August 2020

KNOWLEDGE SHARING REPORT

Ballarat Battery Energy Storage System

OPERATIONAL REPORT #1 AND #2 (KNOWLEDGE SHARING DELIVERABLE 3)

FIRST 12 MONTHS OF OPERATION

The Consortium

Downner SPOTLESS EnergyAustralia AusNet services

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PART I
Introduction

The Consortium is pleased to provide this knowledge sharing report that outlines the performance of the Ballarat Battery Energy Storage System (Ballarat System) over the first 12 months of operation.

The purpose of this report is to share the learnings from the first twelve months of operation of the Ballarat System as part of the Consortium's obligations with ARENA and DELWP under the Knowledge Sharing Agreement. This document is intended to be released to the public and covers the following key areas:

- Operational Performance;
- Market Services;
- Network Revenue Opportunities; and
- Other items such as site visits completed.

The Ballarat System is a consortium project undertaken by the Spotless / Downer Group, Fluence, AusNet Services, and Energy Australia. The project was selected during the Victorian Government Energy Storage Initiative tender process and is one of two projects under that program to be constructed and now in operations. The Victorian Government and the Australian Renewable Energy Agency (ARENA) through the Advancing Renewables Program contributed $25 million in grant funding for this project.

The project is the first of its kind in Australia -- a standalone battery-based energy storage system being installed in front of the meter and directly connected to the transmission network -- and the first grid-scale battery-based storage system commissioned in the state of Victoria.

The Ballarat System is a 30MW / 30MWh system utilising Lithium-ion battery technology and Fluence's proprietary hardware and software controls. The system is installed at Ballarat Terminal Station (BATS) and is connected to the transmission network via the BATS No.1 transformer tertiary winding (rated at 22kV 40MVA). The Ballarat System is registered to operate as a 30MW generator, a 30MW load, and to provide regulation Frequency Control Ancillary Services (FCAS) raise and lower as well as all six contingency FCAS markets. The Ballarat Terminal Station is the central hub for the electricity transmission network in western Victoria and the location was chosen to add new capabilities at AusNet Services' existing facility to support further renewable electricity generation, in addition to over 620MW of existing local renewable energy generation.

The project was constructed in nine months during 2018 and was completed and capable of dispatching services for all eight FCAS markets and energy to the NEM on 22 December 2018. Providing capacity comparable to 6,000 residential battery storage systems at a single location, the project was designed to provide the following outcomes:

1. to enhance network stability and reduce congestion on Victoria's transmission grid through direct grid connection and participation in both Australia's National Electricity Market's (NEM) contingency and regulation Frequency Control Ancillary Services (FCAS) markets; and
2. to add a peak power resource to help manage price volatility and reliability risks during high demand periods, by providing a reliable energy source to the Australian Energy Market Operator (AEMO).

Key Achievements from the first 12 months of operation include:

- The System has provided 7,312 MWh in the Energy and FCAS markets.
- The System has achieved $6.07M in revenue, with revenue in Energy markets meeting expectations and revenue in FCAS markets exceeding expectations.
- The System had an overall availability of 86.36%. Availability was mainly impacted by:
  - A precautionary and temporary modification to the system State of Charge (SoC) to 75% (if this is excluded, the availability would have been 95.65%); and
  - Early operational issues as discussed below.

Key learnings from the first 12 months of operation:

The consortium wants to highlight for the industry the key learnings from the first 12 months of operation to assist future storage projects.

Technical Specification

Clear alignment between equipment supplier and future operator

In the development of the project ensure there is a clear alignment between the future operators and the technical specification to ensure the system is adequately sized and all desired functionality included to maximise the revenue of the system.

Communications Architecture

Clear signalling and data requirements

An understanding of the communication architecture for a battery system and the systems it shares data with is critical to ensure continued operation and minimisation of interruptions. Communication architecture should consider the ability for the system to receive dispatch targets from AEMO, ability for the operator to understand the current status of the system to submit bids, and ability for the operations and maintenance service provider to be able to monitor the system continuously.

Reliability Testing

Plan a window to resolve initial issues and align on operational procedures to ensure reliability prior to commercial operations

For this project there were several post commissioning/early operational issues that needed to be resolved that affected system availability. A combination of 'new-to-market technology' issues as this was the first standalone grid-connected battery connected to the NEM and system operations reduced the overall availability in the first 5 weeks.

Energy vs Power

Maximising revenue from the system

Based on current configuration, the revenue generated from the Ballarat battery indicates that a high-power (MW), low-energy (MWhs) system provides the greatest value in revenue. This enables the battery to operate in FCAS markets and capture high priced volatile events in the Energy market.

PART II
Operations Report

2.1 Project Overview

The Ballarat System commenced commercial operations on 22 December 2018 and is owned and operated under the following structure:

- EnergyAustralia as the Market Intermediary, operating and trading the system in the National Energy Market (NEM) in accordance with the Operating Parameters;
- AusNet Services/Mondo as the asset owner, with a service agreement with EnergyAustralia for use of the Ballarat system in the NEM in accordance according to the Operating Parameters;
- AusNet Services/Mondo contracts Fluence under a 15-year services agreement ("Term") to ensure the battery system is available for use according to the Operating Parameters; and
- AusNet Services maintains the Balance of Plant to ensure the system is available for use according to the Operating Parameters.

Operations and maintenance (O&M) responsibilities are summarised in Figure 1.

