



**POWERSHOP**  
A better power company

# **Powershop Demand Response Program**

Project Report (*1 of 7*)

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*The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.*

## Activity Summary

This report (**Project Report**) relates to the behavioural demand response program (**Program**) conducted by Powershop Australia Pty Ltd (**Powershop**) over the period November 2017 to March 2018 and provides:

- an update to Australian Renewable Energy Agency (**ARENA**) on the Program;
- a comprehensive summary of the Program's performance to date; and
- insights on key learnings.

## Project Summary

### 1. Knowledge sharing activities

Powershop has engaged in a number of knowledge sharing activities since the start of the Program. A summary of each of these activities is outlined below.

#### 1.1 Workshops and information sharing

##### a) ARENA and Australian Energy Market Operator (**AEMO**) initial workshop

Powershop attended an initial workshop in October 2017 with other participants in the ARENA and AEMO joint pilot demand response program (**Pilot Program**) to discuss the operation of the Reliable and Emergency Reserve Trader (**RERT**) Panel Agreement with AEMO. One of the main intentions of this workshop was to collaborate on how vulnerable customers should be managed and if necessary, excluded from participation in demand response (**DR**) programs.

##### b) Summer Public Awareness and Advocacy Messaging Workshop

Powershop attended a meeting called by AEMO with other Pilot Program participants to discuss how messaging to customers can be optimised to ensure maximum participation during DR events.

##### c) 2018 Demand Response Conference

Powershop's Head of Commercial & Strategy, Michael Benveniste, presented at the 2018 Demand Response Conference and provided an overall summary of the Program, including an initial overview of impacts, learnings and issues encountered relating to behavioural DR (**BDR**).

##### d) ARENA workshop – conclusion of summer 2017/2018 Program period

Powershop and other Pilot Program participants attended a workshop to discuss the outcomes of each of their respective DR programs over summer 2017/2018. Each participant had the opportunity to address the group and discuss the positives of their program and areas that may need improvement.

##### e) Sharing information on baseline methodology with Oakley Greenwood

Powershop is collaborating with Oakley Greenwood to discuss the issues with the current baseline methodology for residential customers and is providing information on alternative baseline methods.

## 1.2 Research organisations

Powershop has engaged a number of research organisations to conduct different types of research relating to BDR.

### a) ThinkPlace

ThinkPlace has received funding from ARENA to conduct research on AGL, Energy Australia and Powershop's BDR programs. All three retailers have been included in the research with the intention of determining how DR programs and products are viewed by the public and whether they are considered desirable, effective, safe and reliable.

ThinkPlace recruited approximately 200 customers (about 66 from each retailer) to complete two surveys over March 2018. From customers recruited, 30 customers were selected (10 from each participating retailer) to take part in further qualitative research.

The main research questions ThinkPlace were looking to unpack were:

- How can BDR products be better targeted to improve take-up by residential customers?
- How can the effectiveness and sustainability of BDR products be improved?
- How can retailers influence the system (i.e. how do retailers perceive BDR, BDR customers, and their influence in levels of uptake)?
- How can the positive social outcomes of DR be amplified?

### b) Behavioural Economics Team of Australia (BETA)

BETA will build on the research conducted by ThinkPlace by designing and delivering a fully randomised controlled trial to test:

- the effectiveness of different incentives, if any;
- what messaging customers are most receptive to; and
- the reasons why customers participate in BDR.

BETA will be looking at the larger picture and will run a complete analysis to determine:

- what type of customers are likely to participate in BDR programs and what type of customers are considered good or bad participants;
- the true capacity of a BDR program and industry standards for how capacity is measured and presented;
- issues with the current baseline methodology and other possibilities.

## 2. Overview of Program portfolio

This section provides an outline of the different segments that contribute to Powershop's DR portfolio.

