

Measuring performance against this Outcome will include a **blend of both quantitative and qualitative performance metrics**. The qualitative elements will allow Rheem to provide additional richness to the learnings that would not be possible with a purely quantitative approach and will be particularly important given that challenge of setting 'baselines' against which the quantitative metrics will be compared.

The quantitative and qualitative metrics to be used to measure performance are listed in Table 5 and Table 6, respectively.

Quantitative metrics

Metric	Unit	'Baseline' data	'Test' data
B1. **Total quantity of sales**	Volume of sales (#)	Number of regular (i.e. non-smart) electric water heaters sold and installed.	Number of smart electric water heaters sold and installed.
B2. **Sales by technology type**	Volume of sales (#)	N/A	• Type of hot water heater installed (PowerStore, PowerStore Lite, retrofit device) • Split of solar/non-solar homes • Number of other DER assets (air conditioners, pool pumps)

Table 5: Outcome B: Customer value - Quantitative performance metrics.

Qualitative metrics

Metric	Data
B3. **Retail offer type**	• Average retail tariffs for customers • Details of standard project customer offers, including any changes over the life of the project • Any additional incentives offered, including any changes over the life of the project
B4. **Customer research**	Summary results of smart electric water heaters customer follow-up surveys (including commentary). Survey sample size n ≈ 20. Survey to capture: • Purchasing driver(s) • Satisfaction to date • Net Promoter Score • Customer attitudes to price (including rebates) • General feedback
B5. **Sales channel research**	Summary results of surveys of sales channel partners. Survey sample size n ≈ 5. Survey to capture: • Key sales barriers • Customer attitudes to price (including rebates) • Feedback received from customers • General feedback

Table 6: Outcome B: Customer value - Qualitative performance metrics.

Data collection frequency, source and responsible party / parties

The approach to ensuring the data needed to assess this Outcome is collected and provided to Rheem is summarised in Table 7.

Metric	Data sampling frequency	Data source(s)	Responsible party / parties
B1. **Total quantity of sales**	Annually	Rheem sales data	Rheem
B2. **Sales by technology type**	Annually	Rheem sales data, CET records	Rheem, CET
B3. **Retail offer type**	Annually	Project Retailers sales data	Project Retailers, Rheem
B4. **Customer research**	Annually	Customer survey developed and managed by Rheem	Rheem
B5. **Sales channel research**	Annually	Sales channel survey developed and managed by Rheem	Rheem

Table 7: Outcome B: Customer value - Data collection approach and responsible party / parties.

Data risks and mitigation

Potential for limited knowledge of customers' other DER products

Rheem / CET may not have full visibility of all other types of DER that smart electric water heaters customers have. To mitigate this, a sampling approach may be employed whereby knowledge about a subset of customers will be extrapolated to represent the entire customer base.

4 Outcome C / D: Aggregator value

Please note: As per Item 1.2(b) of the Knowledge Sharing Plan, Outcomes C and D are considered as a single Outcome.

What is Outcome C / D aiming to measure?

OBJECTIVE
To test the value of aggregated hot water Demand Response as part of a VPP with visibility for SA Power Networks and AEMO.

Outcome C / D are about measuring the benefits for Virtual Power Plant (VPP) aggregators via the deployment of smart electric water heaters to **generate value in FCAS and wholesale energy markets**.

This Outcome also aims to gauge the proportion of this **value that is passed through to customers** in exchange for their participation in the VPP and allowing their smart water heater to respond to network and market events.

It should be noted that ‘value’ in this Outcome will largely be defined in terms of numbers of water heaters in the VPP and the capacity dispatched (MWh) rather than in terms of financials ($).

This Outcome is of particular interest to Rheem as we believe this will be one of the first occasions when smart water heaters have been used at scale as part of a wider VPP.

Performance measurement methodology and comparative baselines

Measuring performance against this Outcome will largely involve quantitative data to demonstrate the scale of energy demand flexibility that an aggregate fleet of smart electric water heaters can provide to a VPP.

The list of metrics and data to be captured is shown following in Table 8. Baseline data points have also been proposed for those metrics where comparative baseline data is applicable.