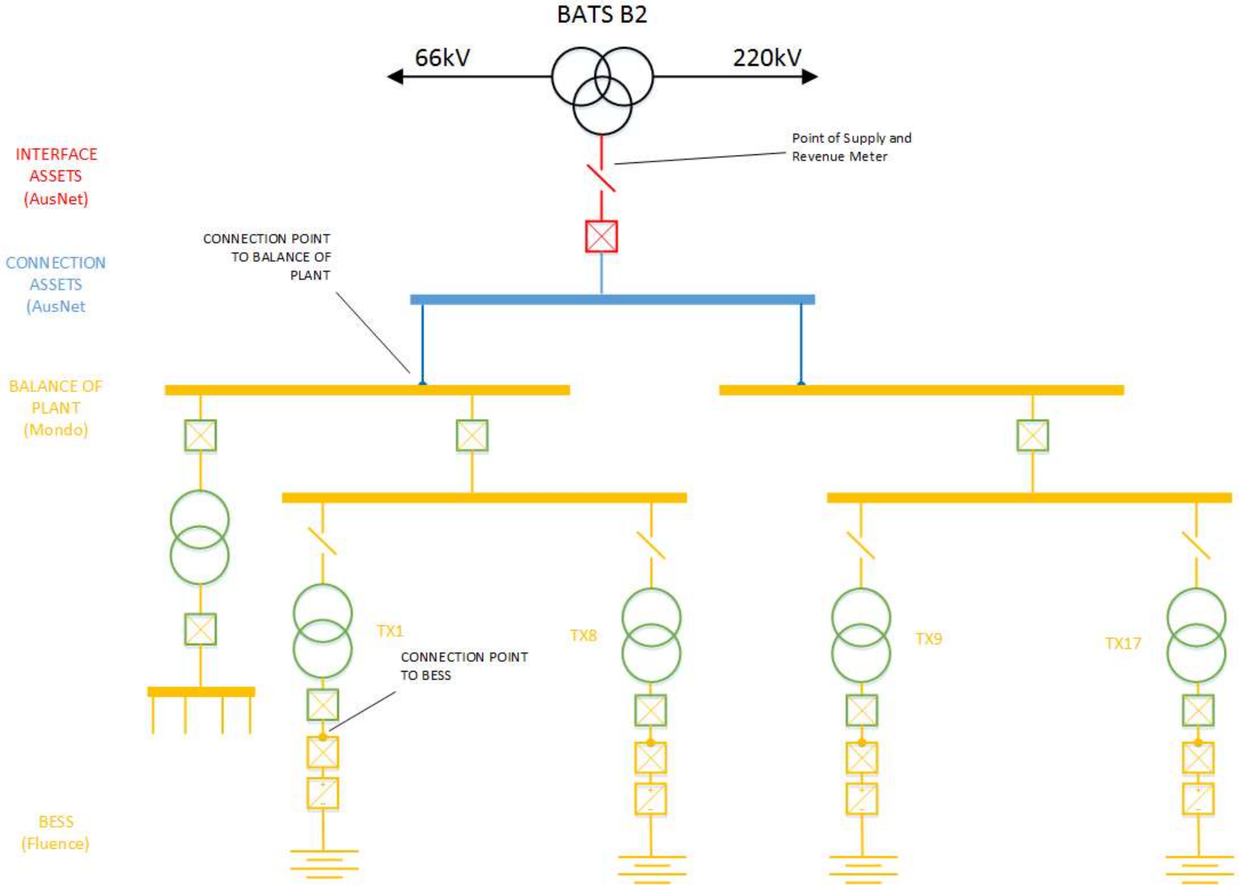


Figure 1 - O&M Responsibilities

2.2 Operating Parameter Summary

Operating parameters for the first year of operation, from 22 December 2018 to 21 December 2019 ("Contract Year 1") of the Ballarat System are presented in Table 1. The Operational parameters for subsequent years are reduced in accordance with the nominated degradation curve.

Table 1 - Operating Parameter Summary

Parameter	Requirement – Contract Year 1
Availability	$Availability\ (\%) = \frac{Capacity}{Rated\ Power}, averaged\ over\ all\ Periods$ Where, for each Period: Capacity is the lesser of: (i) Actual Available Capacity; and (ii) $\frac{Actual\ Available\ Energy}{Usable\ Energy} \times Rated\ Power$
Rated Power	30.38 MW
Usable Energy	30.38 MWh
Round Trip Efficiency	87.17%

2.3 Performance

The performance of the Ballarat System for Contract Year 1 is summarised in Table 2.

Table 2 - Key performance summary

	Actual
Availability for Contract Year 1	86.36% (Availability for Contract Year 1 excluding SoC restriction – 95.65%)

Other key performance parameters from the Ballarat System for Contract Year 1 and Term are provided in Table 3.

Table 3 - Key performance parameters

Parameter	Actual (Contract Year 1)
Cumulative energy discharge (i.e., FCAS provisioned/energy sales for arbitrage)	7311.96 MWh
Deep Discharge	1 event per 24 hours 45 events during Contract Year 1
State of Charge	34.1% average SoC in Contract Year 1 14 times at >50% SoC for 14 to 20 hours

A deep discharge event is defined as the SoC of the system during a discharge event going from greater than 80% to under 20% during the event.

For the Ballarat System there is a limit in the average SoC allowable over the course of the year due to the hardware and software installed. These limitations are identified above regarding the SoC.

2.4 Availability Issues

The following section discusses key issues that have affected the availability during Contract Year 1 of operation, under the following categories:

- Early operations (shakedown period);
- Precautionary and temporary modifications; and
- Unplanned maintenance activities.

2.4.1. Early Operations (first 2 months)

Nearly all grid-connected power resources require a period of time to work through a number of early issues; as the first standalone battery-based energy storage asset in the NEM, the Ballarat system has been no different. The project was delivered and commissioned as specified and procured by the consortium. However, after project commissioning there were several communications and software issues that impacted operation of the Ballarat system, along with additional feature requests from the EnergyAustralia to improve the system for trading purposes. This was expected and as such the commercial arrangement between parties excluded the first 5 weeks from any abatement schemes.

Initial issues which arose post-commissioning related to data transfer between the on-site system controllers and remote energy management systems:

- Stable secure network connectivity is critical to the system operation. At multiple points in Contract Year 1, unplanned telecommunications service provider outages have occurred that have interrupted operation. To mitigate the risk of future service provider outages, additional backup connectivity has been added onsite in stages by the technology partner and owner.

- An early recurring issue occurred around data transfer whereby real-time battery information provided through Ballarat's Data Acquisition System was not integrated with the Mondo/AusNet and EnergyAustralia systems. This restricted the ability to view the SoC by EnergyAustralia viewers and to provide the ability to use alarms to alert the traders when critical data points are being met. This forced the traders to make conservative overnight bids (or make none at all) so as to not reach the SoC limits, foregoing revenue and optimisation opportunities. The technology partner has worked closely with the owner and operator to improve signalling and data transfer to deliver the desired visibility.

The interface between the Ballarat System and AEMO systems required significant planning and testing for receiving dispatch targets. These signals need to be pass from the Ballarat System through AusNet's system through to AEMO's system. This meant that debugging of incorrect signals could be challenging with multiple parties involved.

Another significant lesson learned during early operations was the impact of parasitic loads – which could drain energy from the system during extended periods that the system is not in use – and how those should be managed. While multiple options to address this matter were discussed, the option adopted by the owner and preferred by the market operator was to have the technology partner implement a software-based automatic adjustment of the SoC to ensure the parasitic load did not interfere with daily operations.

