Demand Management Innovation Allowance Report 2020-2021

Submission to AER

Endeavour Energy

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1.0 Executive Summary

Endeavour Energy currently have two Demand Management Innovation Allowance (DMIA) projects:

1. Grid Connected Battery Energy Storage Trial which commenced in FY17-18
2. Digital Customer Engagement Platform which commenced in FY19-20

The total DMIA claim for FY20-21 is $533,644.

Project	**Operating Expenditure** ($ nominal)	**Capital Expenditure** ($ nominal)	**Total Expenditure** ($ nominal)	**New or Continuing**
Grid Connected Battery Energy Storage System Trial	$0	$50,633	$50,633	Continuing
Digital Customer Engagement Platform	$0	$483,011	$483,011	Continuing
Total	**$0**	**$533,644**	**$533,644**	

2.0 Background

This report has been prepared in accordance with the AER's Regulatory Information Notice in response to paragraph 7 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 2019-24 Distribution Determination).

As per paragraph 7 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 eligible project (DMIAM) for which Endeavour Energy seeks approval.

2. For each demand *management eligible project identified in the response to paragraph 7.1:*

   (a) explain how it complies with *project* criteria detailed at section 2.2.1 of the *demand management innovation allowance mechanism;*

   (b) submit a compliance report in accordance with section 2.3 of the *demand management innovation allowance mechanism*.

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.

4. Provide any other required information as specified by the demand management innovation allowance mechanism.

3.0 Previously Approved Projects

This section reports on the progress of projects previously approved by the AER.

3.1 Grid Connected Battery Energy Storage System Trial

Battery storage can provide several network benefits to Endeavour Energy. Primary network benefits such as peak load lopping, voltage management, load balancing and reliability improvement can be realised in the foreseeable future and may reduce or defer investment decisions. There is strategic value in understanding the operation of battery storage in order to position the company to realise storage related opportunities and applications as they are developed.

Utilising a BESS to defer the construction of a greenfield zone substation (ZS) is one such opportunity. In this application, the BESS can be used as an alternative to a Mobile ZS for deferral periods of up to 3 years. Short term demand growth can be met with supplementary supply from a BESS to defer both the augmentation of the existing network and the establishment of the final supply infrastructure.

3.1.1 Nature and Scope

Project scope includes:

- Identify the functional requirements of the BESS for connection and operation on Endeavour Energy's network;
- Procure a grid connected BESS with a minimum of 1MWh storage capacity, and 500kVA inverter, with a modular and transportable design;
- Deploy BESS onsite at West Dapto;
- Prove the BESS can provide 1MWh at a peak of 500kVA as required for peak shaving;
- Confirm round trip charge/discharge energy efficiency of 80%;
- Understanding the SCADA control and protection requirements for the grid connected BESS; and
- Test the voltage, power quality, power factor management and reliability support functions of the BESS.

3.1.2 Aims and Expectations

Aims and expectations of the trial include:

- Determine the suitability for peak demand reduction and other network support applications such as voltage, power quality and power factor management;
- Test the use of battery storage as grid backup supply for reliability support;

- Gain an understanding of design considerations such as component losses, charge/discharge rates, system lifecycle, safety, installation, control and monitoring requirements, and any limitations of the equipment;
- Confirm the viability of a relocatable storage solution, in terms of cost and ease of relocation;
- Practicalities of installation, testing and commissioning;
- Check the maturity of the technology and suppliers in the Australian market;
- Understand the cost to procure a grid connected BESS; and
- Viability of intended primary application of the battery storage, that is, as a tool to assist in deferral of zone substation construction.

3.1.3 Project Justification

Battery storage is approaching a price point that makes this technology a contender as an alternative network investment option. BESS have the potential to provide NPV positive returns when used for ZS construction deferral and will also provide a potential opportunity return, as the substations may be amalgamated, relocated or further deferred if load growth does not meet forecast levels.

It is in Endeavour Energy's interest to pilot grid connected storage to position the company to realise the benefits battery storage can provide such as peak shaving, reliability support, quality of supply improvement, and better understand the operational impacts of their application to our network.

West Dapto ZS, planned for construction in 2025, has been identified as a suitable location for the pilot. Pending successful testing of the BESS' peak lopping capability, the solution will remain onsite to alleviate demand growth in the West Lakes Illawarra development area and assist to defer West Dapto ZS construction.

3.1.4 Implementation Plan

The trial will be implemented as follows:

- Develop a functional specification documenting the requirements of the BESS for connection and operation on Endeavour Energy's network;
- Tender for a grid connected BESS with a minimum of 1MWh storage capacity, and 500kVA inverter, with a modular and transportable design;
- Following selection of the supplier, finalise design of the solution to meet the BESS functional requirements;
- Work with the supplier to construct and test the BESS;
- Connect and commission the BESS onsite at West Dapto; and
- Complete testing of the BESS functions.