Metric	Unit	'Baseline' data	'Test' data
C/D1. **Sales**	Qty.	N/A	• Number of water heaters sold and installed • Type of installation (PowerStore, PowerStore Lite, Retrofit) • Type of home (solar, non-solar) • Additional HEMS-controlled devices (e.g. pool pumps and air conditioners)
C/D2. **Market events**	Qty.	N/A	• Wholesale energy prices above upper limit. Project Retailers to define upper limit in $/MWh (and if the limit is variable, relevant periods) • Wholesale energy prices below lower limit. Project Retailers to define lower limit in $/MWh (and if the limit is variable, relevant periods) • FCAS under-frequency events • FCAS over-frequency events
C/D3. **VPP capacity registered**	Qty. and MWh	Number and dispatchable capacity of non-water heater DER customers enrolled in the VPP fleet.	Number and dispatchable capacity of smart electric water heater customers enrolled in the VPP. (The difference to baseline to show the proportion of VPP capacity provided by smart water heaters.)
C/D4. **VPP capacity dispatched**	Qty. and MWh	N/A	• Number of events • Total and average quantity of VPP capacity dispatched.
C/D5. **Number and time of events and bids**	Qty. and time	N/A	Number and time of events and bids.
C/D6. **Quantity of VPP fleet per event**	MWh	Average delivery from the VPP per event from non-water heater DER.	Average delivery from the VPP per event from water heater DER. (The difference to baseline to show the volume of VPP capacity provided by smart water heaters.)

Table 8: Outcome C / D: Aggregator value - Key performance metrics.

Data collection frequency, source and responsible party / parties

The approach to ensuring the data needed to assess this Outcome is collected and provided to Rheem is summarised in Table 9.

Metric	Data sampling frequency	Data source(s)	Responsible party / parties
C/D1. **Sales**	Annually	Rheem sales data CET data	Rheem, CET
C/D2. **Market events**	Annually	VPP control software	Rheem, Retailers
C/D3. **VPP capacity registered**	Annually	Rheem sales data	Rheem
C/D4. **VPP capacity dispatched**	Annually	VPP control software CET software AEMO	Rheem, CET
C/D5. **Number and time of events and bids**	Annually	VPP control software CET software AEMO	Rheem, CET
C/D6. **Quantity of VPP fleet per event**	Annually	VPP control software CET software AEMO	Rheem, CET

Table 9: Outcome C / D: Aggregator value - Data collection approach and responsible party / parties.

Data risks and mitigation

Risk of unsuccessful DER asset / system integration

This real risk exists due to the dependency on multiple assets and systems operated by multiple stakeholders needing to successfully integrate to provide VPP capabilities and, in turn, data back to Rheem about its smart water heater operation within the VPP. To mitigate this Rheem, with the support of project partners, has undertaken detailed testing to ensure assets and systems are integrated and operating correctly.

5 Outcome E: Supplier value

What is Outcome E aiming to measure?

OBJECTIVE
To measure the commercialisation of a locally manufactured retrofit device to control hot water load.

This Outcome aims to gauge the progress that has been achieved to date towards **commercialisation of the retrofit device technology** developed by Rheem as part of the trial. This is an important Outcome because we consider the development of a retrofit device to be key to the large-scale market take-up of demand management of electric water heaters.

As mentioned earlier in this report and while mindful of some commercial-in-confidence limitations that exist, Rheem is committed to sharing as much market-related learnings as possible with a view to advancing the maturity of the market and local manufacturing in Australia.

Performance measurement methodology and comparative baselines

Measuring performance against this Outcome E will involve a **blend of both quantitative and qualitative performance metrics** as shown in the following tables.

Please note that due to the types of the qualitative metrics to be captured and some commercial-in-confidence limitations, comparative baseline cost and revenue data is not provided for this Outcome. Detailed insights will instead be provided via the qualitative metrics.

The quantitative and qualitative metrics to be used to measure performance are listed in Table 10 and Table 11, respectively.

