

Activation of the ARENA DR Trial portfolio under the SN RERT Panel

JANUARY 2019



DISCLAIMER

This report has been prepared by Oakley Greenwood (OGW) at the request of the Australian Renewable Energy Agency (ARENA). It is intended solely to provide information on baseline methodologies for demand response activities. The information contained in this report, including any diagrams, specifications, calculations and other data, remain the property of ARENA. This report may not be copied, reproduced, or distributed in any way or for any purpose whatsoever without the prior written consent of ARENA.

The report is provided as is, without any guarantee, representation, condition or warranty of any kind, either express, implied or statutory. ARENA and OGW do not assume any liability with respect to any reliance placed on this report by third parties. If a third party relies on the report in any way, that party assumes the entire risk as to the accuracy, currency or completeness of the information contained in the report.

© Australian Renewable Energy Agency 2019

DOCUMENT INFORMATION

Project: ARENA-AEMO Demand Response RERT Trial

Client: ARENA

Report prepared by: Lance Hoch (lhoch@oakleygreenwood.com.au)

Date: September 2019

1. 1 INTRODUCTION

In 2017, ARENA and AEMO entered into a Memorandum of Understanding to jointly develop 'proof of concept' projects that support the integration of renewable energy into the energy market. As part of this initiative, a three-year Demand Response (DR) Short Notice Reliability and Emergency Reserve Trader (SN RERT) trial (the ARENA DR RERT Trial) was developed to provide evidence that could inform the industry of how DR can contribute towards maintaining grid security and reliability.

While the ARENA DR RERT Trial principally focuses on biannually scheduled testing periods, it also allows for trial participants to be called upon by AEMO during emergency RERT events. This report summarises the activities of the trial participants dispatched by AEMO to provide emergency capacity during the RERT events activated in South Australia and Victoria on 24 and 25 January 2019.

AEMO described the environment leading up to the January 2019 RERT event as follows:

"Temperatures in South Australia (SA) broke new records on 24 January 2019 and Victoria (VIC) experienced extreme heat close to record levels. Simultaneous high temperatures in SA and VIC resulted in high electricity demands across both regions. On 24 and 25 January 2019, reductions in availability of electricity supply due to thermal inefficiencies, unexpected equipment failures, urgent maintenance activity, and reduced generation capacity meant there was not enough power generation in the SA and VIC regions to supply the demand."

As a result, AEMO activated the SN RERT Panel to reduce demand in Victoria and South Australia and provide emergency capacity, which included some of ARENA's DR proponents located in these two states.

The standard process for activating a SN RERT activation event is as follows:

1. AEMO identifies the need for emergency capacity, either through additional generation capacity or load reduction.
2. AEMO issues an Invitation to Tender (ITT) to one or more entities on the SN RERT Panel. ITTs in the SN RERT can be issued at any time from seven days to three hours prior to the intended activation time, and in accordance with:
 - the amount of capacity the RERT provider (either a single customer or an aggregator) has been contracted to provide upon request and has declared to be available by the RERT provider²
 - the amount of notice the DR provider has contractually agreed with AEMO as being required by the provider in order to operationalise its contracted capacity
 - any specific timeframes the DR provider has contracted with AEMO during which its capacity will be available.³
3. The RERT provider can accept or reject AEMO's ITT. Accepting the ITT indicates that the provider will supply the amount of MW requested by AEMO at the time and for the duration requested by AEMO. If the RERT provider wants to vary any of the elements of the ITT, they must first reject the ITT and request an alternative ITT with the revised details, which AEMO can accept or reject. SN RERT capacity has not been contracted until an ITT has been issued by AEMO and accepted by the proponent.
4. AEMO sends an activation notice to the RERT provider.
5. The RERT provider dispatches its load reduction or generation capacity.
6. AEMO provides a notice to the RERT provider to de-activate its RERT capacity. This notice can come any time before or at the end of the event time stated in the ITT. AEMO can also ask the RERT provider if it can extend the availability of the RERT capacity.

1 AEMO, [Load Shedding in Victoria on 24 and 25 January 2019](#), 16 April 2019, pg. 4.

2 The declaration mechanism is provided so that RERT providers can notify AEMO of temporary changes in the availability of their contracted capacity.

3 As part of their initial offer to serve on the SN RERT Panel, RERT providers can nominate any regular time periods during which their capacity will (or will not) be available. The fact that these are regular, recurring periods is what differentiates this aspect of the SN RERT from the declared value aspect.

2. RESULTS

Three proponents in the ARENA DR Trial were dispatched during the 24 and 25 January RERT events – Enel X (formerly EnerNOC), Powershop, and United Energy.

Flow Power operates two separate DR programs – one located in New South Wales, which is included in the ARENA DR Trial, and another in Victoria, which is not included in the ARENA DR Trial. The latter portfolio is instead contracted directly to AEMO for RERT events via the SN RERT Panel. Flow Power's Victoria-based operations were dispatched during the January 2019 RERT events but the results are not discussed in this report, as the portfolio is not included in the ARENA DR Trial.

