EVOENERGY REPORT 2018–19
DEMAND MANAGEMENT INCENTIVE ALLOWANCE

Requirement 6.1

Identify each demand management project or program for which Evoenergy seeks approval.

Response

1	Virtual Power Plant	75,642
2	Load Curtailment Contracts	2,640
3	Energy Share SMS Trial	33,485
4	University of Wollongong Scholarship – DM	13,200
5	Future Network Insights Study	3,024
	Total	**127,991**

Requirement 6.2

For each demand management project or program identified in the response to paragraph 6.1:

a. explain:
   I. how it complies with the Demand Management Innovation Allowance criteria detailed at section 3.1.3 of the demand management incentive scheme,·
   II. its nature and scope;
   III. its aims and expected outcomes;
   IV. the process by which it was selected, including its business case and consideration of any alternatives;
   V. how it was/is to be implemented;
   VI. its implementation costs; and
   VII. any identifiable benefits that have arisen from it, including any off peak or peak demand reductions;

b. confirm that its associated costs are not:
   I. recoverable under any other jurisdictional incentive scheme;
   II. recoverable under any other Commonwealth or State Government scheme; and
   III. included in the forecast capital or operating expenditure approved in the 2014-19 Distribution Determination or recoverable under any other incentive scheme in that determination; and:

c. state the total amount of the Demand Management Innovation Allowance spent in the Relevant Regulatory Year and how this amount has been calculated.

Requirement 6.2 Response

1. Virtual Power Plant (Continuing Project)
   The project complies with the DMIA criteria as follows:

I. The project attempts to control the capabilities of solar PV generation and battery storage to dispatch when energy demand requirements on the Evoenergy network are at their maximum, typically on extremely hot or cold days. Aggregating VPP units will provide a system that can be dispatched to manage network capacity constraints. A virtual power plant (VPP) is a collection of distributed energy resources (DER's), such as residential PV and batteries (nodes), that can be aggregated and controlled in real time to help meet the demand needs of a distribution network.

II. This is a peak demand management project or program.

III. The project is an innovative trial where existing customer battery installations through the Reposit Power fleet are controlled by Evoenergy. It would act as a virtual power plant with the novelty of being targeted at specific areas within the Evoenergy network. The project is a continuing project with Evoenergy targeting added functionality of voltage and dispatch control through the VPP fleet.

IV. The project is non-tariff based.

V. This criterion is met because expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

VI. Expenditure is in the nature of the opex.

I. Nature and Scope

The project will be a trial to determine how much impact we can have on network performance through operating distributed energy resources and what size of market signal is required to cause system owners to allow us to control their systems.

II. Aims and outcomes

Evoenergy teamed up with Reposit Power to trial the world's largest residential battery stored virtual power plant (VPP). The objectives for Evoenergy's participation in the new set of trials were to:

1. Test if the VPP Fleet system is capable of coordinating residential batteries to provide grid support.

2. Observe the practicality of third-party service engagement for network support including voltage control

III. Process of selection

There are several ways through which voltage rise in the network can be tackled. A static solution to the problem is to lower transformer tap settings where necessary, however many substations throughout Evoenergy's network are either single tap, or already at a lower setting. A more dynamic solution is to use on-load tap changing transformers (OLTC) which act as voltage regulators. However, these OLTC distribution substations can become cost prohibitive for a network-wide deployment due to the higher capital costs. This method is yet to be trialled in areas with mandated 100% PV, and so far, OLTCs have been installed at the zone substation and not at the distribution transformer level. The effectiveness of OLTCs, as PV penetration continues to increase, is unclear for the ACT network, though future trials to determine their viability are underway.

Another option for Evoenergy is to increase conductor sizes (both length, and cross-sectional) which will reduce the resistance in the cables. Whilst effective, this is a complex solution with high capital costs associated.

Considering the methods mentioned above, a more effective tool has been identified in the form of reactive power control, or Volt Amps Reactive (VAr) control. This solutions helps stabilise fluctuations in the network, by discharging residential batteries at varying power factors. Through instantaneously altering and rectifying the voltage of the network, quality of supply can be maintained at a much lower cost. This would also a big step towards developing a smart grid for the ACT. As a results Evoenergy selected to trial the VPP fleets to test the additional functionality of VAR control. For grid support services, the existing fleet could be used again using the fleet services platform.