Quantitative metrics

Metric	Unit	Data
E1. Retrofit installed price to homeowners	$ / unit	Recommended retail and installation cost of retrofit device technology.

Metric	Unit	Data
E2. **Number of retrofit units sold**	Volume of sales (#)	Number of retrofit devices sold and installed.
E3. **Retrofit sales revenue**	$	Sales revenue from retrofit devices.
E4. **Ongoing subsidies (if any)**	$	Details of any ongoing financial incentives or subsidies provided to Rheem (if any).

Table 10: Outcome E: Supplier value - Quantitative performance metrics.

Qualitative metrics

Metric	Data
E5. **Supplier commentary on retrofit commercialisation**	A short report (3-5 pages approx.) to capture Rheem's view on the commercialisation maturity of retrofit device technology, particularly as it relates to local manufacturing.

Table 11: Outcome E: Supplier value - Qualitative performance metrics.

Data collection frequency, source and responsible party / parties

The approach to ensuring the data needed to assess this Outcome is collected and provided to Rheem is summarised in Table 12.

Metric	Data sampling frequency	Data source(s)	Responsible party / parties
E1. Retrofit installed price to homeowners	Once - 12 months following completion of the trial	Rheem internal data	Rheem
E2. **Number of retrofit units sold**	Once - 12 months following completion of the trial	Rheem internal data	Rheem

Metric	Data sampling frequency	Data source(s)	Responsible party / parties
E3. **Retrofit sales revenue**	Once - 12 months following completion of the trial	Rheem internal data	Rheem
E4. **Ongoing subsidies (if any)**	Once - 12 months following completion of the trial	Rheem internal data	Rheem
E5. **Supplier commentary on retrofit commercialisation**	Once - 12 months following completion of the trial	Rheem project management personnel	Rheem

Table 12: Outcome E: Supplier value - Data collection approach and responsible party / parties.

Data risks and mitigation

Given that all data required to support this Outcome is sourced from Rheem and is already being captured as part of business-as-usual operations, we do not foresee any risks to assessing this Outcome E. We will however keep a watch on any potential risks and advise ARENA and SA DEM of these risks (with mitigation steps) as required.

6 Next Steps

This report is the first of two Performance Reports to be provided during the project. The next performance report will employ the methodologies and data described here to measure actual performance and report against the project 'Outcomes' A to E.

The immediate next steps for the project include to further drive sales volumes of the smart electric water heaters to ensure there is an adequate sample size to measure project performance. Other key upcoming activities include to register the project for FCAS with AEMO and to ensure integration of the smart water heaters with CET's technology.

Appendix A: Project Information

Project Background

Water heating is a significant electricity sink, ***comprising 25% of household energy use in Australia*** (the second largest segment of household energy consumption behind space heating and cooling). As a large energy-using appliance that can be "time shifted", many DNSP's offer a controlled load tariff that is applied to electric water heaters during off-peak times (referred to as Off-Peak Controlled Load, OPCL), so that they can draw electricity at a predictable time and a cheaper rate. In South Australia, this load is set through static time switches to operate overnight between 11PM and 7AM. Similar timings for OPCL exist across all NEM regions.

This off-peak timing is based on historic centralised generation, and transmission network loads which have become out-dated due to high penetrations of residential solar in the network. With growing rooftop PV penetration, significant volumes of electricity are being generated such that grid demand during the middle of the day is being reduced to record low levels, creating the "duck curve" (see Figure 1 below). In addition, PV uptake has increased variability in the range of power flows that the network must be able to support (i.e. demand transience due to cloud cover, fluctuations in demand between the middle of the day and in the late afternoon) and can cause power quality issues such as high voltages when PV systems are at peak output. This can limit the renewable energy hosting capacity of networks unless costly network solutions are employed (e.g. transformer taps, voltage regulators, load compensators) or customers are incentivised to shift load through energy storage or demand management incentives.