Prior to establishing an Australian presence for technical support, there were initial challenges to resolve issues with the global team of the technology partner, which is based in the United States. The technology partner has since greatly expanded their local presence in Australia including a dedicated support team to improve responsiveness and communication.

Table 4 is a summary of the early operational issues and corresponding resolutions.

Table 4 - Early operational issues

Description of Issue	Resolution
The Ballarat system was not receiving regulatory FCAS bids.	Adjustments made to system communications.
AEMO would not accept a signal above 30MW.	Interface improvements were made to accommodate these limitations.
Loss of communications – a single node/core.	System hardware replaced.
Ballarat system did not respond to setpoints from AEMO.	Adjustments made to system communications.
Internal software communication failures caused system to not respond to setpoints.	U.S.-based software development team investigated and successfully implemented solution.
The system did not perform to expectations outside the 3% and 97% operating range.	Software was updated to ensure operation occurs within limits.
Parasitic load was running SoC to below 3%.	Configuration changes deployed to manage parasitic load.

2.4.2. Precautionary and Temporary Modification

In April 2019, the Ballarat System received a notification for a precautionary and temporary modification (Modification) to system operational parameters such that the battery modules in the system did not exceed a maximum SoC of 75% of the rated system nameplate. This Modification was recommended by Fluence following a safety event at a U.S.-based storage facility. While the U.S.-based facility has a differing layout and some differing equipment to the Ballarat System, until an investigation of the event could be undertaken, and a review of any impact to the Ballarat System was determined, the Modification was deemed a prudent safety measure and was enacted.

Several steps were taken that enabled the SoC restriction to be removed in September 2019 and the system returned to normal operations. The impact of the Modification, while it was in effect, was reduced availability of the Ballarat System for trading purposes relative to the SoC reduction, as noted in Table 2.

The following actions were taken at Ballarat prior to releasing the Modification:

1. Inspection of Battery Modules – Fluence inspected the battery modules at the site. This was a precautionary measure to make sure all modules remain consistent with normal and expected conditions. There were no abnormalities detected.
2. Software Enhancements – An additional element was added to system control software to detect any early deviations in battery cells that may indicate an impending issue and an update in managing the SoC of each battery module.
3. Updated First Responder Training Materials – To prevent injury to personnel, Fluence provided updated first responder training materials. These built on an earlier safety notice recommending all first responders to stay clear of the facility during and after a safety event. This training material also included a review and installation of onsite safety signage.

4. Review of Fire Suppression System – Fluence reviewed the type and level of fire suppression for restricted projects. It was determined to be fit for purpose.

In addition to the activities undertaken by Fluence, AusNet Services engaged an expert to:

- Perform a detailed safety review of the Ballarat system;
- Formulate additional questions to Fluence to understand the event and any potential impact of the event to the Ballarat system; and
- Assist AusNet Services to develop an informed view of risk and mitigation strategies employed with regard to health and safety of employees, the community and emergency services and fire personnel and for asset protection.

2.4.3. Unplanned Maintenances Activities

In addition to the early operational issued noted in *Table 4* and Section 2.4.2 regarding the SoC Modification, additional unplanned maintenance activities are noted in Table 5 below.

Table 5 - Unplanned maintenance items

Unplanned Maintenance	Impact
Low temperature within the container	One core out of service
Inverter fault, requiring reset	One core out of service
Two cores inadvertently taken out of service during maintenance on the fire protection system	Two cores out of service
Delay in resetting one core during software maintenance	One core out of service
Faulted power meter in one core requiring replacement	One core out of service
Software issue in one core's battery power unit	One core out of service

Figure 2 summarises the cause of unplanned outages throughout the year. The main factor contributing to reduced battery availability was the precautionary SoC restriction (9.29%) noted in Section 2.4.2.

