



flow
power

**Project performance
report – Energy Under
Control
November 2019**

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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.

1. Executive Summary

Flow Power's second year of the ARENA DR Trial very much continued the theme of the first year – a fully committed and recruited customer base utilising traditional DR loads in the commercial and industrial space.

There were no live activations during this period, as per previous program periods. This reflects the underlying lack of volatility and reliability concerns currently in New South Wales. This stands in contrast to Victoria and South Australia where significant reliability concerns continue to exist.

As the trial continues familiarity with the CAISO 10 of 10 baseline continues to develop, with a greater understanding of how the time of year and time of day testing occurs impacts the portfolio and specific businesses within. A testing event in the morning demonstrated clearly the impacts of time of day that the baseline has on results.

Site integration and technology is a continued focus of Flow Power's ARENA portfolio, with the goal of fully automated and integrated DR butting heads with the commercial and operational realities of businesses. A new and interesting challenge around NMI meter installation was encountered in year two and the interactions with the Metering Data Provider involved.

Looking forward to year three of the trial Flow Power sees the continued general awareness of demand response coupled with the significant regulatory reforms underway as a boon for the growth of commercial and industrial demand response. This growth in demand response entails both emergency DR and a willingness to explore spot price exposure and the market signals.

2. Introduction

This is the Project Performance Report for Flow Power’s Energy Under Control project. Part of ARENA’s Demand Response Competitive Round, Flow Power works with commercial and industrial customers to provide strategic reserves in the National Electricity Market.



We’re a licensed electricity retailer focusing on giving Australian businesses access to the wholesale market.

We offer businesses



Transparency



Flexibility



Cost savings

3. Summary of Knowledge Sharing Activities

In the June 2019 – November 2019 period, Knowledge Sharing Activities focused on confirming customer participation and sharing learnings with the broader energy community.

ACTIVITY	KNOWLEDGE CONTENT	AUDIENCE	DOCUMENTATION
Webinars	'Six Steps to Becoming Demand Response Ready'	Prospective participants and current participants	https://bit.ly/3583PZA
Events	Thought leadership on the role of demand response in the Australian power market	Industry, prospective and current participants	https://bit.ly/2Z8clku https://bit.ly/2F68rER
Media coverage	Focus on customer facing stories that show the value of demand response	Industry, prospective and current participants	https://bit.ly/2EyvCHK https://bit.ly/2ttHSqC
Social media	Focus on driving the conversation towards demand response	Industry, prospective and current participants	https://bit.ly/37j80Df https://bit.ly/2MzGqKb
Material creation	Developed a framework for industrial customer to implement demand response in a consistent and logical way	Industry, prospective and current participants	https://flowpower.com.au/demand-response-framework-webinar/ Physical brochure created and mailed out to customers

4. Response provided

Technology

Proprietary technology, the kWatch® Intelligent Controller, has been installed at each customer site to facilitate ten-minute response to AEMO activation signals.

Purpose built for allowing customers to respond to market signals and automate the curtailment of load, the Controller gives customers:

- Live data feed – weather, market data, other signals as desired
- Alerts
- Automation of connected equipment

If AEMO call an event, Flow Power sends alerts to customers. Customers typically need to accept the activation and opt in before the Controller will then reduce their load; however some customers have elected to operate on an “opt out” basis.

Model

Customers receive two payments:

- Availability – based on the volume of capacity provided during tests or activations
- Activation – based on the volume of load shed during events

Customers pay an annual fee to cover the installation of and access to data from the Controller.

Portfolio

Flow Power’s portfolio is comprised of customers from a diverse set of industries across NSW.

INDUSTRY	INDUSTRY TYPE	RESERVE	LOCATION
Agri-businesses	Orchards/Irrigators	1.47	NSW and VIC border
Warehouse/Storage	Refrigeration	1.16	Sydney
Councils	Water Management	1.3	Throughout NSW
Food Processing	Packaging/Manufacturing	1.7	Throughout NSW
Forestry	Timber Mill	0.5	North Eastern NSW
Manufacturing	Building Supplies	3.7	Western Sydney region
Manufacturing	Steel Production	20	Newcastle region

5. Analysis of performance

INITIAL TEST – 30/01/2018

TARGET RESERVES	5	MW
Recruited Capacity	7	MW in Maximum demand
Number of Customers	4	
Test Results	1.52	MW
Number of Activations	0	

RE-TEST – 27/03/2018

TARGET RESERVES	5	MW
Recruited Capacity	11.6	MW in Maximum demand
Number of Customers	7	
Test Results	3.51	MW
Number of Activations	0	

TEST TWO – 23/05/2018

TARGET RESERVES	5	MW
Recruited Capacity	39.3	MW in Maximum demand
Number of Customers	6	
Test Results	27.9	MW
Number of Activations	0	

