Demand Management Innovation Allowance Report 2023-2024

Submission to AER

Endeavour Energy

POWER together

Contents

1. Executive summary

Endeavour Energy currently has four Demand Management Innovation Allowance (DMIA) projects:

1. *Power*Savers
2. Bawley Point and Kioloa Community Microgrid
3. Gridsight

The total DMIA claim for 2023-24 is $1,757,760

Project	Operating Expenditure ($ nominal)	Capital Expenditure ($ nominal)	Total Expenditure ($ nominal)	New or Continuing
***Power*Savers**	$21,260	$0	$21,260	Continuing
Bawley Point & Kioloa Community Microgrid	$0	$1,026,000	$1,026,000	Continuing
Gridsight	$0	$710,500	$710,500	Continuing
Total	**$21,260**	**$1,736,500**	**$1,757,760**	

2. Background

This report has been prepared in accordance with the AER's Regulatory Information Notice in response to paragraph 6 of Schedule 1. The information provided will constitute the provision of an annual report for the purposes of paragraph 3.1.4.1 of the Demand Management Incentive Scheme (DMIS) applying to Endeavour Energy (as set out in the 2019-2024 Distribution Determination).

As per paragraph 6 of the AER's Regulatory Information Notice Schedule 1, Endeavour Energy is requested to provide responses describing its expenditure and the nature of its demand management activities for review by the AER. The annual reporting requirements are outlined below.

Endeavour Energy's response on the Demand Management Incentive Allowance must include:

1. Identify each demand management project or program for which Endeavour Energy seeks approval.

2. For each demand management project or program identified in the response to paragraph 1:

    - 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;

    - 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 2019-24 Distribution Determination or recoverable under any other incentive scheme in that determination; and:

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

3. Provide an overview of developments in relation to projects or programs completed in previous years of the regulatory control period, and of any results to date.

3. Previously Approved Projects

3.1 *Power*Savers

The PowerSavers program, designed and implemented by Endeavour Energy, is a comprehensive suite of customer technology applications and services to manage demand and other network constraints.

The PowerSavers program for residential customers has been established to manage a range of smart load devices including air-conditioning units, water heaters, EV chargers and assets comprising solar and battery unit combinations.

3.1.1 Nature and Scope

The purpose of this specific program is to provide customers with maximum choice by including an expanded list of devices compared to those included in earlier programs.

One of the outcomes of earlier demand management programs was the need for a more comprehensive and complete product which comprises full integration of a customer engagement application, software applications to fully manage the customers' end devices and configurable customer notifications to provide customer flexibility to opt out of Event days or join more programs with a wide range of customer incentives.

The scope of the project also comprises comprehensive data reporting functionality to measure the customer and network benefits progressively through the trial and at completion.

3.1.2 Aims and Expectations

The aims of the PowerSavers program are as follows:

Efficiently manage the demand management programs for residential customer smart load devices including air-conditioning units, electric water heaters, EV chargers and assets comprising solar and battery unit combinations.

Provide analysis:

- To understand customer behaviour and anticipate the impact of demand management programs to incentives; and
- On the impact of demand management programs to the distribution network to support the efficient deployment of non-network solutions.

The expected outcomes include:

- Well-developed understanding of participants' interest in the program and the penetration of controllable devices across the Endeavour Energy network;
- Capturing actual/estimated energy reduction per customer and the prevailing weather conditions during Event days;
- Confirming average and total energy reduction for all participants;
- Identifying any issues captured during the Event period including those who discontinued their participation and archiving of all raw data collected; and
- Suitability of the application to be applied more widely across the Endeavour Energy network to manage system demand efficiently with our existing network support resources and services.

3.1.3 Project Justification

The PowerSavers program is an opportunity for Endeavour Energy to accelerate a transition to a modern grid and deliver a suite of solutions to make energy more efficient for customers while harnessing the rapid uptake of renewables.

We are enabling our customers' evolving energy choices with the expanded list of devices that customers can connect to the program.

Through controlling many types of these distributed energy resources (DERs), we are not only increasing the total amount of flexibility available but can actively manage both peak and minimum demand.

3.1.4 Implementation Plan

The demand management system is delivered by a prime vendor who has assembled a consortium of suppliers charged with designing and implementing the various demand management programs around a core platform.

3.1.5 Implementation Costs

Expenditure claim in FY24 is $21,260 in OPEX covering customer incentives associated with the project. All expenses are accounted in work orders linked to the project.

3.1.6 Results

The trial went live on 31 March 2022 and was intended to operate over several seasons. However, it was concluded after two summer seasons due to the administrative cost versus benefits of continuing the program and the scalability of the incentive model.

PowerSavers had already demonstrated success in interoperability of demand response across multiple appliance types including air conditioning thermostats, EV chargers, electric hot water systems, solar inverters, and residential batteries.