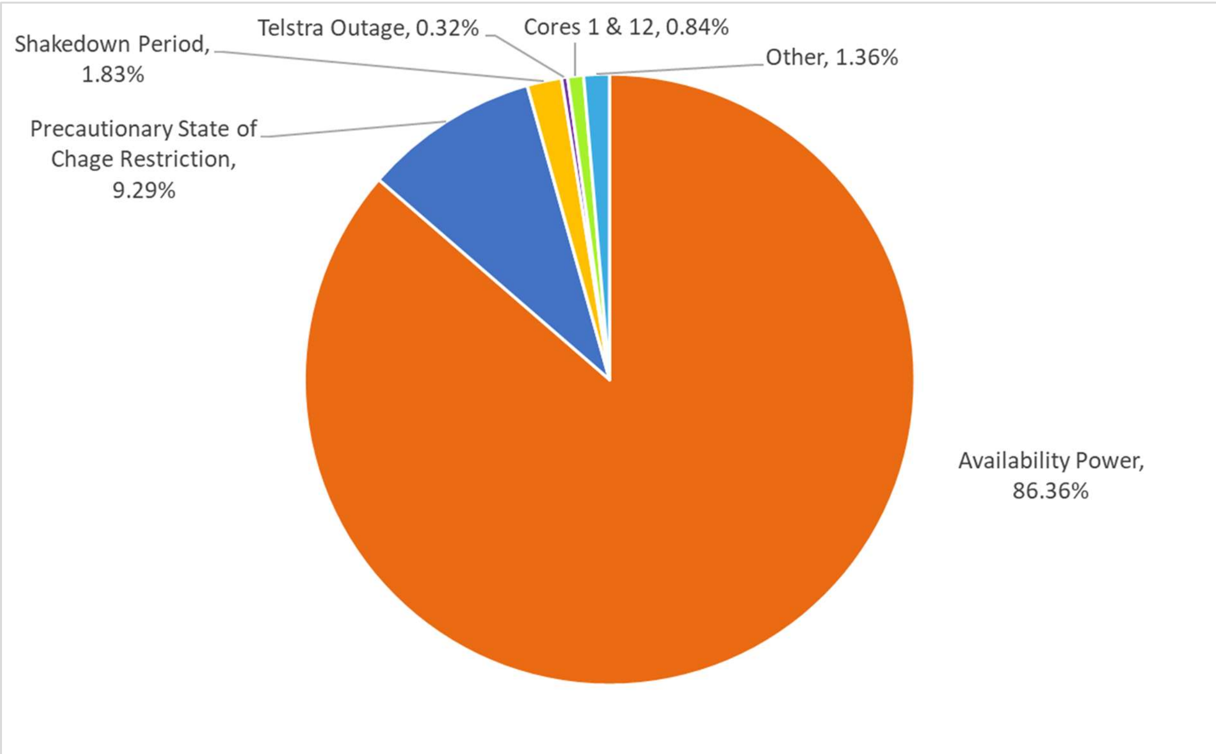


Figure 2 - Unplanned maintenance outages

PART III
Market Services

3.1 General Financial Performance

EnergyAustralia is the registered market intermediary for the Ballarat System and is therefore responsible for the bidding of the battery system with AEMO. The Ballarat System has been registered as both a generator, and a market load, along with all FCAS markets. While the primary business case for EnergyAustralia was for energy arbitrage and capacity, the Ballarat System has out-performed expectations in the FCAS markets, which have enjoyed strong pricing recently. The Ballarat Battery has been highly effective in the provision of FCAS services, which are critical in ensuring the stability of the system. The higher penetration of renewable energy has seen a higher requirement and resulted in the recent higher FCAS prices. While it is unlikely that the FCAS services will remain at such high prices in the longer term, revenue stacking is critical to making the battery storage systems economic without Government support.

Table 6 – Financial Performance (figures in table provided in $000's)

BALLARAT	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Pool Revenue	407	57	372	52	48	125	107	183	126	76	19	64
Charging Costs	-75	-46	-64	-45	-39	-89	-79	-127	-107	-62	-21	-31
Ancillary Services Revenue	98	153	246	329	243	586	382	706	905	621	620	337
Ancillary Services Costs	0.21	0.40	0.55	0.43	0.41	0.88	0.98	1.20	-	-	-	-
Market Fees	-0.13	-0.20	-0.25	-0.20	-0.19	-0.36	-1.14	-1.24	-1.13	-0.98	-0.82	-0.90
Net Revenue	430	164	554	336	252	623	410	762	923	634	617	369

3.2 Ballarat System Value Streams

The overall bidding strategy for the Ballarat System is to optimise the earnings by utilising the registered markets (Energy/FCAS), while taking into account the contractual and technical limitations of the battery system. The monthly revenue stack for the Ballarat System is shown in Figure 3. The performance of the Ballarat System in the FCAS markets, particularly the Contingency FCAS and the Regulation Raise FCAS markets has been extremely strong, despite some operational restrictions.

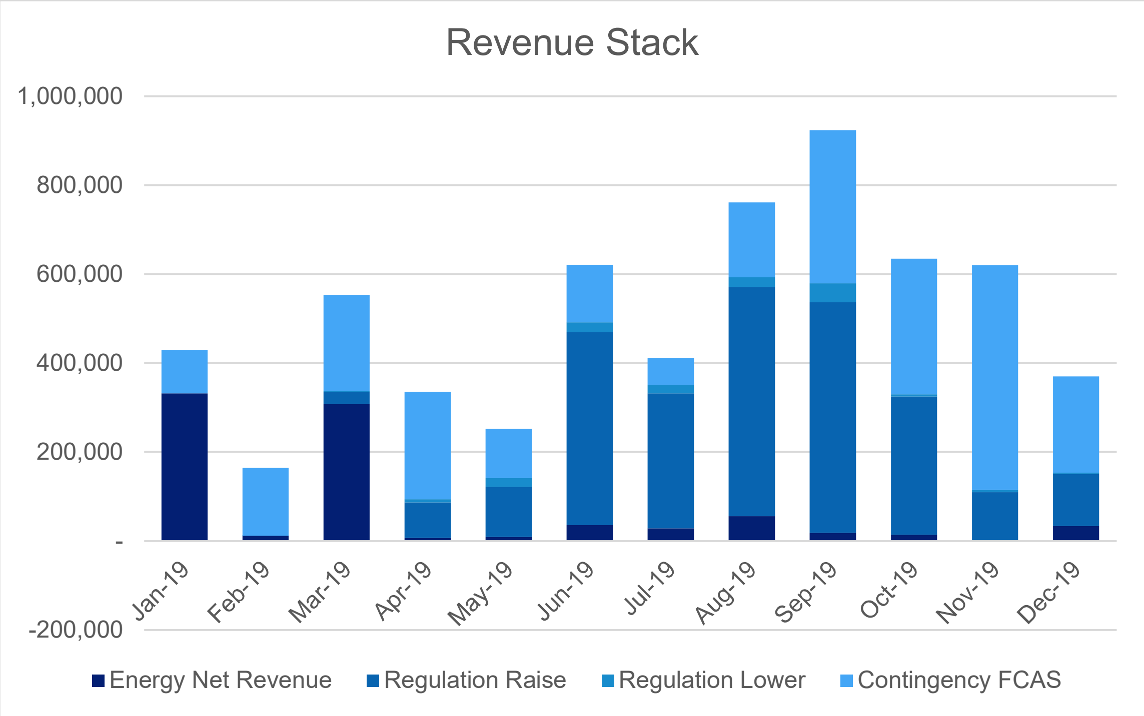


Figure 3 - Revenue summary

3.2.1. Bidding Strategy Discussion

The Ballarat System bidding strategy has evolved over the first 12 months of operation due to changing market conditions as well as integrating technical limitations of the System as initially procured into the strategy.

System Limitations

A key restriction of the System is a contracted maximum number of cycles per year to maintain a 15-year performance guarantee. The initial view was to aim for 1 cycle per peak day within the Energy market, essentially charging from the grid during the low demand overnight periods and discharging when prices were the highest (over the evening peak). This typical charging profiles can be seen in Figure 4.

Another limitation was around the contracted maximum number of continuous hours at a SoC above 50%. This meant that holding a high SoC between the low priced and high priced period was, on occasions, unattainable creating the requirement to dip below 50% SoC to reset this limitation. This can be seen in some of the profiles below with multiple charge/discharge profiles intraday and charge/discharge profiles occurring closer together.

Further to managing the SoC contractual requirements, EnergyAustralia aimed to restore the SoC overnight setting up the bids to charge across the 0200-0600 window unless the forecasts indicated a lower price across the middle of the day due to excess renewables. This provides charge in the battery and the targeted volume of charge would depend on the price forecasts and trader insight into the market. On subdued days where large price variances are not forecast/expected then the SoC would remain at levels around 50% as to manage the contractual obligations. If large price variances were anticipated a higher SoC would be targeted to increase capacity to discharge into higher priced periods.