TEST THREE– 24/10/2018

TARGET RESERVES	15	MW
Recruited Capacity	39.57	MW in Maximum demand
Number of Customers	7	
Test Results	21.8	MW
Number of Activations	0	

TEST FOUR– 24/05/2019

TARGET RESERVES	15	MW
Recruited Capacity	39.57	MW in Maximum demand
Number of Customers	7	
Test Results	23.1	MW
Number of Activations	0	

6. Lessons learnt

Year 1 – Recruitment and Set up

- Many large customers (Maximum Demand > 1 MW) felt the financial reward was not significant enough to offset their risks of program participation. This forced Flow Power to shift the focus towards smaller businesses. In some cases the Controller was provided at no cost as an additional incentive to program participation.
- In comparison to Flow Power's experience operating and recruiting for RERT portfolios in Victoria and South Australia, NSW customers generally had less knowledge of demand response and the RERT mechanism.
- In some occasions, Flow Power found that within customer organisations there were varying drivers. For example, operation managers had different motivations to the main decision makers signing onto the program, namely operational targets being of greater importance than pure financial decisions. In some cases these different motivations may be encapsulated in operational or revenue-based KPI targets.
- Several customers, specifically those who are not existing Flow Power customers, expressed concerns about integrating new technologies with their existing control systems. This issue is often resolved through improving the customer's understanding of how the kWatch® Intelligent Controller operates and the process followed when sending customer signals.
- The initial recruitment of customers yielded significantly lower demand reductions than anticipated or estimated. For example, the initial contracted portfolio was expected to provide 6 MW, however the first test yielded only 1.5 MW. The second test yielded a 3.6 MW reduction in demand from an expected portfolio of 9 MW. The risk of portfolio underperformance due to weather conditions or altered production conditions can be mitigated by over-subscribing the portfolio.
- The kWatch® Intelligent Controller has had significant updates to its installed firmware. Major development effort was undertaken to improve the reliability and stability of the Controller under all conditions. Flow Power achieved the goal of keeping all the Controllers online most of the time. The Controllers have an in-built watchdog monitoring network failures and device recovery.
- The kWatch® Intelligent Controller has the ability for near-real time information collection from meters and delivery (via portal and app) to enable participants to make educated decisions about energy usage. Continued development also been undertaken to provide notifications of events via various communication channels.

Year 2 – Build and Maintenance Phase

Year two of the project brought increased understanding and learnings across four broad categories: technology, data, customer-specific and the impact of externalities on DR. The discussion below will dive into these categories further, from a general and a customer-specific perspective.

General Perspectives

- Baselines continue to be a significant aspect of demand response, particularly the RERT program. Unlike spot-responsive DR customers, the RERT program relies on a baseline against which to assess performance and determine the value provided. The baseline used (the CAISO 10 of 10 asymmetric adjustment) has been the topic of much discussion throughout the ARENA DR trial and suffice to say that impact has been noticed on Flow Power's portfolio.
- The significance of the baseline to Flow Power's portfolio was observed when the time window for testing the portfolio varied significantly from the time that the portfolio would typically be called upon. One of the tests was conducted in the morning, where typically the requirement for RERT is late afternoon/early evening. The difference in available load, as determined by a baseline, is apparent – particularly in agriculture and cold store customers who have seasonal and/or temperature dependent loads.
- Data access is a continued impediment to the efficient management of demand response. Without real time data it is impossible to monitor the performance at some customer sites. While most industrial customers have their own SCADA systems are able to monitor their own energy consumption, aggregated real time data on the aggregator side would lead to more efficient DR management outcomes.
- As discussed previously, the delay in metering upgrades in NSW has made receiving data feeds more difficult than in states such as Victoria. The Controller is designed to receive customer energy usage and other site-based data via the Modbus standard (available on the EDMI mk10 device but not the mk6, for example). Modifications have been made to the Controller to allow pulsing inputs from older meters, however due to reliability and scalability concerns meter upgrades have been the preferred path forward.

Customer-Specific Perspectives

- As the program matures individual customer performances have been improving. This is a combination of improved understanding of demand response on the customer side, education and resources provided by Flow Power as well as improved operational systems and processes within Flow Power. While the improvement with program maturation is to be expected, it highlights the importance of familiarity and education to implementing successful demand response initiatives.
- Although public awareness of demand response and its benefits to commercial customers has broadly increased, Flow Power has had challenges signing up new customers to the ARENA DR trial in order to diversify the portfolio. Multiple customers were initially very keen on the concept of implementing demand response, but later decided not to participate. In most of these cases this was a commercial decision – the impacts of demand response were determined to be too significant on their business operations.

