Section 6 - Demand Management Incentive Scheme

Under the AER's Demand Management Incentive Scheme (DMIS)[6], in addition to the general annual revenue cap which Aurora is allowed to recover from customers in return for the provision of Tasmania's distribution network and network connection services, Aurora is permitted to recover a fixed amount of additional revenue – the Demand Management Innovation Allowance (DMIA) – as a contribution towards the cost of implementing non-network alternatives to network augmentation, or measures that shift or reduce the demand from customers for network and/or connection services.

As part of its response to the AER's RIN for 2012-13, Aurora is required to report any expenditure on demand management measures undertaken under the DMIS, and demonstrate how each project or program complies with the DMIA criteria[7] set out in the DMIS. This information will form the basis of the AER's assessment of Aurora's compliance with the DMIA criteria, and its entitlement to recover expenditure on those demand management initiatives under the DMIS.

Paragraph 6.1(a) - Provide an explanation of each demand management project or program for which approval is sought

1. **Modelling the amount of load associated with uncontrolled domestic hot water heating that may be shifted using Direct Load Control**

    - The contribution of uncontrolled electric domestic water heating to network peak demand in Tasmania is significant, ranging from 19 per cent – 30 per cent on weekday mornings and 16 per cent – 19 per cent on weekday evenings, as a percentage of the total domestic load.

    - The purpose of this project is the development of a *Hot Water Demand Evaluation Tool,* in order to provide the capability to accurately model and predict the extent of demand reduction (both by location and demographics) that might be achieved through the control of residential electric storage hot water systems, in order to defer network augmentation.

    - The tool will inform the design of a load management program for domestic hot water systems which achieves the maximum peak demand reductions possible whilst ensuring negligible impact on customer amenity.

2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**

    - The purpose of this project is to model an integrated non-network solution involving load management, energy storage, static voltage control and backup diesel generation, to address capacity constraints in a specific area of the distribution network (Bruny Island). The integrated solution will also be required to provide the capability to allow connection of renewable energy resources, such as wind and solar generation, to the network.

[6] Australian Energy Regulator, Demand Management Incentive Scheme (Aurora Energy) for the Regulatory control period commencing 1 July 2012, October 2010

[7] Australian Energy Regulator, Demand Management Incentive Scheme (Aurora Energy) for the Regulatory control period commencing 1 July 2012, Section 3.1.3, October 2010

3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**

    - This project entails the execution of a state-wide commercial and industrial (C&I) load survey to identify the characteristics of the principal C&I customers (and customer groups) connected to the distribution network. The survey will also identify the demand management potential which may be realised by C&I customers. The survey's findings will be used to determine the ultimate scope of the C&I demand management program and the benefits which could be realised from the program.

Section 6.1(b) – Compliance with DMIS section 3.1.3 criteria

Paragraph 6.1(b)(i) – Nature and scope of each demand management project or program

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted using Direct Load Control**

    This project involves three phases:

    - gathering consumption data by consumer class and undertaking technical analysis of domestic hot water heating characteristics;
    - building a model that estimates the expected demand reduction that can be achieved without inconveniencing customers; and
    - verifying performance of the model against consumer data.

2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**

    - The aim of this project is to develop an understanding of the technical feasibility of using an embedded micro-grid power system solution, utilising energy storage and standby diesel generation, to address network constraints in remote areas.
    - The research addresses issues such as frequency and voltage management (encompassing both operational and control strategies), which become more significant for hybrid micro-grid power systems in remote areas such as Bruny Island. The research also addresses issues including dynamic voltage and frequency control, along with small signal stability (i.e. the ability for the network to maintain synchronism under the occurrence of a disturbance). Consideration is also being given to the potential for increasing large-scale and small-scale solar penetration, and the resultant micro-grid coordination and control capabilities which may be required to manage such issues.

3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**

    - The scope of this project is to evaluate the total potential reduction in peak demand that could be achieved by engaging with C&I customers in the following categories:
        - commercial buildings that have a building management system (BMS) installed;
        - commercial buildings that have the potential to have a BMS installed; and

- industrial customers with discretionary loads, including an evaluation of the discretion that these customers may have to modify their peak demand.