EnergyAustralia and Planet Innovation had informed AEMO prior to 24 January that their DR capacity was unavailable (0 MW declared) and were consequently not called upon during the January 2019 RERT events.

Proponent	State	MW contracted	MW declared	Notice required to activate (minutes)	Dispatched (Y/N)
EnergyAustralia	SA	12	0	10	N
Intercast & Forge	SA	10	10	10	N
Enel X	VIC	30	30	10	Y
EnergyAustralia	VIC	18	0	10	N
Powershop	VIC	5	4	60	Y
Planet Innovation	VIC	5	0	60	N
United Energy	VIC	30	30	10	Y

2.1 Sequence of events

Tables 3 and 4 detail the sequence of RERT events for the ARENA DR Trial proponents activated on 24 and 25 January. Information has been sourced from interviews and the AEMO Load Shedding in Victoria on 24 and 25 January 2019 report.

Table 3: Sequence of actions during the 24 January RERT event.

Market time	Entity	Event/Activity
13:54	AEMO	Notifies intention to commence RERT contract negotiations for emergency reserve in VIC and SA.
13:56	Powershop	The Availability Declaration is updated from 5 MW to 4 MW due to the temporary unavailability of the Monash Cogeneration facility.
13:56	Enel X	Receives and accepts the ITT requesting 30 MW for 16:30 to 19:30. Customers are notified to be on standby for the event.
13:56	United Energy	Receives an ITT requesting 30 MW to be activated from 16:00 to 20:00.
13:57	Powershop	Receives an ITT requesting 5 MW to be activated from 16:30 to 19:00.
~14:20	Powershop	Accepts the ITT.
Prior to 14:26	United Energy	Accepts the ITT for 30 MW.
15:00	Powershop	Schedules sending SMS notifications ⁴ to customers at 15:30 requesting them to reduce their consumption between 16:30 – 19:00. Reposit Power is scheduled to dispatch using the Reposit Fleet platform.
15:32	Powershop	Receives an activation email requesting 5 MW for 16:30 to 19:30.
15:33	Powershop	1-hour notice SMS is sent to customers. An updated 1-hour notice SMS is sent to Reposit Power (aggregated batteries). AEMO is contacted to confirm the activation and seek the reason for the extension of the activation period.
16:30	Powershop	Customers and Reposit Power are activated.
16:41	United Energy	Notified by AEMO of the change to the activation period to between 17:00 – 21:00
16:52	Enel X	Receives an activation notice from AEMO for 17:00 to 21:00.
17:06	Enel X	Activates entire portfolio to maximise the likelihood of delivering the 30 MW contracted and notifies AEMO that, in line with the ITT, the activation would be for 17:00 to 19:30 with any DR provided beyond 19:30 to be undertaken on a 'best endeavours' basis.
16:51	United Energy	Activates DR.
17:55	AEMO	Notifies that all RERT is exhausted.
18:10	AEMO	Directs AusNet Services to shed 75 MW and Portland Smelter to shed first potline (266 MW).
19:00	Powershop	Sends deactivation SMS to customers in accordance with original ITT. Uses the Reposit Fleet platform to extend Reposit's dispatch to 19:30.
19:05	AEMO	Directs Portland Smelter to shed second potline (190 MW) so that the first potline can return to service.
19:10	AEMO	Allows first Portland Smelter potline to return to service.
19:30	Enel X	Notifies customers that the activation period is over but asks whether any customers can continue to reduce their loads until 21:00.
19:50	AEMO	Allows second Portland Smelter potline to return to service.
20:00	AEMO	Cancels remaining load shed direction to AusNet.
21:10	United Energy	Ends DR activation.
22:30	AEMO	Ends RERT Dispatch and intervention event.

⁴ Powershop used a series of three SMS messages: SMS 1 provides the 1-hour notice and includes the start and stop times of the DR event, SMS 2 is sent when the customer is meant to reduce their demand, and SMS 3 is sent at the end of the event and instructs the customer to cease their DR activities.

Table 4: Sequence of actions during the 25 January RERT event.