### 2.1 Curb Your Power

The Program (called 'Curb Your Power' (CYP)) is an opt-in program where customers are notified (initially via SMS, eventually via push notifications from the Powershop mobile app once such capability is developed) to curtail their electricity usage during times of peak demand. The Program is entirely voluntary and certain customers are excluded from participation (e.g.

vulnerable customers).

### a) Program overview and operations

Powershop customers register to participate in CYP by completing an online registration form on Powershop's website. All registrations are recorded and stored within an in-house built information management system (**Curbomatic**) built by Powershop specifically for CYP.

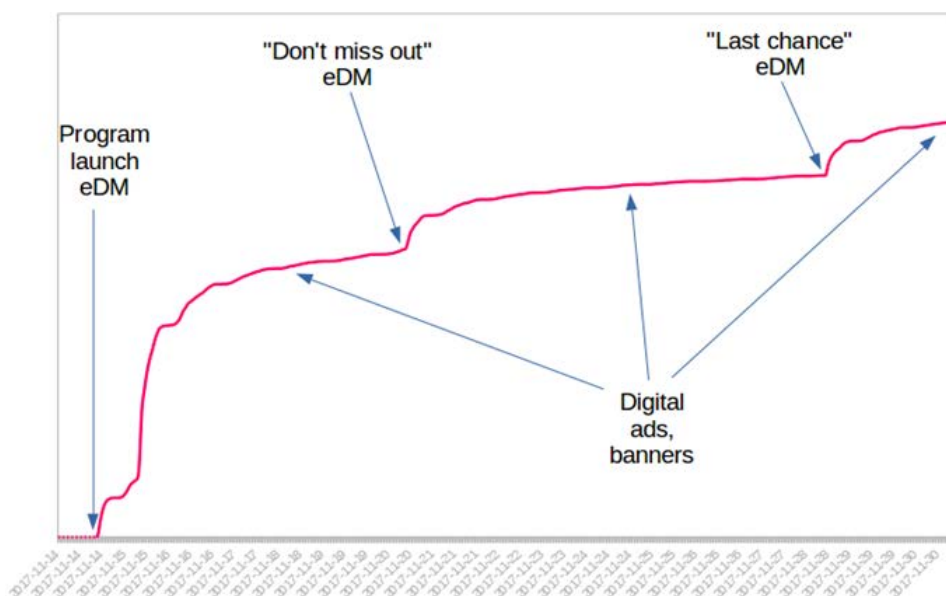
Curbomatic has been programmed to:

- send management daily notifications outlining the total number of registered customers (residential and commercial);
- integrate with an SMS delivery platform to enable Powershop to send bulk SMS's during RERT events (**Events**);
- to measure the baseline of each individual customer and accordingly the estimated reduction in energy usage following an Event; and
- send CYP customers a tailored email summarising their performance following an Event.

### b) CYP recruitment strategy

Powershop's main recruitment avenues have been direct emails, digital ads and account banners. The first tranche of recruitment emails were sent between 14 November 2017 and 16 November 2017 and resulted in around 7,500 registrations from a total of around 56,000 eligible customers. Digital ads and banners directed at current Powershop customers provided a constant flow of registrations.

Powershop exceeded its target of 8,500 CYP customers. At the time of writing this report, CYP has 10,364 registered customers.



### c) Pricing structure and incentives

Residential customers receive a \$10 power credit if they hit their 'curb target'. The power credit can be used by customers to purchase electricity with Powershop. The curb target for a residential customer is:

- a 10% reduction from their baseline; or
- a reduction of 1 kWh every hour of the Event.

Small business customers have the following incentive structure.

