SP AusNet

Demand Management Innovation Allowance (DMIA) Annual Report 2012

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SP AusNet
A member of Singapore Power Group

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1 Introduction

This annual report has been prepared pursuant to the Demand Management Incentive Scheme (DMIS) scheme applied to SP AusNet by the AER in the 2011-15 Victorian Electricity Distribution Price Determination (the 2011-15 Price Determination). The Demand Management Incentive Scheme provides revenue designed to encourage innovation in demand side participation.

The DMIS requires SP AusNet to submit a report on expenditure attributed to the Demand Management Innovation Allowance (DMIA) for each regulatory year. This expenditure must fulfil the DMIA criteria set out in the DMIS.

This report details the projects undertaken by SP AusNet in the 2012 calendar year which satisfy the DMIA criteria.

2 Background to DMIA

In the 2011-15 Price Determination the AER approved a DMIA of $3 million for SP AusNet. The DMIA is provided as an ex-ante allowance in the form of $600,000 (nominal) of expenditure at the commencement of each year of the 2011-15 regulatory period. While it is provided on an annual basis, SP AusNet has the flexibility to select an expenditure profile over the period which suits its needs. The total amount of expenditure recoverable under the DMIA cannot exceed $3 million in total.

The expenditure recoverable under the DMIA must satisfy the following DMIA criteria:

1. Demand management projects or programs are measures undertaken by a DNSP to meet customer demand by shifting or reducing demand for standard control services through non-network alternatives, or the management of demand in some other way, rather than increasing supply through network augmentation.
2. Demand management projects or programs may be:
   (a) broad-based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs and/or
   (b) peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.
3. Demand management projects or programs may be innovative, designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms, including but not limited to new or original concepts.
4. Recoverable projects and programs may be tariff or non-tariff based.
5. Costs recovered under the DMIS:

(a) must not be recoverable under any other jurisdictional incentive scheme

(b) must not be recoverable under any other Commonwealth or State/Territory Government scheme and

(c) must not be included in forecast capital or operating expenditure approved in the distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination.

Expenditure under the DMIA can be in the nature of capital or operating expenditure. Capex made under the DMIA is likely to be treated as capital contributions and therefore not rolled into the regulatory asset base (RAB) at the start of the next regulatory control period. However the AER's decision on this will only be made as part of the next (2016-20) Victorian Electricity Distribution Price Determination.

3 DMIA Reporting Requirements

Under Section 3.1.4.1 of the, SP AusNet's DMIA annual report must include:

1. The total amount of the DMIA spent in the previous regulatory year, and how this amount has been calculated.
2. An explanation of each demand management project or program for which approval is sought, demonstrating compliance with the DMIA criteria detailed at section 3.1.3 with reference to:
   a. the nature and scope of each demand management project or program,
   b. the aims and expectations of each demand management project or program,
   c. the process by which each project or program was selected, including the business case for the project and consideration of any alternatives,
   d. how each project or program was/is to be implemented,
   e. the implementation costs of the project or program, and
   f. any identifiable benefits that have arisen from the project or program, including any off peak or peak demand reductions.
3. A statement signed by a director of the DNSP certifying that the costs of the demand management program:
   a. are not recoverable under any other jurisdictional incentive scheme,
   b. are not recoverable under any other state or Commonwealth government scheme, and
   c. are not 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.

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

4 Residential Battery Storage Trial

4.1 Project Overview

SP AusNet's Residential Battery Storage Trial will use stationary batteries connected to consumer homes to simulate the potential characteristics of a demand management (DM) enabled electric vehicle. The batteries can be remotely controlled by SP AusNet.

4.2 Nature and scope

This trial will deliver an integrated residential storage solution to ten customers, with five customers being provided with batteries only, and the other five provided with a combination of a battery and solar photovoltaic (PV) cells and their associated inverters, metering and energy management systems. The storage system will have internet connectivity so control signals can be sent to start charging or discharging and to retrieve measurement data. Data from the trial will be collected for a period of two years.

4.3 Aims and expectations

This trial will explore how battery storage at the residential level can be used for peak DM as well as developing key insights into how electric vehicles (EVs) may interact with the network in the future. Specifically over a two year trial period the project will endeavour to:

- Ascertain whether local storage can be used to flatten the network demand profile;
- Ascertain whether Solar PV / Storage combinations can be used to manage peak demand;
- Inform the potential effect of controlled/uncontrolled charging of electric vehicles;
- Inform the economic viability view of distributed storage as a means to manage peak demand and defer network asset investment; and
- Investigate the behaviour of solar PV systems and their contribution to network voltage management challenges.

4.4 Process of project selection

An emerging issue for industry is recognising the need to reduce and smooth peak demand given that peak demand is a key driver of augmentation capex. Methods to smooth peaks include offering time of use tariffs, utilising Demand Response Enabling Devices (DRED) and the use of battery storage technology.

Another issue that is predicted to emerge is the impact to the network that may be caused by a large scale uptake of electric vehicles. In order to effectively manage the network, utilities need to better understand this technology and the behaviours which it may drive.

The Residential Battery Storage Trial has been selected as it has the potential to address both of the above issues. The Residential Battery Storage Trial will assess the ability of residential batteries to effectively shift the peak demand to off peak periods and to simulate the impact of electric vehicles on the network by operating the residential battery in a similar manner to an electric vehicle.

4.5 Project implementation

The project rolled out a residential battery storage system into the field before the summer peak of 2012/13, followed by two customer installations per fortnight.