Market Conditions

From March to June 2019, AEMO increased the minimum FCAS Regulation requirement from 130MW to 220MW and consequently Regulation FCAS prices increased creating further value within the FCAS markets as compared to the Energy market. It was noted that on average only ~10-20% of real energy was dispatched compared to the time the FCAS service(s) were required and hence the battery can be enabled for a longer duration while optimising cycles.

Typical Profiles

As a result of system limitations and changing market conditions, there is no has been single typical discharging/charging profile. Initially EnergyAustralia was seeking a return of >$50/MWh in arbitrage and were happy to cycle >1 time if the market provided opportunities knowing there will be days when prices would remain flat with no cycling required. A good reflection of this can be seen early on with multiple profiles (refer to Figure 4) witnessed within Feb-Mar ’19 (30 min granularity).

Further to this, the typical day’s cycle also depends highly upon the time of year/season with demand shapes varying and hence price highs/lows occurring at different times of the day. The dynamics are also changing as more renewable projects are implemented with high winds creating low price outcomes at all times of the day and high solar across the afternoons where typical daylight demands are at the lowest in winter and shoulder seasons.

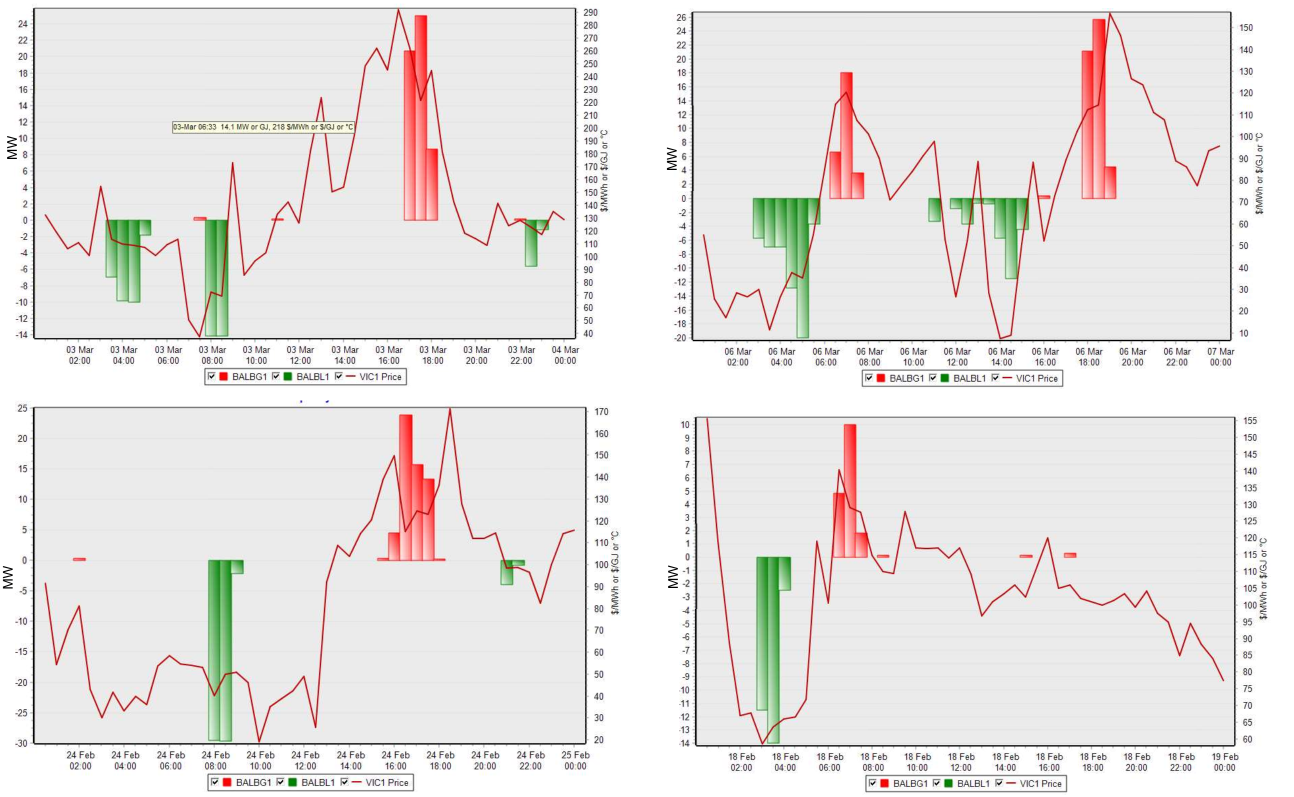


Figure 4 - Charging/Discharging Profiles - Feb-Mar (Note: BALBG1 refers to amount exported while generating, BALBL1 refers to amount of energy consumed during charging)

Strategy Testing

From early on in its operations, the battery was bid into the FCAS contingency markets. As mentioned, when enabled for the service (bid price at or above market price), the battery was only required to dispatch energy for ~10-20% of the enablement period, which allowed for incremental Energy market dispatch to increase the value of each cycle and maximise the revenue of the battery.

Due to the increase in the FCAS regulation requirement reaching 200MW (Raise) by late April, the value in the Regulation market increased. With this increased dispatch in the FCAS markets and the reduced cycling due to less actual energy dispatched compared to enablement, the need to maintain a high SoC was reduced as it was more difficult to reduce the SoC to maintain contractual obligations without energy only bids to discharge which would most likely be at a sub-optimal price.

Within May '19, a combination of Energy and FCAS bids were used to charge/discharge the battery providing ample SoC initially to dispatch into predominantly FCAS Raise services across the day. It can be noted that lower average energy volumes are dispatched across the day as discussed. Profiles can be seen below.

From late May '19 several scenarios were tested utilising the Raise/Lower Regulation FCAS services on both the Generator and the Load DUID's. As we can see from the graphs below (5 min granularity) the energy requirements were quite demanding on the battery with both Raise/Lower FCAS services being enabled at varying times and multiple services being paid with the actual energy draw being rather small amount being shown in the SoC trace.

Note: Energy bids on the Load were used to supplement charging as to manage a higher SoC.