3.1.5 Implementation Costs

Expenditure claim in FY20-21 is $50,633 in CAPEX covering engineering development and testing costs associated with the project. All expenses are accounted in work orders linked to the project.

3.1.6 Results

Endeavour Energy is currently still in the trialling phase of the BESS with the testing of the grid connection and islanding operation, with some functionality still in development. The key learnings from the trial to date are related to the significant nature of the challenges met in the implementation of such a project.

- Integration of the battery system (such as inverter, batteries, transformer, protection) capable of a high voltage connection is a significant task, even when components are understood and at manufacturing maturity.
- A functional specification was used for procurement of the BESS, this permitted vendors flexibility to nominate optimal design of the system.
- The BESS was designed with modular HV and LV containers. Fit out was completed in the workshop before relocation to site for commissioning. This demonstrated the potential to rapidly deploy or relocate the BESS to address network constraints.
- The size of the solution limits the range of workshop testing that can be performed, that is, due to reliance on generator supply and load banks. Grid connection is required to test the full range system capability.
- Existing internal and external standards are not designed for grid sized battery systems, and requirements that are appropriate for household systems are less appropriate for grid scale.
- The market is still emerging for grid battery energy storage technology. This has provided opportunities for innovation and customisation of the solution.
- Protection and Safety systems being implemented require considerable expertise from both battery, inverter and utility backgrounds to achieve an outcome that allows for a safe and reliable connection to the grid.
- Considerations relating to the use of the BESS for network support, and operational use of the BESS.
- Detailed understanding of the capacity and sizing requirements to network functions including islanding operation, peak shaving, and power factor support.
- Maintenance and support needs for the BESS.

The benefits of these key learnings from the battery system will be optimal for use as a deferral of network expenditure in locations where the growth of customers and loading is low and/or uncertain. An evaluation report will be completed at the end of the trial.

3.2 Digital Customer Engagement Platform

A Digital Customer Engagement Platform (DCEP) is a mobile application and web portal which Endeavour Energy will trial as a customer engagement and recruitment tool for multiple Demand Management (DM) programs. This project provides a non-network option by implementing DM programs as alternatives to network augmentation and to address network limitations where cost effective to do so.

The DCEP trial is marketed to residential customers as the "*Power*Savers" program and aims to provide opportunities for customers to employ one or more of the DM programs in their household, as well as provide real-time energy consumption data.

Specific programs target selected areas in our network that currently experience network constraints during peak loading times.

To encourage customers to participate, Endeavour Energy will offer the incentives of gift cards as rewards for meeting energy usage goals outlined by the program. These *Power*Savers programs will educate customers on how to effectively manage power usage and in turn, their impact on the Low Voltage (LV) network.

Through an Expression of Interest and Request for Proposal procurement process, GreenBe was identified as the successful supplier to provide software and services to develop a DCEP for Endeavour Energy to meet the trial's objectives.

3.2.1 Nature and Scope

The project scope includes:

- Engage a supplier for the provision of software and services to develop a DCEP (mobile app and web portal) for Endeavour Energy to meet the program objectives;
- Sign up 1,000 residential customers predominantly within the Penrith and Albion Park ZS supply areas;
- Segment participants into the following DM programs via the DCEP:
  - *PeakSaver – voluntary load curtailment program (for customers with smart meters);*
  - *CoolSaver – air conditioning control program;*
  - *Endeavour Energy SolarSaver – residential battery demand response (DR) program;*
  - *CommunitySaver – voluntary energy reduction program (for customers without smart meters); and*
  - *AtHomeSaver – energy saving challenges with tips and advice about managing energy use and reducing electricity bills.*
- Implement up to 15 DR events for the duration of the trial;
- Engage and communicate with participants;
- Provide consumption data to participants by integrating internal applications (Historian) to the DCEP;

- Conduct a customer survey at the end of the trial; and
- Prepare a project evaluation report at the end of the trial with the view of incorporating the learnings into future DM programs either internally or by using external service providers.

3.2.2 Aims and Expectations

Aims and expectations of the trial include:

- Determine the effectiveness of a DCEP including the customer facing mobile application and web portal, and a strategy for the ongoing use of the customer engagement platform for both DM and customer strategy;
- Further improving the network demand reduction delivered from residential customers using the customer facing application and the accompanying communication strategies;
- Finding the most effective communications modes and channels for each program;
- Gaining a further understanding of the most effective and preferred reward mechanism;
- Helping to develop a customer education strategy; and
- Finding the cost-effective means for implementing a DCEP.

3.2.3 Project Justification

A DCEP has the potential to transform the way we approach, communicate and engage customers. The use of a DCEP is an innovative way to engage customers and encourage participation in our programs.

This solution offers a cost-effective means of implementing residential DM programs and the communication needs for the company. The solution will not only test app-based engagement of our customers, but also digital recruitment methods to maximise participation in DM programs.