IV. Implementation

During the 2018/19 financial year, Evoenergy tested the energy dispatch from the VPP fleet on a day that load shedding may have been required by AEMO. Evoenergy was not requested to load shed, but chose to conduct a trial anyway to analyse the performance of the fleet in the event of such a request. Dispatches between 2017 and 2018 utilised approximately 330 nodes of individual battery and PV systems. The January 2019 dispatch employed almost double that, at 650 nodes. The fleet was dispatched at peak time (between 5.30 pm and 6.30 pm), during the period when the Lack of Reserve (LoR) event was initially forecast but later cancelled.

Evoenergy also separately tested the voltage control functionality of the VPP fleet. This was done through the fleet portal for the VPP where Evoenergy selected certain battery systems that were concentrated on a particular distribution substation.

To conduct the initial VAr trials two site locations were identified within the Evoenergy network with total capacities of 39.12 kWh and 13 kWh. Due to the small scale of the test, careful location selection was

required for greater visibility of results at a substation level. The sites used to perform the trials offered the highest battery penetration at a close proximity to the nearest substation. All of the battery systems used in the trial used Solax Gen 2 inverters, with LG Chem RESU6.5 batteries, and were controlled using Reposit Power's web based 'Fleet Management System' (FMS).

Data collection for the trial used: FMS, Reposit Power's API, Evoenergy's Advanced Distribution Management System (ADMS), and substation loggers. Real-time data could be viewed using either the FMS or ADMS.

As the timescale and detail of the FMS was insufficient, live changes were tracked in near real time with ADMS. However, due to the typical setting of the ADMS, deadbanding prevented the value changes seen in the trial not being recorded by the ADMS. Deadbands allow for a low data footprint by disregarding fluctuations below a specified magnitude. While this can be altered in ADMS, it was not considered for this trial.

Class A data loggers were installed at the substation to further validate the dataset that was provided by Reposit Power and Evoenergy's Advanced Distribution Management System. By recording a range of data including voltage and current in 10-second intervals, the effects of the trials were successfully observed at the substation level. Using this data the typical usage curves could be determined for the substations of interest, and compared with the data from FMS. Other options that provide real time data, at the cost of accuracy, were also considered and may be used for future trials.

V. Implementation costs

The 2018-19 implementation cost for the VPP trial was $75,642.

VI. Identifiable benefits

a. Grid dispatch trials were overwhelmingly successful with upwards of 80% response rates from the battery units. Evoenergy used the batteries to dispatch power into the grid during the 2019 heatwave conditions. This resulted in over 3 MW of power being dispatched into the grid. Evoenergy is also using the data from the customer DERs to accurately predict the level of solar penetration and battery storage in the Evoenergy network at any given time. This has being incorporated into the ADMS platform to accurately plan and manage the network in the ACT and can be viewed in a standalone DER page by Evoenergy personnel including the control room.

Using the VPP fleet as a digital solution, Evoenergy also conducted VAR trials to investigate the voltage control capability. Three trials have produced encouraging results showing the LV network can be manipulated through intelligent, automated export of power at different power factors. From the completed trials, there are some recommendations that can be made for future trials:

- Site (feeder) selection is critical, and the following factors must be considered:
- High battery penetration
- Low noise levels
- Predictable customer behaviour at the feeder (e.g. a commercial load)
- Minimal distance between the batteries and the feeder.
- Adjusting inverter output for solar power instead of battery power.

Until the battery penetration significantly increases in the network, it may prove difficult to test VAr control using residential batteries. Potentially, a critical mass of residential batteries could be modelled using commercial batteries. Additionally it was recommended that the recovery time of the inverter be investigated.

b. Evoenergy confirms that these costs are not recoverable under any other jurisdictional incentive scheme and are not recoverable under any other Commonwealth or State Government incentive scheme. While this project was not identified in the Evoenergy 5 year regulatory submission, the progression of uptake of battery systems in ACT has been rapid and it was in Evoenergy's best interest to initiate this project. The total amount of the DMIA spent in the 18/19 financial year was $75,642.

Overview of developments

Evoenergy has much to learn from the increasingly relevant DER and battery storage environment, and to this end, has purchased access to Reposit Power's Fleet management system and customer network data from their growing fleet of residential batteries. Evoenergy's transformation to a Distribution System Operator (DSO) is dependent on our ability to learn from and utilise internal and external data sources and make use of intelligent tools and techniques to create value for the wider network.