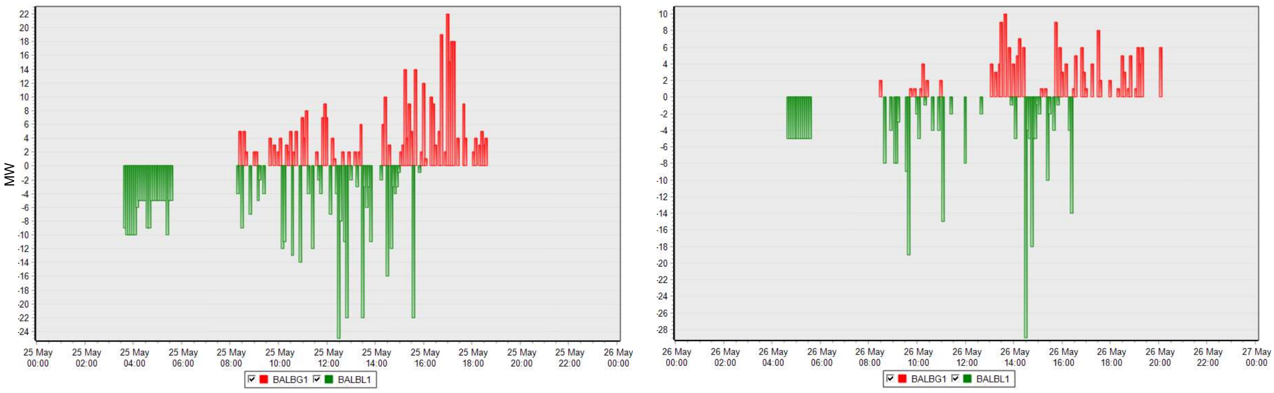


Figure 5 - Dispatch profiles - May 2019 (Note: BALBG1 refers to amount exported while generating, BALBL1 refers to amount of energy consumed during charging)

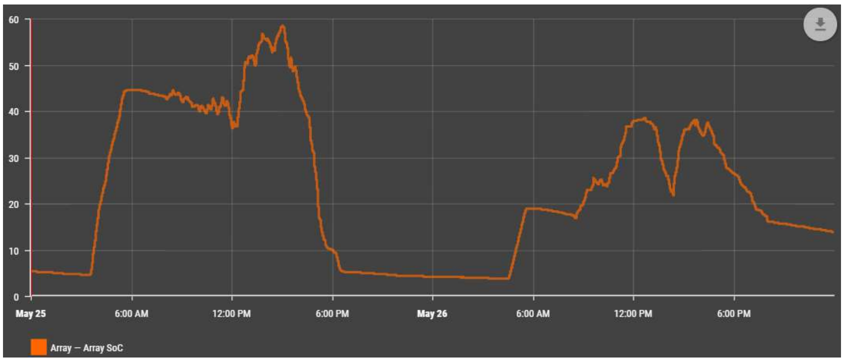
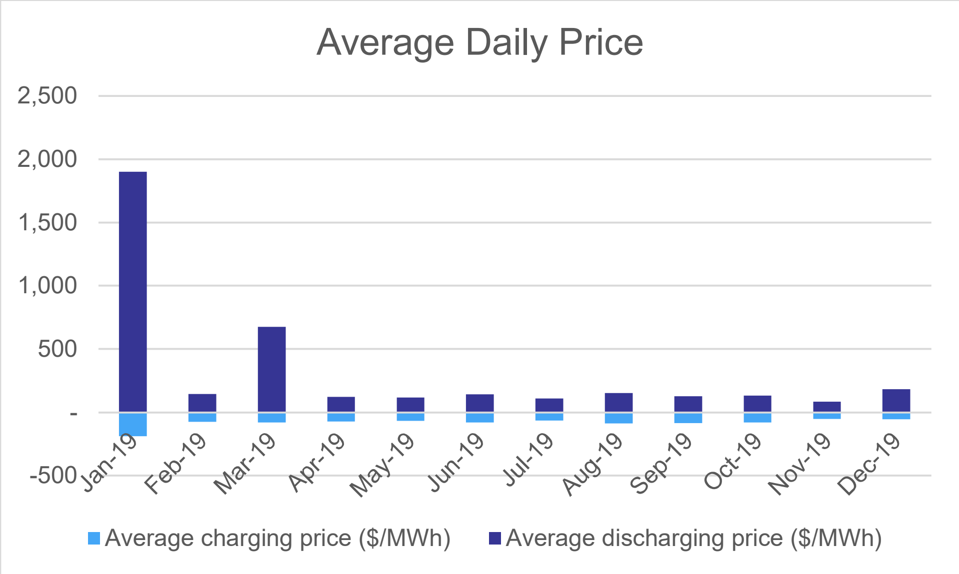


Figure 6 - Dispatch profile - May 2019

3.3 Energy Arbitrage Outcomes

The Ballarat System delivered significant revenue in Q1 driven by summer volatility. The Ballarat System's 1-hour duration means that it has limited firmness from a capacity perspective, which was highlighted by the sustained high price events on 24th-25th January. The Ballarat System is therefore only able to effectively assist with peak shaving.



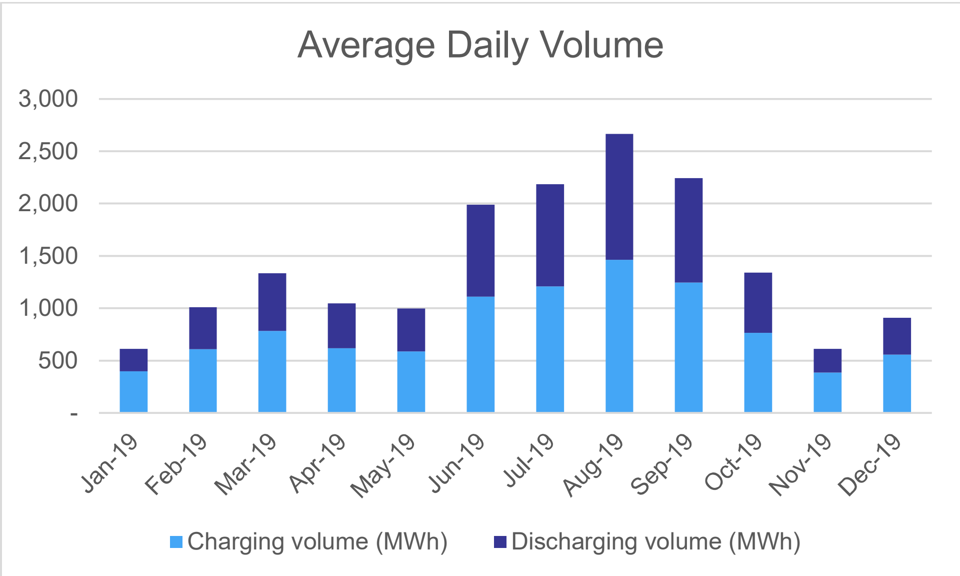


Figure 7 – Average Daily Revenue and Charging/Discharging Volume

3.4 FCAS Services Outcomes

The Ballarat System has performed extremely well in both the regulation and contingency FCAS markets, as shown in Figure 4.