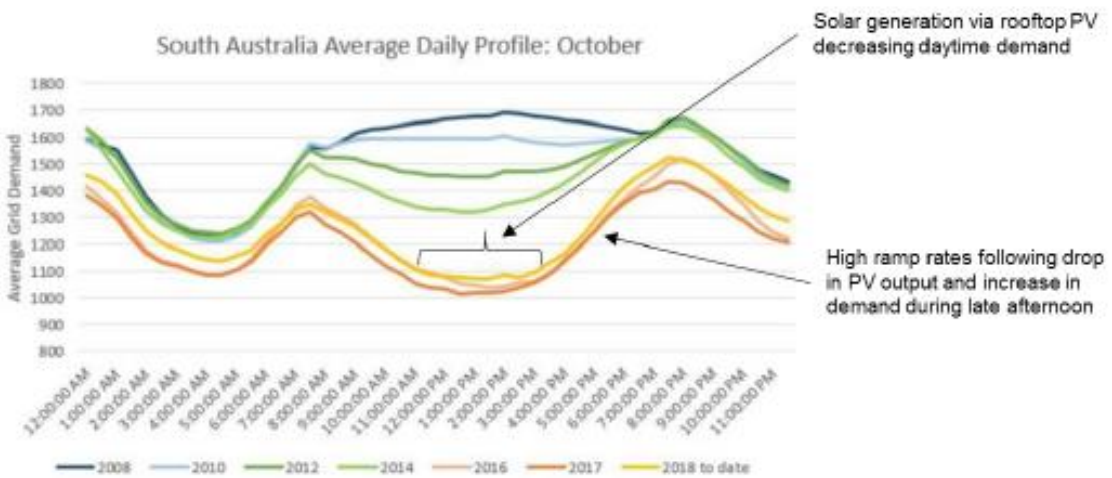

Figure 1: Impact of solar PV on daily demand profiles in South Australia.

SA Power Networks (SAPN) has over 300,000 off peak hot water storage loads throughout its distribution network. Assuming an average water heater power draw of 3.6 kW, this equates to 1,080 MW of un-tapped DER load, with a total average daily energy consumption of between 3 – 4.5 GWh (based on 10 - 15 kWh of water heating per tank per day - weather and seasonally dependent). This represents a significant energy storage capacity across South Australia, and more widely the NEM, yet to be harnessed.

In South Australia, currently, electric hot water systems on controlled load are switched on at a fixed time via mechanical time switches at the customers' premise, or in switches that have been incorporated through electronic meters. SAPN's control over electric water heaters is limited to these time switches, which cannot be controlled dynamically or remotely, thus timing cannot be varied without manual adjustments for each customer. Furthermore, all hot water systems are currently run at their full load rating when heating, at a significant ramp rate which has previously driven spikes in electricity prices in SA.

Rheem's Smart Network project aims to demonstrate how this significant energy resource could potentially be brought under control using novel technology developed through 5 years of innovation in variable power water heating and home energy management systems. The project aims to test different strategies to shift the timing of water heating to consume excess solar PV generation during the day.

Project Overview

The SA Smart Network project aims to explore alternative approaches for shifting the timing of and demonstrating active control over hot water systems within South Australia.

The project will explore the potential for 2,400 residential hot water systems along with (at a minimum) 200 air conditioning systems and 200 pool pumps to provide aggregated demand response within a Virtual Power Plant (VPP) to deliver wholesale market value to participating customers. The project will test the potential to derive further wholesale and deliver Frequency Control Ancillary Services (FCAS), in addition to bill optimisation for trial participants.

Furthermore, the project will investigate hot water control through testing a range of technologies and product offerings, developed to maximise participation from customers, assess customer preferences for participating in hot water demand management, and demonstrate a low-cost and scalable solution to providing active control. This will include the development and commercialisation of a locally manufactured retrofit device that can be added to existing hot water heaters.

The project also involves collaboration with CET, a leading provider of home energy management systems (HEMS) in providing active control over the hot water systems, SA Power Networks in developing a network tariff to incentivise hot water load shifting and a number of Project Retailers to develop a range of product offerings to achieve customer participation in the aggregation/orchestration of hot water systems within the VPP and to pass back value derived in the wholesale market to participating customers.