Evoenergy has expanded on this success, developing the Internet of Things (IoT) Hub since 2018 onwards to integrate two key tools for network control: the VPP fleet and Evoenergy's ADMS. This integration is the first of its kind in Australia and currently delivers real-time information directly into the ADMS. This direct interface with the VPP platform unlocks a level of visibility and control of the LV network that has never before been possible, giving network controllers the ability to assess available supply, via battery levels within the network, and utilise the stored energy to help protect the grid. This represents the cutting edge in innovation, integration and orchestration of consumer owned, decentralised energy assets via a Distribution Management System in Australia. Further voltage control trial are planned for trials through existing and new VPP aggregators through innovations at a precinct and aggregated nodal levels. Evoenergy aims to transition this technology to business-as-usual and justify VPPs on its own economic merits against traditional augmentation.

2. Load Curtailment Contracts (continuing project)

I. The project complies with the Demand Management Innovation Allowance criteria detailed at section 3.1.3 of the demand management incentive scheme as detailed below:

II. The project assesses the impact on network load from customer and network management of load curtailment contracts. The project aims to quantify the reductions in demand that can be obtained through the timely use of curtailment contracts with large customers.

III. This is a broad based demand management project that targets commercial and industrial consumers.

IV. This project will explore potentially efficient demand management through the use of load curtailment contracts with large customers.

V. This project is non-tariff based.

VI. Evoenergy expenditure for this project is not recoverable under any other jurisdictional incentive scheme, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

VII. Expenditure on this project is opex.

I. Nature and Scope

The project scope was to trial the establishment and implementation of load curtailment contracts with the 20 major customers in the ACT. The aim was to establish a standard operating model and contract and develop a pricing mechanism for the different customer categories. The project was driven by local demand management requirements and preparing for NEM Lack of Reserve (LOR) events with possible load shedding events.

II. Aims and outcomes

The aims and expected outcomes of the trial were to establish an effective range of customer curtailment contracts that could be used for NEM LOR events and local DM requirements.

III. Process of selection

The establishment of commercial and voluntary load curtailment contracts was considered a better alternative to compulsory DM.

IV. Implementation

The initial project was implemented by contacting all the 20 large customers in the ACT and engaging in detailed discussions on their interest and ability to provide a load curtailment contract. A standard contract, with an editable schedule, was developed. For this financial year, as part of the major customer stakeholder engagement, Evoenergy met with local government and industry bodies as well as federal government agencies who are ultimately responsible for the emergency response procedures for Commonwealth department buildings. This included meetings with the Department of Prime Minister and Cabinet (PM&C) who are based in the ACT. These meeting involved face to face meetings and presentations on the role Evoenergy plays during a load shedding event and how the business is preparing for such events by procuring demand response contracts as a failsafe. As this is a continuing project from the previous financial year, Evoenergy decided that in order to get the large users being comfortable around a DR contract, Evoenergy needed to further engage closely with this user group to understand the drivers and barriers to their participation. Evoenergy has chosen to operationalise the access and control of the DR contracts by having Evoenergy control room operators directly contact the contracted entities or their personnel and request a load shed or to commence operations on their backup generation.

V. Implementation costs

The 2018/19 implementation costs was $27,654.

VI. Identifiable benefits

The identifiable benefits were the successful placement of three demand response contracts after considerable negotiation with a number of large customers. The trial also highlighted that many customers do not have operations and assets that suit the application of demand management. The trial also demonstrated the price complexities and price levels that need to be offered in order to be financially attractive and viable for a large range of customers. Evoenergy's control room personnel have also added this DR mechanism into their operating procedures and is helping further build capability around this for automation in the future.

b. Evoenergy confirms that these costs are not recoverable under any other jurisdictional incentive scheme and are not recoverable under any other Commonwealth or State Government incentive scheme. While this project was not identified in the Evoenergy 5 year regulatory submission, the progression of residential estate development in greenfield sites in conjunction with ACT Government's goal to transition to 100% renewables by 2020, this project was deemed an ideal test case to provide learnings back to Evoenergy.

c. The total amount of the DMIA spent in the 18/19 financial year was $27,654.