- This behaviour has been observed in Flow Power’s spot-responsive demand response customers, and typically takes a combination of a strong sales cycle with an in-house champion. Without the in-house champion driving the idea of implementing DR the proposition always falls over. The sale or job of convincing companies that DR is worthwhile is a complex one, and typically requires a long and technical sales cycle. Flow Power is still working on improving the DR pitch and has developed some sales material to help businesses understand the benefits and potential ease of implementing DR.
- This inability to recruit new customers has led to a lack of diversity within the portfolio, which is a significant risk factor in the portfolio
- The lack of spot price volatility and reliability concerns in the New South Wales region haven’t helped with the demand response sales cycle. Memories are short and the reliability concerns of February 2017 in NSW seem long gone. This isn’t helped by a strong media focus on the reliability and price volatility in Victoria and South Australia. In this regard selling DR to businesses is much easier in these regions – if customers see a potential situation where they could choose to reduce load and be rewarded or be forcibly disconnected from the grid during a load shedding event than the choice is an obvious one. This dichotomy doesn’t currently seem to exist in New South Wales.
- There are several technology barriers and concerns still being observed with customers – the first of these are the integration of the kWatch Intelligent Controller with customer sites. Integration of the controller requires three fundamental things – a compatible electricity meter, access to the site for installation (and sometimes temporary interruption to operations) and integration with the on-site control systems. There has been a surprising amount of resistance by customers to site access in order to install equipment. This is further exacerbated when the integration of on-site control systems is factored in.
- One surprising barrier experienced in upgrading meters has been the cooperation of the Metering Data Providers. From a customer perspective the retailer, and in the case of the ARENA DR trial the aggregator, owns the relationship and manages all aspects of the electricity connection. However, the NMI meter is the exclusive domain of the MDP, and all changes including upgrades or maintenance to this meter must be done by the MDP. This is further exacerbated by the fact that different customers typically have different MDPs, which means new relationships and new negotiations.
- One customer in the portfolio has a high voltage connection with the NMI meter located in the HV switch yard of the distributor away from the customer site location. Access to this HV switchyard has been all but impossible due to the nature of the work required to access a HV site.
- One of the challenges developing an in-house technology solution with a small team has been developing a platform that is flexible enough to handle a range of different customer control systems. The general approach has been to provide a single point of relay control, which a customer’s electrical contractors can then integrate with their specific control systems. However, in some cases Flow Power has worked more closely with customers to integrate and specifically program parameters on the Flow Power platform side.

- Seasonality of customer loads continues to be significant – the agricultural loads are primarily based on irrigation requirements, which are significantly reduced or in some cases non-existent during winter. Cold store loads while constant throughout the year are highly dependent on ambient temperatures. This is an issue for the ARENA DR portfolio which has a static size between the winter and summer periods as well as payments based on a constant rate of MW availability and delivery.

7. Looking Forward to Year 3

As the ARENA DR Trial has been progressing there has been several very significant movements in the DR regulatory space:

- The Wholesale Demand Response Mechanism
- The Enhancement to the RERT
- Extended RERT contracts in Victoria
- Integration of Distributed Energy Resources into the grid

These regulatory changes will have a significant impact on the operation of the electricity grid and the way customers, especially large commercial and industrial customers, interact with the grid. Flow Power has been pursuing a number of avenues associated with demand response as part of this trial to inform what the future of C&I DR looks like in the Australian market. A few themes are readily apparent:

- The DR trial has encouraged interest in spot price exposure, which more accurately aligns DR to market signals and the design of the electricity market. Flow Power has seen a number of customers begin down a path of participating in emergency demand response programs and later migrate to a retail spot price exposure contract. This is significant because it shows that a) customers typically have a significantly more load flexibility in their operations than initially thought and b) a willingness to utilise DR in order to improve commercial outcomes. The flipside of a migration of commercial DR load from emergency DR programs to spot price exposure is that it should help mitigate some of the underlying reliability concerns without the requirement to call the RERT trigger.
- The DR trial has shown a desire to integrate controls equipment more significantly with a customer site and improve automation. Automated DR is the gold standard, both from the perspective of the DR portfolio manager (guarantees a higher level of performance and control over the aggregated assets) and from the customer perspective where less resources are required to manage the ongoing DR activities. Many customers are initially hesitant to significantly integrate third party controls into their operations but will do so when the commercial benefits are clear.
- The DR trial and the broad media coverage have provided an ability to utilise and leverage this DR positivity to enter new customer verticals. Traditional DR loads (pumping, cooling) have been low hanging fruit targets of many international DR programs, but as the general understanding of demand response increases more opportunities in industries traditionally hesitant to explore DR become possible. This includes highly risk adverse businesses and those with tighter production and delivery timeframes.

8. Key contacts

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