Market time	Entity	Event/Activity
07:37	AEMO	Notifies intention to commence RERT contract negotiations for emergency reserve in VIC.
07:39	Enel X	Receives and accepts the ITT requesting 30 MW from 11:30 to 15:30. Customers are notified to be on standby for the event.
07:39	Powershop	Receives an ITT requesting 4 MW to be activated from 11:00 to 15:00.
07:39	United Energy	Receives an ITT requesting 30 MW to be activated from 11:30 to 15:30.
Prior to 08:09	United Energy	Accepts the ITT.
~08:05	Powershop	Accepts the ITT.
08:30	Powershop	Schedules SMS notifications to be sent at 10:00 requesting customers reduce their usage from 11:00 to 13:00. Schedules Reposit Power dispatch using Reposit Fleet platform.
08:39	Enel X	Receives and accepts an ITT requesting 30 MW to be activated from 11:30 to 15:30.
08:45	AEMO	Sends instruction to pre-activate a reserve contract for the 25 January 2019 forecast reserve shortfall.
08:57	AEMO	Commences activation of reserve contracts.
09:00	AEMO	Contacts reserve providers (including United Energy) regarding the possibility of them activating on shorter notice than contract minimum lead times and extending the activation period beyond maximum activation times. Several reserve providers confirm their ability to do so.
09:02	Powershop	Receives an activation email from AEMO requesting 4 MW from 10:00 to 14:00.
09:03	Powershop	Re-programs content of SMS notices and amends dispatch period times for Reposit Power. Contacts AEMO to confirm activation.
10:00	Powershop	Activates reserves.
10:55	United Energy	Asked to activate 30 MW immediately (35 minutes early). United Energy agrees, activates DR immediately and accepts the increase in activation duration from 4.0 to 4.5 hours.
11:00	AEMO	Directs AusNet Services to shed 100 MW of load as per priority load shedding schedule – AusNet Services asks United Energy to shed 24 MW. United Energy shed 26.7 MW in response to this request from the transmission system operator, which is in addition to the load reduction United Energy was contracted to provide under the ARENA DR RERT trial.
11:30	Enel X	Activates 30 MW.
11:30	AEMO	Directs AusNet Services to shed additional 150 MW of load as per priority load shedding schedule – AusNet Services asks United Energy to shed an additional 36 MW. VIC energy prices reach the cumulative price threshold (CPT), with energy prices capped at the administered price cap (APC) of \$300/MWh.
13:25	AEMO	Directs AusNet Services to restore 50 MW of load as per priority load shedding schedule.
13:50	AEMO	Directs Ausnet Services to restore all remaining shed load as per priority load shedding schedule. Removes APC on VIC energy price.
14:00	Powershop	Sends deactivation SMS.
15:30	United Energy	Ends DR activation.
15:30	Enel X	Ends DR activation.
16:30	AEMO	Ends RERT Dispatch and intervention event.

2.2 Performance results

Table 2 summarises the performance outcomes from the ARENA DR Trial proponents activated during the January RERT events. Overall, proponents delivered around 91 per cent of total activated capacity.

Key RERT activities and outcomes	24 January 2019		25 January 2019
	SA	VIC	VIC
Time of first RERT activation ⁵	14:30	14:30	09:00
Total MW activated ⁶	216	180	625
ARENA DR MW activated	0	65	65
Residual load shed	0.0	266.0	271.6
End of RERT activations; all load restored	22:30	22:30	16:30

5 All times quoted in this report are in NEM 'market time' (i.e. AEST/AEDT). Source: AEMO, [Load Shedding in Victoria on 24 and 25 January 2019](#), 16 April 2019.

6 The actual capacity delivered in response to a RERT activation may not be the same as the amount activated.

3. LESSONS LEARNED

3.1 Declaration policy

Proponents on the SN RERT panel are currently able to update their declared MW capacity themselves via the AEMO RERT portal. The January RERT events highlighted a need to clarify the process for submitting and reviewing voluntary declarations to ensure that all declarations are accurate and accepted by all relevant parties prior to ITTs being issued.

3.2 Availability of DR capacity for other uses

An ITT can be issued anywhere from seven days to three hours prior to the need for DR to be dispatched. Once an ITT has been accepted by the proponent, that DR capacity cannot be used for the duration of the ITT for any other application. Issues may arise if DR capacity is dispatched prior to the issuance of an ITT, for example in response to high wholesale market prices. This would effectively mean the SN RERT produced no additional demand reduction compared to the impact of the wholesale price itself.

3.3 Relationship between ITT, notification of customers and activation timing

The January RERT events demonstrated that it is best practice for DR proponents to notify their customers of a RERT activation event as early and quickly as possible, particularly where proponent performance relies on manual behavioural DR.

3.4 Response to ITT needs to be made more flexible and faster

At present the only responses available to an ITT are 'yes', or 'no'. A proponent cannot accept an ITT for a level of DR or a time other than what is specified in the ITT. If the proponent cannot say 'yes' unequivocally, they need to reject the ITT, inform AEMO operations of what they can respond to and AEMO needs to prepare and send a new ITT. Allowing proponents to respond to the ITT with a 'MW available' amount could improve this process.

3.5 Changes between the ITT and activation

The January RERT events highlighted communication challenges between relevant parties, particularly regarding activation periods. Clarification is needed on how changes to the activation window impacts the assessment of the DR provider's performance and the calculation of dispatch payments.

3.6 Payment for performance

Performance payments are currently based on the MW delivered within each 30-minute trading interval, and capped at the amount at the DR capacity agreed upon in the ITT. This has the potential to result in payments being withheld for both under- and over-delivery of the agreed DR capacity. One solution could be to base performance on the average MW delivered per 30-minutes across the entire RERT activation period.