Also, PowerSavers will be superseded by our new Flexible Connections project, which will focus on unlocking export capacity initially and evolve toward demand response in future iterations. This will serve as a keystone project for the bigger role of distribution networks in the energy transition and unlock value for both solar and non-solar customers, alike.

A report was prepared on the results from the first year of the trial.

382 customers were able to actively participate, leading to a significant reduction in energy consumption and effective management of excess solar generation on Event days. The program was well-received, with a post year one survey conducted in May 2023 finding 92% of participants' expectations being met or exceeded and an overall satisfaction rating of 8.6 out of 10. Satisfaction with the incentive received for participating was also strong, with an average rating of 8.5 out of 10 similarly.

The 50 participants in the Smart Hot Water System plan with their associated Home Energy Management Systems (HEMS) and smart hot water devices, saved up to 41,328kWh or an equivalent 32 tonnes of CO_2 based on NSW emission factors, over the first summer period.

Detailed results were unavailable for the other plans, as it require customer smart meter data, which was not readily available for a majority of participants. Also, comprehensive data reporting of the reductions achieved to measure the customer and network benefits, would have required upgrades to supplier platforms.

Thus, the time and resources involved in actively operating the second year and continuing for a third year of the PowerSavers program exceeded the potential additional learnings and benefits that could be obtained.

No Event days were executed during the second summer season but there is still benefit in customers using the smart devices to efficiently manage their electricity use so the financial incentives offered to participants for renewing for a second year, were honoured.

3.2 Bawley Point & Kioloa Community Microgrid

3.2.1 Nature and Scope

The Bawley Point, Kioloa and Termeil communities are located at the extreme southern end of Endeavour Energy's franchise area. The area is a popular tourist destination, and this means that energy demand can increase four to five-fold during peak holiday periods. Being at the very end of the Endeavour Energy network, electricity services at Bawley Point and Kioloa experience relatively high SAIDI and SAIFI values. Load has also increased to near capacity with regional permanent population movements, in part due to COVID-19. Additionally, the network is voltage constrained – facing low voltage during peak periods, and high voltage during the low demand periods, which will in the longer-term result in poor power quality and curtailment of customers' DER.

To assist in addressing emerging network needs, Endeavour Energy had previously installed a 1MVA diesel generator between Bawley Point and Kioloa to supplement the existing network, but this solution faces ongoing operational costs and is aging. The largest customer in the network is Willinga Park, who have privately installed a considerable amount of behind-the-meter generation assets (including solar PV/battery/diesel generators) to allow for standalone operation. Currently only the PV system exports into the network, with the remaining assets only providing a back-up supply for the facilities (or zero export peak demand reduction).

The increasing capabilities and viability of DER - both at a residential and community level - have since made an alternative new technology solution credible when compared to a traditional network solution. This alternative solution would involve the development of a microgrid, with elements co-funded and co-designed with the community.

The major features of the project involve:

- Community co-design, and integration of community-owned assets;
- Turnkey supply and installation of a new ~3MVA/3MWh Battery Energy Storage System (BESS);
- Roll out of residential batteries and solar (funded through the NSW Government's Bushfire Livelihoods Economic Recovery program); and
- A Distributed Energy Resources Management System (DERMS) to enable control of local generation and storage.

3.2.2 Aims and Expectations

The aims of the program include:

- Address the vulnerability of the Bawley Point and Kioloa communities' network reliability and resilience, and to address the growing demand requirements;
- Demonstrate new planning approaches, including how we can partner and work closely with our customers and communities, and utilise participatory design processes;
- Accelerate decarbonisation, through accessing and incentivising sustainable and renewable energy in our network;
- Establish the first microgrid in Endeavour Energy's network as a new technology solution for edge-of-grid customers, and apply learnings to opportunities in diverse and metropolitan environments; and
- Develop a cornerstone project that combines multiple Future Grid technologies such as DERMS, VPPs and community-scale grid batteries.

3.2.3 Project Justification

The project was justified as there was emerging network need through load growth and increasing reliance on the aging diesel generator. The project was economically justified when compared to a traditional network solution, with the alternative being construction of a new zone substation at Termeil. This would have meant service to Bawley Point and Kioloa still relied on power lines running through significant areas of bushland. NSW government funding was secured and planned to be used solely to enable the rollout of behind the meter resources. The program leverages significant co-contribution from customers who will own the eventual assets.

3.2.4 Implementation Plan

Endeavour Energy has commenced a number of parallel work streams to progress the project for complete commissioning in late 2023.