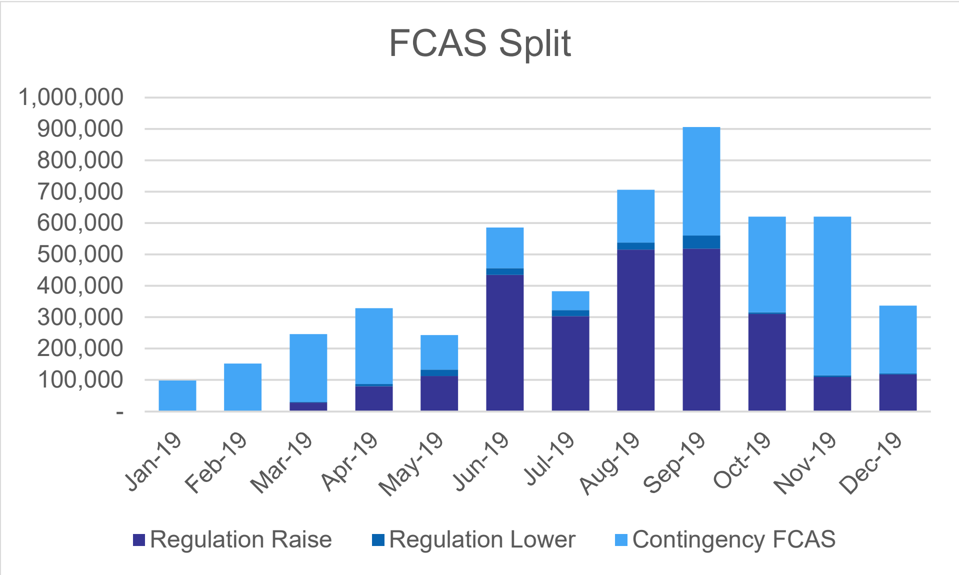


Figure 8 - FCAS Revenue Summary

3.5 Lessons Learnt

Some of the key lessons learnt with regards to considering a battery project are:

- If cycling limitations exist, then it is possible to maximise/extend a cycle by operating in the FCAS markets as well as the energy market;
- To date, based on the recent pricing, EnergyAustralia has had a bias towards FCAS markets compared to Energy utilisation (however several markets can be provided concurrently as paid for enablement without actual energy use).
- For the moment, from a trading perspective, a Higher Capacity (MW) batteries are more advantageous compared to a higher Energy (MWh) battery with the ability to capture the low/high prices at a higher volume and a shorter timeframe. Higher MWs also have more value in the FCAS markets.
- Trading has required additional data points to be captured to allow for further analysis, use in alerting tools, business rule validations and API calls.
- Default offers can be used to an extent but due to daily variations in price it is difficult to set and forget and fully optimise the return. The added variable is managing the SoC to optimise depending on market outcomes.

3.5.1. Human V Auto Bidding

If market/price forecasts were accurate than auto bidding may be the optimal approach but EnergyAustralia understand that many factors can change moving closer to a market outcome. Demand/supply forecasts can deviate greatly with uncontrolled renewables playing a large part in the variability of market outcomes. Forced outages/de-ratings and lack of participant bidding until close to dispatch would cause auto bidding to produce sub-optimal results especially around managing SOC % where the expected high price period of the day (to start the day) may very well be different as the day progresses. Energy price forecasts are one aspect but FCAS price forecasts have been shown to be rather inaccurate and hence utilising a high level of FCAS related cycling without an accurate forecast would be difficult.

Where the auto bidding would be beneficial is around maintaining compliance. Having the ability to bid the battery unavailable when the associated SOC % is reached. When the SOC % reaches a nominated maximum or minimum then the load or gen DUID can be bid unavailable respectively. This function will be able to be performed in a future release of the Bidding system utilising business rules and API calls to manage bids. Auto bidding may also assist in coordinating a portfolio of batteries or capturing unexpected price volatility.

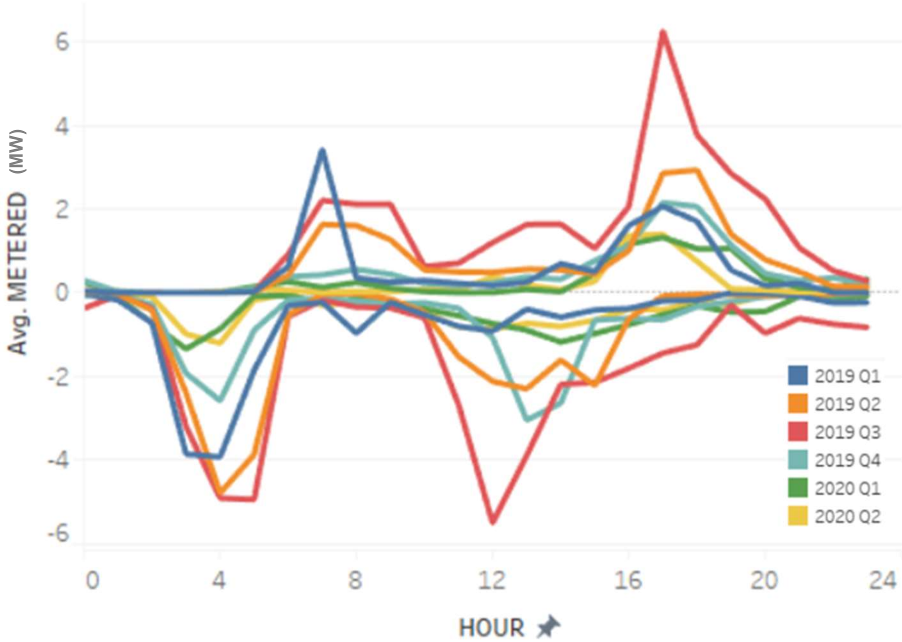


Figure 9 - Average Charge/Discharge profiles over a 24 hours period through 2019/2020 (negative refers to discharge, positive refers to charge)

Part IV: Other Items

4.1 Performance Highlights

The following sections highlight some key performance results from the Ballarat System over the first 12 months.