Reduction amount (kWh each hour of Event)	Reward (power credit)
10% reduction from baseline or 1 kWh reduction for every hour	\$10
2 to 5 kWh reduction for every hour	\$20
5 to 10 kWh reduction for every hour	\$50
10 to 20 kWh reduction for every hour	\$100
20+ kWh reduction for every hour	\$200

If the curb target is hit in 100% of Events over a one year period, all customers can earn a bonus reward if:

The average reduction for all Events is	Reward (power credit)
greater than 5 kWh	\$150
greater than 10 kWh	\$300
greater than 20 kWh	\$600
greater than 30 kWh	\$900

## 2.2 Reposit Power

### a) Reposit GridCredit Technology

Powershop is utilising customer's Reposit enabled solar and battery systems, essentially creating a virtual power plant (VPP). Using the Reposit web application Powershop has the ability to:

- create multiple VPP's;
- dispatch any/or all VPP's on command;
- see geographically where each battery is located; and
- at any given time, determine the capacity of each battery (and accordingly the entire VPP's capacity).

### b) Grid Impact - Program overview

Powershop is now offering a Reposit plan (called 'Grid Impact') to customers that have a Reposit enabled solar and battery system. Registrations are completed online and once verified as a Reposit customer, they will receive a fixed payment every three months. The payment is based on the size of their battery power output. For example, a Victorian customer will receive the following:

GridCredits®	less than 3.5kW	3.5kW to 7.5kW	7.5kW or more
Victoria (yearly)	\$100	\$156	\$236

Grid Impact gives customers the security of guaranteed payments, the trade-off being Powershop has the ability to discharge their battery at certain times.

**c) Reposit recruitment plan**

This information is commercially sensitive and confidential.

**2.3 Monash cogeneration facility**

Powershop has contracted Monash University’s 1MW gas cogeneration facility (Cogen) to provide additional ‘firm’ capacity.

**2.4 Activation of Program portfolio**

This information is commercially sensitive and confidential.

**3. Performance and Analysis**

**3.1 Performance: test Events**

This information is commercially sensitive and confidential.

**3.2 Analysis: Event time and weather conditions**

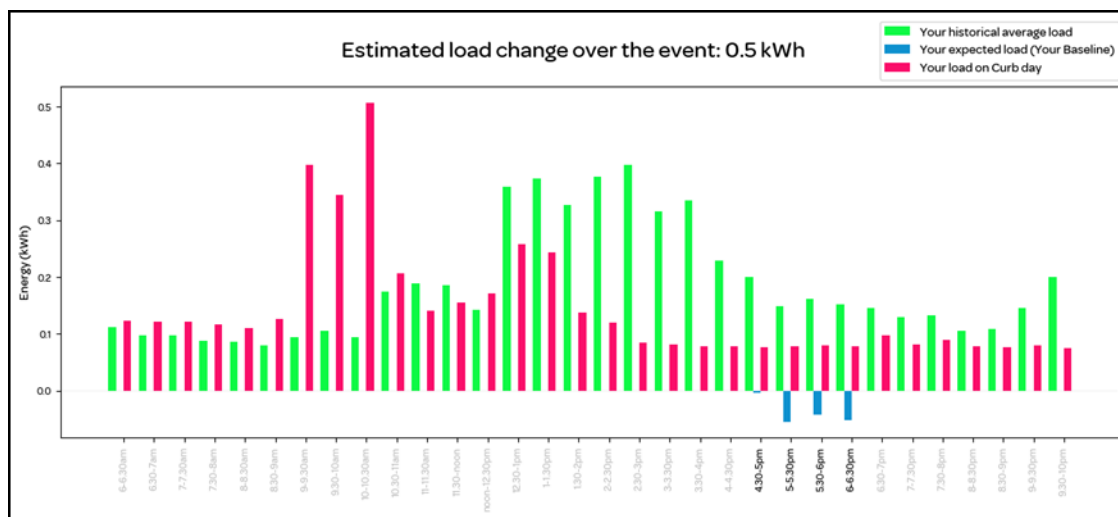
This information is commercially sensitive and confidential.

**3.3 Analysis: Baseline methodology**

The main issues identified with the current method AEMO uses to calculate baseline are set out below.

**a) Negative baseline**

Due to the calculation having additive factors, there are cases where a non-solar customer’s baseline can fall below zero. This makes it impossible to show a reduction and hit a curb target.