Overview of developments

The project scope was to trial the establishment and implementation of load curtailment contracts with the 20 major customers in the ACT. Only 2 contracts were signed in the previous financial year with a number still under negotiation. With Evoenergy further engaging with the large industry customer base and conveying the extent of their involvement, the users were willing to engage further on these discussions. Unfortunately a large number of customers rejected participation outright because it did not suit their operations. The exercise highlighted that many customers do not have operations and assets that suit the application of demand management. The continuing of the trial also demonstrated the pricing complexities and price levels that need to be offered in order to be financially attractive and viable for a large range of customers with a wide range of DM options from load reduction to alternative generation. This includes the lack of automation for some of these assets, the operational hours of these business not coincident with demand peaks and lack of personnel equipped to be available for Evoenergy's request with short lead times. These are now being considered by Evoenergy as to the continuing role of these DR contracts and if there is a need to relaunch or discontinue this project. As of 30 June 2019, Evoenergy has signed up one additional party to the DR contract compared to the previous financial year. All three parties have now been across a trial run as well.

The contracted parties were called to be on standby in January 2019 when AEMO forecast a Lack of Reserve 2 (LoR 2) in the NSW region. As part of the NSW DNSPs, TransGrid and AEMO communicated this to Evoenergy and as a precaution, Evoenergy contacted its fleet of large users to alert them of a possible load shedding event that could happen in the next 12 hours. With the local ACT Government announcements and AEMO requesting additional generation to be available, the forecast LoR was cancelled the next day around mid-day (4 hours before the forecast LoR event timing). Evoenergy was prepared to meet at least some of its obligation for a possible load shedding using the DR contracts in place. Going forward this project will be moved to be funded from the operations budget.

3. Energy Share SMS Trial
The project complies with the DMIA criteria as follows:

I. The project sought to incentivise customers to reduce their load during peak times. Building on the previous SMS trial run by Evoenergy, a new program was devised to assess the willingness of all customers within the ACT to reduce their electricity load at short notice during peak times. The test would be able to assess the effectiveness of SMS communications to reduce load against various incentives being offered and verify it using near-real time information from smart meter devices.

II. This is a peak demand management project or program.

III. The trial of residential demand management for all residential smart meter customers in the ACT is innovative. While the previous SMS trial was targeted at a particular suburb, the trial received a poor sign up rate and did not provide statistically relevant results. This project is designed to build demand management capability in Evoenergy's network and provide a new potentially efficient demand management mechanism which can be scaled to the whole of ACT in the future.

IV. The project is non-tariff based.

V. This criterion is met because expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

VI. Expenditure is in the nature of the opex.

I. Nature and Scope

This program targeted existing smart meter residents (~ 9,000 residential customers on Type 4 meters) and is directly scalable to the entire ACT network (Type 4 and Type 6 meters, covering ~ 95% of Evoenergy's consumer base). Targeted communications were sent to these residents to achieve a high sign up rate.

II. Aims and outcomes

The overall outcome of this pilot program is to develop the capability for Evoenergy to use and scale demand response at a residential level to manage the future network efficiently and sustainably. Evoenergy will have a recommended delivery pathway to embed an ongoing SMS DMS program into Evoenergy's day to day business practices if the results from the program are viable. A residential SMS demand response program has the potential to offer both network-wide and targeted (geographic area or feeder specific) peak load reductions.

III. Process of selection

Over 62% of the feeders in the Evoenergy distribution network are residential-dominated (i.e. >80% connections on the feeder supply a residential premise). To enable realistic and substantiated deferral of network augmentation through Demand Management Solutions (DMS), residential-based demand management and demand response initiatives are required. Evoenergy decided to investigate the viability of such an option as part of the DM initiatives.

Other Options considered:

a) Do nothing in this area: There are other demand management programs running but it is not clear how successful they will be. This is relatively low cost with the potential to give returns that have a significant effect on the network.

b) Carry out individual event advertising, skipping the SMS stage: The individual event advertising would be difficult to co-ordinate at short notice in response to weather conditions, would cost more per event and would not have the potential for geographic targeting that this presents.

c) Roll out ACT wide: This would have been a logical option had the previous iteration of the SMS trial yielded good results with a replicable mechanism. The previous trial showed high engagement from the registered participants but the level of demand reduction was negligible or not observed on Evoenergy's LV network. The only way to gauge the level of reduction was to monitor it in real-time using smart meters which covered only a small sub-section of the ACT residential population. This sample, however small, could still yield an identifiable and verifiable level of peak demand reduction that could be achieved.