SP AusNet conducted a pre-approval inspection for site suitability for potential participants. To simplify the trial, participants who have premium feed in tariff (PFIT) or feed in tariff (FIT) contracts in place were not eligible.

4.6 Implementation costs

The approximate total cost of this project is $250,000 over 2 years (2012 and 2013).

Expenditure in 2012 amounts to $**148,760** (as provided in Annexure 1) and is a mixture of capital and operating expenditure. These costs are made up of:

- the accrued costs of the residential battery storage system (capex);
- contractor services for electrical works to install the systems (opex); and
- costs related to project management, data investigation and analysis and project implementation and monitoring (opex).

4.7 Benefits

The expected benefits of the project are to enable SP AusNet to:

1) Analyse the potential for deferred network augmentation through managing transformer and feeder peak demand. This can be measured by observing whether a battery is able to supply sufficient charge to limit the household peak demand.

2) Support the transition to smarter networks by studying how energy management solutions such as batteries and EVs can be integrated into the network for DM. This can be measured by observing the installation of the system at a household level. This benefit will be realised through future planning for storage and EV in the network.

3) Understand and test the use of domestic storage coupled to local renewable resources (solar PV, wind) and how it can assist to mitigate intermittency problems and thereby provide a DM facility that extends the usefulness of the solar PV into the domestic peak demand period.

5 Grid Energy Storage System (GESS) trial

5.1 Project Overview

In 2012 SP AusNet initiated a project to trial the use of a large battery storage system to manage the peak demand and at the same time to explore other benefits of storage systems to network management. This innovative technology, whilst not yet cost competitive, has the potential to provide demand levelling and voltage support services which could defer asset investment and improve the quality of supply to customers.

This project is to conduct the grid energy storage trial at Watsonia (feeder WT12). The findings of this trial will inform SP AusNet's asset management strategy in the future.

SP AusNet is claiming $40,000 of costs for this project as DMIA for 2012, and expects to incur further DMIA costs for this project when the system is purchased and placed into service.

5.2 Nature and scope

The project will install a large (1 MW / 1MWhr) battery system to support the peak load at Watsonia. It is expected that the trial will provide operational data to verify performance of the battery, inverter and the controller to support the grid for peak demand, voltage and power factor.

The system includes a 1MW diesel generator set to extend the MWh rating of the battery system to provide full coverage of the peak demand period. This has been done in order to keep the costs of the entire system down but to fully simulate a larger battery system. Battery prices are expected to decline in the medium term offering good potential for an efficient low emission solution for grid support.

Only the battery, inverter and the controller are claimed under the DMIA.

5.3 Aims and expectations

SP AusNet is exploring grid connected storage to manage network demand and to defer augmentation works until a clear demand growth trend emerges guaranteeing higher level of asset utilisation. Additional functions such as voltage support, power factor correction and phase imbalance will be explored to add to the benefits.

Ongoing development of batteries and smart controllers have made battery storage an attractive technical option. SP AusNet intends to get knowledge and experience in this technology by conducting this pilot at Watsonia. It is expected that if the trial is successful, the grid storage solution will have potential for wider deployment subject to the tipping point in the battery prices happening in the medium term.

5.4 Process of project selection

As part of its 2011-15 Electricity Distribution Price Review (EDPR) Proposal, SP AusNet proposed a trial of energy storage and distributed generation.

In 2012 SP AusNet conducted a feasibility study into such a trial in terms of the costs and the availability of the technology and suppliers. It was found that the technology is available and there is adequate experience and suppliers in the market for such a trial.

Six potential locations for the trial were selected-Euroa (BN1), Clyde North (CLN21), Ring Wood North (RWN26), Thomas Town (TT7), Watsonia (WT12) and Watsonia (WT13). These locations were evaluated based upon the peak demand (unserved energy), voltage support, islanding and the demand growth.

WT12 was chosen as a preferred location to conduct the trial for 3 years based upon the evaluation and also because it offered flexibility to conduct experimentation which is an important part of the trial. After the initial trial, it is expected that the system will be relocated to a more critical location.

5.5 Project implementation

It is planned that project commissioning will occur before the summer peak of 2013-14 and the units will continue operation and trialling until 2015-16.

5.6 Implementation costs

The total costs for the GESS trial are estimated to be around $5.2 million for the duration of the trial (2012-2016).

In 2012 the $40,000 of DMIA costs are related to:

- engineering costs for preparing functional specifications; and
- project management including budgetary enquiry, evaluation of offers and engagement with vendors.

5.7 Benefits

This project has progressed to the tendering stage now and will continue in 2013 for the procurement, delivery, testing and commissioning.

The expected benefits of the project when completed include:

- Peak demand support from the battery storage system;
- Improve the supply of electricity meeting code quality standards
- Improve network voltage stability during network disturbances including generator start-up and shutdown; and
- Power-factor correction, islanding and other power system functions by intelligent inverter control

6 Certification of costs

Appendix-1 of this report contains a statement signed by a director of SP AusNet confirming that the costs of the above demand management projects:

a. are not recoverable under any other jurisdictional incentive scheme,

b. are not recoverable under any other state or Commonwealth government scheme, and
c. are not included in the forecast capex or opex approved in the AER's distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination.

7 Developments in previous DMIS projects

The project to manage peak demand at Mallacoota (manage hot water peak) claimed against the DMIA in 2011 was completed in the same year and resulted in the net peak reduction of 0.5MW as reported. There are no further developments from this project to report.