- Community workshops for consultation and behind-the-meter asset participation design (March 2022 – ongoing).
- Rollout of subsidised battery and solar systems - installation started in December 2022, and completed a total of 134 installed systems as of August 2023.
- Grid scale BESS (~3MW/3MWh) to be commissioned before the end of 2024.
- DERMS and the VPP were procured and designed during FY23, and will be commissioned with the grid battery before the end of 2024.

3.2.5 Implementation Costs

The DMIA components will be used to support the innovative aspects of the project including the participatory community engagement and co-design approach, as well as contribution toward supply, network integration and commissioning of the islandable grid-forming battery. Expenditure claim in FY24 is $1,026,000 in CAPEX. All expenses are accounted for in work orders linked to the project.

3.2.6 Results

All components of the microgrid (VPP and grid battery) are installed and working independently. Testing is ongoing for the DERMS, which would enable control of local generation and storage. Community engagement is continuing to keep the community updated on the progress of the project. Endeavour Energy expects insights into the integration, control and impact of this project in providing a new planning approach in fringe of grid areas is expected to be measurable over FY25.

3.3 Gridsight

Endeavour Energy is collaborating with Gridsight to develop a platform capable of providing tools to enhance LV visibility and leverage AI to generate data-driven insights surrounding network performance, CER detection and Safety Hazard detection.

3.3.1 Nature and Scope

As customers seek to connect more customer energy resources (CER) and increasingly use sophisticated digital platforms, the network and its management must evolve. Endeavour Energy's objective is to enable customers' energy choices for a sustainable future, moving us towards the future integrated and low carbon energy system. Low Voltage Visibility and Analytics is one of the key enablers of this objective.

Gridsight's analytics platform utilises customers' meter data to provide visibility of and insights on, existing and emerging constraints, which enables a better understanding of customer usage patterns, improved tariff designing processes, and better consideration of non-network solutions to demand management. This bottom-up approach places the customer as the focus.

The platform ingests smart meter market data from some 416,000 sites. From this population, Endeavour Energy is purchasing power quality data of approximately 50,000 sites. Basic meter data is ingested for all other customers.

3.3.2 Aims and Expectations

The Gridsight platform aims to serve the following use cases:

- Provide optimal data-driven Dynamic Operating Envelopes (DOEs) to unlock additional hosting capacity without the need for network investment.
- Provide load estimation tools to help proactively identify equipment capacity issues through aggregating downstream customer data and creating data-driven estimates.
- Identify and validate customer energy resources including customer solar PV, battery storage systems and electric vehicle chargers to increase compliance efforts and minimise network spend.
- Detect customer energy resource performance including analysis on self-consumption of solar, detection of inverter disconnections and solar curtailments due to overvoltage issues and network voltage unbalance.
- Proactively identify safety issues on the network including broken neutrals such that they can be rectified proactively.

3.3.3 Project Justification

The platform provides Endeavour Energy with tools to better understand evolving customer needs. Enhanced LV visibility, load profile analysis, and DER detection are key enablers in implementing an effective demand management system in the energy transition.

Algorithms which detect overvoltage, unbalance, and loading issues will minimise network costs by allowing for proactive targeting of network support devices. Load profile analysis of different customer types and CER customers will also reduce costs by facilitating DOEs and supports tariff analysis and trials in the future.

3.3.4 Implementation Plan

The implementation of this project was conducted by Gridsight. Endeavour Energy supplied smart meter data daily and network connectivity models for the platform to be operational.

There were four parallel streams developed with relevant SMEs from both Endeavour Energy and Gridsight. The four streams developed include:

- Load Estimator Tool
- DER detection, compliance and performance
- Dynamic Operating Envelopes
- PQ / voltage monitoring
- Hosting Capacity

3.3.5 Implementation Costs

Expenditure claim in FY24 is $710,500 in CAPEX covering the cost of the Gridsight platform. All expenses are accounted in work orders linked to the project.

3.3.6 Results

All five streams identified in the implementation plan are fully operational. That includes the load estimator tool, extending from the distribution substation, all the way up to the MV feeder, Dynamic Operation Envelopes (DOE), the PV detection, Hosting Capacity and Power Quality monitoring tools. The streams identified in the last report have continued into this financial year, focussing on the uplift of each of their functionalities. The platform is continuously improving and adding value through added functionality, features and accuracy which is helped by the accelerated roll out of smart meters.

The LV analytics platform has now transitioned to BAU, replacing legacy systems and is being used widely by all staff across the business.

4. New Projects for Approval

There are no new projects under the DMIA for FY24.

5. Background

Endeavour Energy confirms the funding of the projects contained in this report are not:

a. recoverable under any other jurisdictional incentive scheme;
b. recoverable under any other state or Commonwealth government scheme; and

included in the forecast CAPEX or OPEX approved in the AER's distribution determination for the next regulatory control period, or under any other incentive scheme in that determination (such as the D-factor scheme for NSW).

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