4.1.1. FCAS Contribution

In its first year 12 months of operation, the Ballarat project delivered over 7,311 MWh of service to the Victorian grid – injecting power to meet peak needs, and providing FCAS to ensure reliability. AEMO shared in its Q1 2019 Quarterly Energy Dynamics report that FCAS provided by Ballarat "displaced higher-priced supply from other technologies, largely coal."

Despite only representing a small fraction (~0.3%) of Victoria's installed electricity generating capacity – in relative terms the Ballarat project has been providing significant contingency FCAS services and regulation FCAS service, participating in all 8 FCAS markets.

Table 7 - FCAS Markets Served (Source: AEMO – Q1 2019 Quarterly Energy Dynamics)

	Fast Raise (R6)	Slow Raise (R60)	Delayed Raise (R5)	Regulation (RREG)
% OF VIC	25%	28%	23%	4%
% OF NEM	3%	5%	4%	0%
TOTAL MWh	27,388	33,848	31,168	565

4.1.2. Low Frequency Response

Figure 6 below illustrates how the Ballarat system was dispatched at 13:03 on 25 February 2019 to arrest a fast drop in frequency. Within seconds, the system was delivering 14 MW of power onto the grid, then matching drops in the frequency until it was back into standard operating range (above 49.85 Hz).

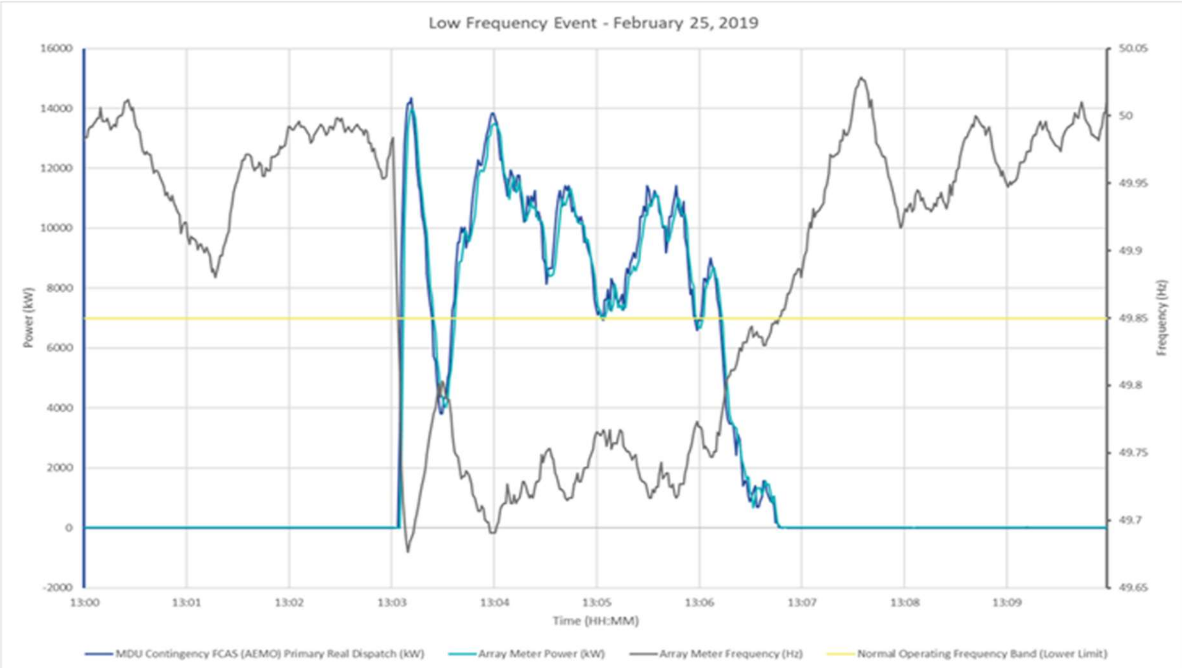


Figure 10 - Low Frequency Response

4.1.3. Lack of Reserve Response

The following table outlines the response of the Ballarat System during a Lack of Reserve notification from AEMO during the summer period. The Ballarat System was able to provide full capacity to the network during these periods.

Type of event	Date/Time	Description of event	Output of Ballarat System (MW)				
			Event start (0:00)	1st half-hour (0:30)	2nd half-hour (1:00)	3rd half-hour (1:30)	End of event (2:00)
Lack of Reserve (LO2)	24/1/2019 – 16:00-18:00	AEMO calls on market to activate assets to provide adequate reserve capacity during tight market conditions	0.00	19.17	29.00	5.33	0.00
Lack of Reserve (LO3)	25/1/2019 – 13:00-15:00	Customer load shedding in progress – Ballarat dispatched to inject power to meet peak need	0.00	3.33	23.00	23.00	0.00

Figure 11 - System response to Lack of Reserve

4.2 Site Visits

Over the first 12 months of operations, the AusNet Services and Fluence teams have completed the following industry visits to the site:

- Australian Energy Market Operator (AEMO) – On Thursday 20th June, a group from AEMO from the operational analysis and engineering team visited the site and were provided an overview of the installation by AusNet Services and Fluence.
- CLP Group – On Friday 26th June, representatives from CLP Group visited the site and were provided an overview of the installation by AusNet Services and Fluence.
- Pacific Hydro - On Friday 26th June, representatives from the CLP group visited the site and were provided an overview of the installation by AusNet Services and Fluence.
- Asian Development Bank – On Wednesday 16th October, representatives from the Asian Development Bank were provided an overview of the installation by AusNet Services and Fluence.

4.3 Industry Presentations

EnergyAustralia and Fluence both presented at the ARENA Large-scale Battery Storage Knowledge Sharing Workshop (21 May 2019).

- Topic: Lessons learnt on market operations of both Victorian battery storage projects to date

EnergyAustralia also presented at:

- ARENA stakeholder presentation (following ARENA Board meeting) (17 October 2019)
  - Topic: Brief discussion on how we had worked with ARENA to achieve financial close on Victoria's first two large scale battery storage projects.
- ALL Energy Conference – Financing New Investments (23 October 2019)
  - Topic: The role and impact of market contracts for financing new investments
- Informa Grid Stability Conference – Integrating Renewable Energy (2 December 2019)
  - Topic: Need for storage to help integrate renewables into the grid, including the need for the market to better reward assets that deliver reliability and security.

Fluence also presented at:

- Australian Energy Storage Conference (13-14 June 2019)
- All-Energy Australia (24 October 2019)
- RMIT Conference on Reshaping the Ancillary Services Market of the Future Australian Power Grid (25th25th October 2019)

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