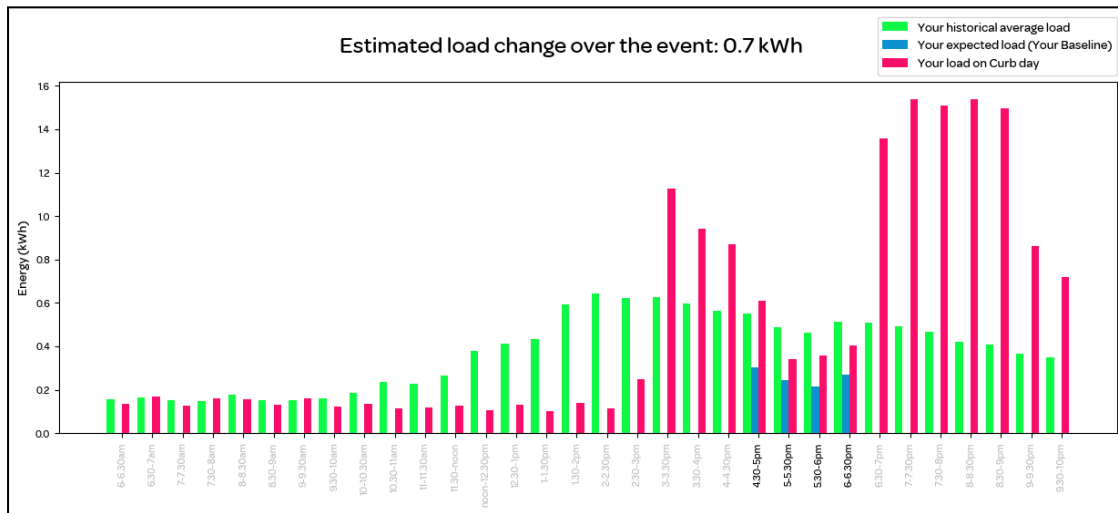


## b) False negatives

A customer that shows a false negative is one that displays a reduction in usage during the time of the Event, however, the baseline calculation records minimal reduction. In the example below you can clearly see that the customer reduced their usage during the Event but the calculation says otherwise.

This scenario occurs when customers use more electricity than usual in the hours leading up to the Event. The irony is the likelihood of customers using more electricity on Event days is high.

A survey of non-successful participants indicated that 9% of customers fell into this category.