Investigation of these options recommended that Evoenergy pursue the Energy Share SMS trial option to understand its viability to scale up for demand response events while understanding the impact of variable incentives.

IV. Implementation

Next-day data collected in Evoenergy's metering system will allow for comparisons to be made against previous similar day energy usage, which will develop results for participation numbers and average household energy reduction. The load reduction potential for the wider ACT network can be then be extrapolated. Participation was incentivised through a number of gift card prize draw entries and then via SMS messaging at the time of the event, offering varying incentives to gauge the level of participating against different level of incentives. Evoenergy also surveyed the participants after the events with a survey monkey poll seeking feedback about the process, ease of use and interaction with the program.

V. Implementation costs

The 2018-19 implementation cost for the Energy Share SMS trial was $33,485.

VI. Identifiable benefits

The number of trials was limited to winter period. Although the intention was to run the trial during the summer months during early 2019, the establishment of the program took considerably longer. Additionally, Evoenergy's mechanism to communicate to smart meter customers had to be channelled from a marketing/communication point of view. As a result, the business made the decision to target winter period for the trial to get a result analysis of the demand reduction achieved. Evoenergy's peak demand is typically in the winter months, due to the dominating winter heating load. This demand is also met by the large number of gas users in the ACT, which also has an effect. As customers tend to make a fuel switch due to incentives from local government, retailers etc., this period to test the Energy Share SMS program was considered a viable alternative. The project conducted 6 events and ran from April to June 2019. The peak demand reduction results are being investigated and will be reported in the coming financial year.

From the sample size of smart meter customers of around 9000 users, Evoenergy received registrations from 476 (around 5.3%). There was an average participation rate of 61% for the events, with 60% of participants willing to repeat their engagement (participated in 3 or more events).
The project also conducted a follow up survey after the event which received positive feedback from the respondents.

b. Evoenergy confirms that these costs are not recoverable under any other jurisdictional incentive scheme and are not recoverable under any other Commonwealth or State Government incentive scheme. The SMS trial was considered a better alternative to compulsory DM. The total amount of the DMIA spent in the 18/19 financial year was $33,485.00 inclusive of overheads.

Overview of developments
As part of the analysis of the data, Evoenergy identified a critical error in the analytical tool that was used to manipulate the smart meter data. This tool was identified to be re-built for this purpose and was re-launched for internal use in early October 2019. As a result, the full analysis and reporting has not been finalised. Additionally Evoenergy also identified that many smart meter customers in the Evoenergy database had been created for tentative or future greenfield sites which were in the process of being constructed. This led to an oversampling of the population which resulted in considerable time and resources being dedicated to re-routing communications and feedback. The results when analysed will give a definite baseline for this customer base and will be highly beneficial to lock in the right incentives to target the ACT population while being able to verify a measurable reduction in peak demand.

4. University of Wollongong – PhD scholarship (Continuing Project)
The project complies with the DMIA criteria as follows:

I. Under this project, Evoenergy sponsored the funding of a PhD student at University of Wollongong to study the optimal demand response strategies for home energy management systems (HEMS) in smart grid to achieve net zero energy.

II. This is a broad based demand management project.

III. This project is innovative as Evoenergy will be able to gain a greater understanding of how demand management strategies assist in deferring capital investment while also reducing peak demand within the network. This project is designed to build demand management capability in Evoenergy's network and provide a new potentially efficient demand management solution for future estate developments in the ACT.

IV. The project is non-tariff based.

V. This criterion is met because expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

VI. Expenditure is in the nature of the opex.

VII. Nature and Scope

The project involves sponsoring a 3 year PhD of a student at University of Wollongong to gain insight to how smart grid technologies will interact with the greater network on a local and precinct level. The project will develop and test optimal control system for smart residential house which optimises the consumption and storage of energy along with the operation of several controllable loads.

