Powershop Demand Response Program

Project Report for 30 May 2018 to 30 November 2018 (Year 1)
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**Activity Summary**

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

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

**Project Summary**

1. **Knowledge Sharing Activities**

A summary of knowledge sharing activities conducted during the Period is outlined below.

1.1 **The Behavioural Insights Team (BIT)**

Powershop is in discussions with BIT who are an organisation that specialises in applying behavioural insights to large programs. BIT will build on the research conducted by ThinkPlace by designing and delivering two fully randomised controlled trials (RTC) to test:

- the effectiveness of different incentives;
- what messaging is most effective; and
- whether, when looking at the larger picture, what type of customers are likely to participate in behavioural demand response (BDR) programs and what type of customers are considered ideal participants.

BIT’s mission is to generate and apply behavioural insights and interventions to programs designed by governments, business and charities to inform policy and improve public services.

1.2 **ARENA Insights forum**

A Powershop representative participated in a panel discussion at the ARENA Insights Forum discussing ‘Exchanging Distributed Energy Resources Value’ focusing on customer experience.

2. **Overview of Powershop’s Demand Response Portfolio**

This section provides an outline of the different segments that contribute to Powershop’s demand response (DR) portfolio.

2.1 **Curb Your Power**

Curb Your Power (CYP) is an opt-in BDR program where customers are notified 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 information management system (Curbomatic) built by Powershop specifically for CYP.
Curbomatic has been programmed to:

- send Powershop 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);
- 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) Recruitment

At the commencement of the Period Powershop had recruited over 10,000 customers.

c) Pricing structure and Incentives

Residential customers receive a $10 power credit if they hit their ‘curb target’. The curb target for a residential customer is:

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

Small business customers have the following incentive structure.

<table>
<thead>
<tr>
<th>Reduction amount (kWh each hour of Event)</th>
<th>Reward (power credit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% reduction from baseline or 1 kWh reduction for every hour</td>
<td>$10</td>
</tr>
<tr>
<td>2 to 5 kWh reduction for every hour</td>
<td>$20</td>
</tr>
<tr>
<td>5 to 10 kWh reduction for every hour</td>
<td>$50</td>
</tr>
<tr>
<td>10 to 20 kWh reduction for every hour</td>
<td>$100</td>
</tr>
<tr>
<td>20+ kWh reduction for every hour</td>
<td>$200</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>The average reduction for all Events is</th>
<th>Reward (power credit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 5 kWh</td>
<td>$150</td>
</tr>
<tr>
<td>greater than 10 kWh</td>
<td>$300</td>
</tr>
<tr>
<td>greater than 20 kWh</td>
<td>$600</td>
</tr>
<tr>
<td>greater than 30 kWh</td>
<td>$900</td>
</tr>
</tbody>
</table>

2.2 Reposit Power

a) Reposit GridCredit Technology

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

- create multiple VPP’s;
- dispatch selected 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 Demand Response Program – Project Report – May 2018 to November 2018
Grid Impact is Powershop’s VPP plan offered to customers that have a Reposit enabled solar and battery system. Registrations are completed online and once verified as a Reposit customer, customers 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 payments:

<table>
<thead>
<tr>
<th>GridCredits®</th>
<th>less than 3.5kW</th>
<th>3.5kW to 7.5kW</th>
<th>7.5kW or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria (yearly)</td>
<td>$100</td>
<td>$156</td>
<td>$236</td>
</tr>
</tbody>
</table>

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

2.3 Monash Cogeneration Facility

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

2.4 Activation of Portfolio

AEMO issued Powershop with an invitation to tender (ITT) on one occasion during the Period.

a) Test 3 – 29 May 2018

Powershop requested its winter test window to begin on 25 May 2019. AEMO issued Powershop with an ITT on 29 May at 10:39am for an Event between 4pm and 6pm. CYP customers and Monash were notified:

- 1 hour before the Event (3pm);
- at the beginning of the Event (4pm); and
- at the conclusion of the Event (6pm).

As part of this test, Powershop scheduled a VPP dispatched using Reposit’s web application from 4pm to 6pm.

3. Performance and Analysis

3.1 Performance

Powershop’s raw result for each 30 minute interval during Test 3 is shown below.

<table>
<thead>
<tr>
<th>Event</th>
<th>Interval 1</th>
<th>Interval 2</th>
<th>Interval 3</th>
<th>Interval 4</th>
<th>Total (MWh)</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 3</td>
<td>0.62</td>
<td>0.8</td>
<td>0.97</td>
<td>1.04</td>
<td>3.43</td>
<td>1.72*</td>
</tr>
</tbody>
</table>

*Powershop’s Test 3 result remains under review with AEMO. The above results are calculated using AEMO’s baseline.

3.2 Winter Test

Powershop’s total reserve provided in the Winter Test was around 60% of the total reserve provided in the previous two tests. The electricity demand of CYP customers in the autumn and winter months is much less than the demand for electricity in the summer months. This means that the DR potential is lower in winter for BDR programs.

At the time of Test 3, Powershop had approx. 10,000 sites registered with CYP and CYP customers achieved a 55% participation rate with an average reduction of 46%.
<table>
<thead>
<tr>
<th>Event</th>
<th>Capacity (MW)</th>
<th>CYP Sites</th>
<th>Participant (%)</th>
<th>Average Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 3</td>
<td>1.72</td>
<td>10K</td>
<td>55</td>
<td>46</td>
</tr>
</tbody>
</table>

Electricity demand during Test 3 by CYP customers was so low that to achieve a 4 MW reduction, 100% of CYP customers would have had to reduce their usage by 64%.

There is a significant difference in the performance of CYP depending on the season and the time of the event. It would make sense for the DR amount that Powershop is contracted to provide to AEMO to be dependent on the season.

### 3.3 AEMO Operations

As you can see from the image below, AEMO had forecasted peak demand for that day to be at 5.30pm, however, AEMO scheduled Powershop to active its reserve at 4pm when demand was relatively low. To truly test the ability of CYP in winter an activation will need to occur at a time when demand it at its highest.

![Graph showing electricity price and demand](image)

4. **Learnings from the Period**

Below are the key learnings from Powershop’s 2018 winter DR season:

a) **Operational learnings:**
   - The best time for an Event given Powershop’s CYP load profile is between 5pm to 9pm (EST).
   - Customer electricity demand in the winter months is much less than the summer months meaning DR potential is minimised.
   - Program design for BDR is vastly different depending on the season.

b) **Messaging:**
- Powershop’s original messaging was centred around Events occurring on hot days. Messaging and communications to customers needed to be updated to include DR actions suitable for winter.

c) Customer Feedback
- Customers found it more difficult to perform DR actions in winter months.

5. Future Recruitment strategies
Powershop will engage with BIT to run a RCT testing different recruitment messaging strategies.

6. Other commercial objectives for Powershop’s DR 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.