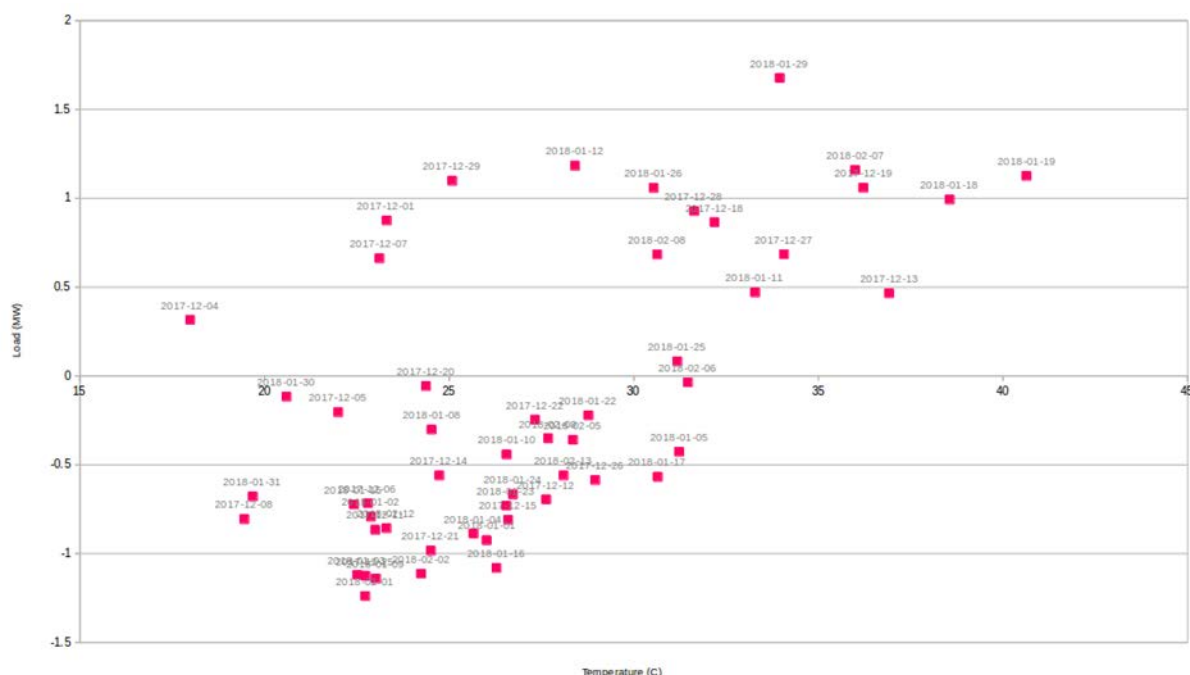
## c) Solar baseline

Solar customers add an extra level of complexity when attempting to calculate a baseline due to weather conditions having an impact on what is happening at the meter. There is no visibility around the amount of PV generation hence solar production is not taken into account when calculating the DR. This means the baseline can be manipulated by conditions outside of usage (i.e. solar radiance, cloud cover and weather are often unforgiving towards solar customers).

Using alternative baseline methodologies that more accurately represent solar customers, it was estimated that there was additional capacity in the Program.

For non-solar customers the correlation of temperature vs portfolio load is proportional with an  $R^2 = 0.89$ . The graph below shows load (MWh) of solar customers vs temperature ( $^{\circ}\text{C}$ ) for summer 2017/2018.





Without visibility on what is happening behind the meter, it is impossible to get an accurate representation of the load available for solar customers. As shown above there is no correlation between temperature and load.

### 3.4 Total capacity available

This information is commercially sensitive and confidential.

## 4. Learnings from the development and operation of the Program

The 2017/2018 summer DR season was a great learning experience for Powershop. Globally, only a handful of BDR programs have been developed and run at this magnitude.

Below are the key learnings from Powershop’s 2017/2018 summer DR season:

#### a) Operational learnings:

- The best time for an Event given Powershop’s CYP load profile is on days between 30 to 34°C around 5pm to 8pm (EST).
- It can take as long as 20 minutes to send 10,000 SMS’s so it is best to schedule the SMS’s 10 to 15 minutes earlier.
- To be inclusive, Powershop decided to base the curb target on a percentage rather than a raw reduction. However, the margin of error is greater for users with smaller loads which imposed the risk of false negatives and false positives.

#### b) Messaging:

- Feedback to customers post-Event is important.
- In the Test 1 Event, Powershop sent 3 SMS’s and in the Test 2 Event, Powershop sent 4 SMS’s. More testing will need to be done to determine which is most affective.
- Powershop has opted for one way communication. Powershop is considering whether it allows customers to respond to SMS’s
- Personalising messages might have an effect of participation and performance.
- Bulk SMS’s could be optimised via location and customer type.
- Notifications via the Powershop app might be better received by customers.

#### c) Customer Feedback

- Some customers reported that 1 hour notice was not enough time to prepare for the Event.

- Customers reported that they didn't trust the baseline.

#### d) Future Development

- Changes to CYP business model
  - Test different incentives.
  - Rewards based on individual and CYP portfolio performance.
  - Highlighting other benefits like community engagement.
- Add gamification.
- Optimise messaging, for example, send high users or reliable 'curbers' different communications.
- Utilise new functionality to send mobile notifications via Powershop app.

## 5. Future recruitment strategies

This information is commercially sensitive and confidential.

## 6. Other commercial objectives for the Program

Powershop is currently not using its Program for any uses other than those pertaining to the funding agreement entered into between Powershop and ARENA.