VIII. Aims and outcomes

The project will develop a network interactive home energy management that utilises model predictive control to optimise the consumption, generation and storage of energy within an individual household and subsequently the greater precinct to achieve net zero energy. This project will develop the software and hardware for a home energy management system (HEMS) for a net-zero energy home that is able to respond to demand response signals and provide support to the local network. The algorithm development to control the different equipment will also be tested and trialled as a result of this project

IX. Process of selection

As the project is an investigative project to determine the effect of new technology on our network, the alternative was to simply not do the project, but then there would have been no associated learning. There is a strong push at the local government level for higher storage penetration within our network area, including new estate developments building 100% PV mandated suburbs. This will lead to increasing penetration and to be prepared for this, it is necessary that Evoenergy carry out studies to learn how the optimally designed residences will and can affect the network. Evoenergy engaged the sole supplier as the student has the necessary skills and qualifications to undertake this project. The project over 3 years will test the predictive model at a real house (Desert Rose House - DRH) designed by the student. The University of Wollongong is funding the construction of this house including the various equipment within this house.

X. Implementation

The student will undertake the project through the University of Wollongong and provide progress updates through reports back to Evoenergy. The student will also provide briefings to Evoenergy representative on an ad-hoc basis in relation to updates and milestones. During the 2018/19 FY, the student along with representation from the university conducted a workshop at Evoenergy's offices in Canberra, where he presented the finding and research outputs from the project. This session was attended by university personnel as well as Evoenergy staff to gain more insights into the development pathway of the HEMS algorithm and the software/hardware optimiser. Evoenergy also provided anonymised data around load and generation from solar and battery customers in the network for the student to further analyse and optimise the algorithm.

XI. Implementation costs

The 2018-19 implementation cost for the PhD scholarship was $13,200.

XII. Identifiable benefits

a. The research has resulted in the development of a fully functioning, smart, model predictive control

(MPC) algorithm for the control of residential energy storage, EV chargers and air conditioners for demand response. The algorithm now allows for coordinated control of distributed energy resources at a precinct level as well as individual control (i.e. in a VPP). The research funding also led to a paper being presented on energy modelling and demand response strategies of the Desert Rose house developed by the student.

The student also undertook in-depth statistical analysis of a years' worth of data from 442 anonymised customers in the Evoenergy network. This helped in developing multiple statistical models looking at the ratio of load to PV generation and how much excess energy from each customer is available to be stored in the battery from the PV.

Using the data the MPC algorithm was simulated over a course of a year and benchmarked against several different scenarios including a customer with no PV, just PV, PV and battery with standard control and PV and battery with MPC control. The MPC provided the following advantages:

- Decreased overall electricity bill for the year
- Significantly less energy imported during peak times (i.e 7am – 9am and 5pm-8pm)
- Significant less battery energy throughput (leading to longer overall battery life)

b. Evoenergy confirms that these costs are not recoverable under any other jurisdictional incentive scheme and are not recoverable under any other Commonwealth or State Government incentive scheme. While this project was not identified in the Evoenergy 5 year regulatory submission, the progression of residential estate development in greenfield sites in conjunction with ACT Government's goal to transition to 100% renewables by 2020, this project was deemed an ideal test case to provide learnings back to Evoenergy.

c. The total amount of the DMIA spent in the 18/19 financial year was $13,200.

Overview of developments

Through the course of the project the student will develop a small network model (based on Evoenergy network) for experimental simulation. In-depth results from this analysis are currently in the process of being published to IEEE SmartGrid journal. Further research is progressing to leverage the spot price to benefit the utility and reduce network overloading using the MPC algorithm.

The future spend for this project is $10,000 (excluding overheads) for $19/20 financial year.

5. Future Network Insights Study
The project complies with the DMIA criteria as follows:

I. Under this project, Evoenergy conducted a future network survey in 2018, followed by focus groups to gather public opinion on several emerging technologies that will have a large impact on the network in the near future.

II. This is a broad based demand management project.

III. This project is innovative as Evoenergy will be able to gain a greater understanding of how the ACT customer base is evolving to accept new and emerging technology and the flow on effects on network planning and management processes to be reviewed now to avoid future network instability. The project will assist Evoenergy develop demand management strategies for reducing peak demand within the network. This project is designed to build demand management capability in Evoenergy's network and provide a new potentially efficient demand management solution for future estate developments in the ACT.

IV. The project is non-tariff based.

V. This criterion is met because expenditure for this project is not being recovered through any other

jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

VI. Expenditure is in the nature of the opex.

I. Nature and scope

The project involved Evoenergy engaging directly with the customer base in the ACT to gauge the level of public engagement and sentiment with emerging technology and their likelihood to accessing distributed energy resources (DER) with or without subsidies.