3.2.4 Implementation Plan

The trial was implemented as follows:

- Approval of business case in September 2019
- Release of RFP in September 2019
- Award contract to successful supplier in November 2019
- Finalise product design with supplier in December 2019
- Internal approval of marketing collateral in January 2020
- DCEP go-live in February 2020

- Secure involvement of partners (local councils, community groups) in July 2020
- Finalise baseline algorithm with supplier in October 2020
- Summer events launch in November 2020
- End of summer events on 31st March 2021
- Post-trial customer survey and analysis in May 2021

The trial commenced in FY19-20 and concluded on 30 June 2021.

3.2.5 Implementation Costs

Expenditure claim in FY20-21 is $483,011 in CAPEX covering the costs for engineering, data collection, access to the software platform and customer incentives associated with the project. All expenses are accounted in work orders linked to the project.

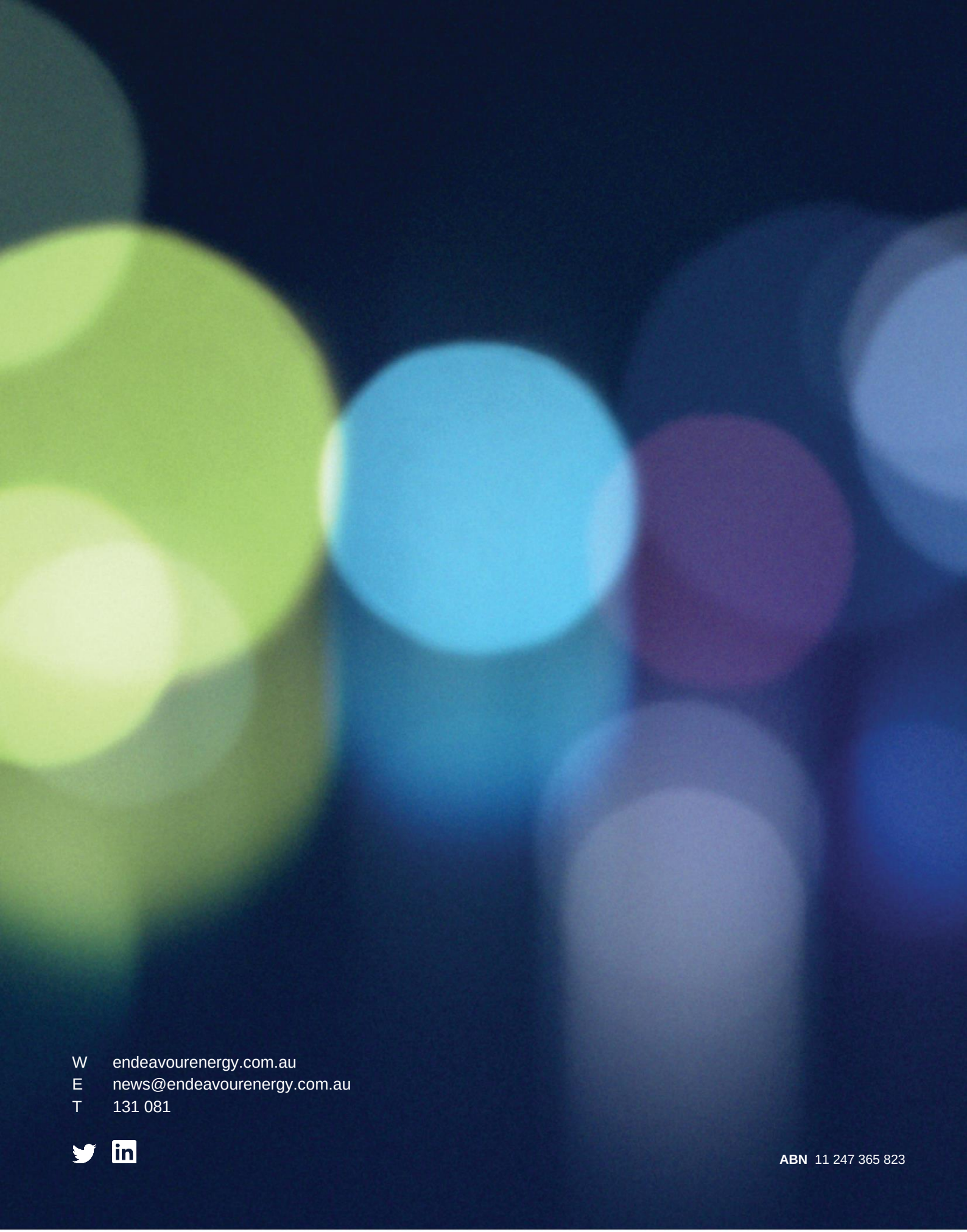
3.2.6 Results

An evaluation report will be completed by November 2021.

4.0 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
c. 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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