The Project will involve the development, deployment and demonstration of three solar-smart electric water heater solutions (PowerStore, PowerStore Lite and a Retrofit device) and two load control adapters, one for air conditioning systems and one for pool pumps. These devices will all be integrated with CET's HEMS. These products are described in the table below.

Technology	Quantity	Description
PowerStore	200 PowerStores in solar homes 200 PowerStores in non-solar homes	The PowerStore is a solar-smart electric water heater that was released by the Recipient to the market in Q3 2018. The PowerStore product can provide 13 kWh of thermal energy storage and offers dynamic adjustments to its power demand on the network. The PowerStore will be available to customers who are replacing their hot water systems or to customers with new installations looking for a sophisticated and state-of the art HWS (with the benefits mentioned earlier).
PowerStore Lite	500 PowerStore Lites in solar homes 500 PowerStores Lites in non-solar homes	The Recipient is developing the PowerStore Lite that is designed to be a lower cost deployment solution to the PowerStore. It will not offer the full functionality of the PowerStore, however it will still offer active control. The PowerStore Lite will be available to customers who are replacing their hot water systems and customers with new installations.

Technology	Quantity	Description
Retrofit device	500 Retrofit devices in solar homes 500 Retrofit devices in non-solar homes	The Retrofit device will be developed to be retrofitted to existing hot water systems, targeting households that are not replacing their hot water systems. The devices will be low cost and allow for rapid deployment and will be available to solar and non-solar homes. The device will enable active control of existing hot water systems targeting customers with suitable water heater systems that are willing to upgrade to the new technologies to take advantage of savings and to assist with grid stabilisation.
Air Conditioning System Adapter	200	The air conditioning adapter will be developed to interface with existing air conditioning systems. These devices will be targeted at existing customers within the program to further increase the value of their solar smart electric water heater and Home Energy Management systems
Pool Pump Adapter	200	The pool pump adapter will be developed to function with pool pump systems. These devices will be targeted at existing customers within the program to further increase the value of their solar smart electric water heater and Home Energy Management systems

Technology	Quantity	Description
HEMS	The HEMS will be integrated with the PowerStore, PowerStore Lite and Retrofit devices	CET's Home Energy Management System (HEMS) is the interface that enables active control of the hot water systems using Power Line Telecommunications (PLT) and to allow the CET/Rheem cloud based application (Virtual Power Plant) to monitor and control household loads to shift the load into the solar period, to lower energy costs for consumers and to participate in stabilising the grid.

Table 13: Project technologies

Project Objectives

The project seeks to demonstrate that hot water systems can provide aggregated demand response within a Virtual Power Plant (VPP) and deliver potential wholesale and Frequency Control Ancillary Services (FCAS) value to participating customers.

The objectives for the Project will be achieved through the following outcomes:

- Improved understanding of the feasibility of different approaches for shifting hot water load to provide network value in South Australia, including the development of new tariff structures that reward electricity consumption aligned with VRE generation.
- Improved understanding of the incorporation of hot water load within a broader demand management package (through inclusion of other household controllable loads or DER types), as well as assessing customer preferences to different incentives.
- Understanding the potential savings that solar and non-solar customers could receive on electricity bills because of active control of hot water systems or load shifting and proposed new tariff structures (Time of Use tariffs).
- Test the potential wholesale energy and potential FCAS value of aggregated hot water systems and other DER types as part of a VPP, with visibility for SAPN and the Australian Energy Market Operator (AEMO).
- Advance the commercialisation of a locally manufactured retrofit device to control hot water load in SA.

Project Stakeholders & Participants

The Project partners with Rheem Australia are:

- Combined Energy Technologies (CET) - will develop the Home Energy Management System (HEMS) interface that will enable active control and aggregation/orchestration over the hot water systems.
- South Australia Power Networks (SAPN) - will develop a network tariff structure to incentivise hot water load shifting and promote the use of active control for such devices.
- Project Retailers – will develop a range of product offerings to achieve customer participation within the VPP and to pass on value derived from the wholesale market to participating consumers.
- Marchment Hill Consulting – will be responsible for the Knowledge Sharing deliverables for the duration of the Project.