II. Aims and expected outcomes

The project aimed to engage with the customers in the ACT to understand the risks and opportunities that Evoenergy would be facing in the coming future as the viability for DER uptake increases. This engagement either through the survey or in focus groups/workshops run by Evoenergy will help the business tailor the demand management programs such as SMS messaging or direct subsidies for residential battery uptake. This in turn will help Evoenergy make better network planning decisions especially in new greenfield estates.

III. Process of selection

Evoenergy conducted the online survey which was promoted through social media as well as via targeted electronic distribution. Prizes were offered to incentivise responses. 623 responses were collected within a month. In addition to an untargeted distribution several specific groups were targeted including groups represented on Evoenergy's Energy Consumer Reference Council (ECRC) and people who already have residential batteries. Following the survey two focus groups were held to explore key points in more detail. The alternative to not conduct this research study was to engage a third party to identify customer groups and conduct the research or be a reactive business whereby Evoenergy would not be able to prepare for the customer base evolving in their energy literacy and use of emerging technologies. As either of those options were considered a potential risk to Evoenergy, the future network study was approved to be conducted.

IV. Implementation

The survey was conducted online and promoted over several online channels. The vast majority of responses came via Facebook, through a combination of paid promotion and organic distribution. In addition to the paid and organic Facebook distribution Evoenergy created specific distribution links for several consumer groups allowing us to identify trends across consumer segments. The links created engagement and responses with community council groups, general customers through social media (Twitter, Facebook, LinkedIn) and existing battery users under the ACT Government – NextGen subsidy scheme.

V. Implementation costs

The 2018-19 implementation cost for the future network insights project was $3,024.

VI. Identifiable benefits

- The responses that came back showed a higher level of solar ownership than expected (28%,

compared to the expected 11%). Possible causes for this include Facebook algorithms preferentially showing the survey to people who have a history of researching energy related topics online, or people with an existing interest in energy related topics being more likely to participate in the survey when it is shown to them.

- 7% of respondents who don't currently have solar said that they would never install solar but nearly 30% said that they would be installing solar within the next three years. This suggests that the solar penetration on Evoenergy's network is going to more than double over the next three years. This increase will be approximately equivalent to a 225MW unscheduled generator, which will cause significant power quality and stability issues for the existing network. Network planning processes must be changed to allow for this desire for high solar penetration.
- Battery Specific results analysis:
  - Financial aspects are a key reason that many people do not invest in batteries, with 51% of respondents selecting one or more of the options related to price, and many of the free text responses mentioning price.
  - 18% said they were not investing in batteries because they were living in a rental property. Access to this market segment will require development of appropriate incentives for both landlords and/or tenants, or a technological solution such as portable battery systems.
  - Around one third of respondents said they were waiting for battery technology to improve
  - This result shows a clear trend, with 44% saying they would be extremely likely to install a battery with a subsidy of $4,000.
  - Respondents strongly preferred a payment structure for battery access that included a per kWh component over a simple up-front payment.

b. Evoenergy confirms that these costs are not recoverable under any other jurisdictional incentive scheme and are not recoverable under any other Commonwealth or State Government incentive scheme. While this project was not identified in the Evoenergy 5 year regulatory submission, the progression of residential estate development in greenfield sites in conjunction with ACT Government's goal to transition to 100% renewables by 2020, this project was deemed an ideal test case to provide learnings back to Evoenergy.

c. The total amount of the DMIA spent in the 18/19 financial year was $3,024.

Overview of developments

Findings support the expectation of rapid change in the network, with much greater penetration of solar generation. Network planning and management processes should be reviewed now to avoid future network instability. The rate of battery uptake is going to be closely linked to battery costs and available subsidies, but even after people have installed batteries access to those batteries for Evoenergy is not automatic. In general people exhibited a distrust of Evoenergy and were unwilling to allow access to battery storage without a per kWh fee. This means that any battery promotion by Evoenergy based around a fixed payment is unlikely to achieve the required results without clear criteria limiting access to specific scenarios. EV take-up is also going to be closely linked to vehicle costs and available subsidies, but is likely to lag behind residential battery take-up. Development of appropriate tariffs and grid integration strategies will be required over the next few years. This was a good research baseline for Evoenergy and currently there are no further plans to revisit this study during the next regulatory cycle.