Paragraph 6.1(b)(ii) – Aims and expectations of each demand management project or program

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted using Direct Load Control**

   - This project seeks to provide an efficient means of assessing investment in broad-based or specific area DLC programs to deliver network augmentation deferral through load curtailment.
   - Previous studies have shown that consumer engagement is very sensitive to the information being provided, and this project aims to provide factual, independently assessed, information in relation to the extent that consumers would be affected by a hot water DLC program.

2. **Research and modelling of the potential for battery storage & embedded generation to address a network constraint on Bruny Island**

The aim of this project is to model and optimise the operation of the following new systems on the island:

- An energy storage system (battery).
- An embedded diesel generator.
- Future demand side management capabilities (both residential and commercial).
- Potential for future solar generation of between 200 kW and 1,000 kW in size.
- Potential for future wind generation of between 200 kW and 1,000 kW in size.

Operational scenarios need to be developed to leverage the capabilities of these systems in order to effectively manage the island in the following modes:

- ***Import Mode:*** where the island is importing power from mainland Tasmania (system normal);
- ***Constrained Supply Mode:*** where one submarine cable is out of service;
- ***Islanded Mode:*** where no supply from the mainland is available to the island;
- ***Export Mode:*** where the island is exporting power to mainland Tasmania. This scenario could occur under a network support arrangement where any embedded or renewable generators on Bruny Island could assist in reducing existing constraints on the local distribution and transmission networks.

3. **Audit of the scope for peak demand reduction amongst commercial and industrial sector customers connected to the distribution network**

The aim of the project is to assist in the creation of a cost effective demand management program to:

- contract significant load reductions from C&I customers, as required; and

- contract the utilisation of embedded/standby generation owned by C&I customers for network support, as required.

Paragraph 6.1(b)(iii) – Process by which each demand management project or program was selected, including the business case for the demand management project and consideration of any alternatives.

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted using Direct Load Control**

   - This project came about through a lack of certainty within the Distribution Business about the demand reduction that might be achieved through the DLC of the large number of domestic electric hot water heating systems that are connected to the uncontrolled energy tariff.

   - To formulate a business case for the implementation of a DLC program for domestic hot water systems, the potential load reduction that might be achieved needs to be quantified. This includes assessment of both the level of the reduction in peak demand that is technically possible using DLC and, as part of a separate project, an assessment of the likely level of take-up by consumers.

   - Options considered included:

     - using existing industry 'norms' for assessment, many of which are based on summer based peak demand, and accept the resultant uncertainty; and

     - presume the level of control that customers would accept and risk consequent consumer dissatisfaction and disengagement.

2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**

   - To address constraints imposed by growing demand on Bruny Island and the need to replace ageing infrastructure, Aurora is investigating alternatives to replacement of one of the submarine cables serving the island.

   - Aurora has undertaken some preliminary research and evaluation of alternative non-network solutions and has concluded that, with the peak demand periods only occurring for a short period per year, the installation of embedded generation to initially manage the risk of ageing asset failure and defer the replacement of a submarine cable is significantly more cost effective than the other alternatives under consideration.

   - Uncertainty does exist regarding whether long term solutions to utilise non-network options, instead of eventual submarine cable replacement, are technically and financially feasible. This project looks at assessing the technical feasibility of the proposed non-network solutions.

3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**

   - C&I customers make a significant contribution to system peak demand.

   - Aurora currently lacks adequate information to develop a comprehensive C&I demand reduction program that takes into account:

- linkages to the technical trial of a Demand Response System for buildings with a BMS; and
- the factors that motivate C&I customers to participate in Demand Management programs and commit to managing their loads in response to notifications, and/or their willingness – with appropriate incentives – to accept Demand Management Control of their electrical loads.

Paragraph 6.1(b)(iv) – How each demand management project or program was/is to be implemented

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted though Direct Load Control**
   - The project has been implemented through a collaborative research project with the University of Tasmania.
2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**
   - The project has been implemented through a collaborative research project with the University of Tasmania.
3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**
   - This project is being implemented with the assistance of an external service provider to undertake customer audits and evaluate findings.

Paragraph 6.1(b)(v) – Implementation costs of the demand management project or program

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted though Direct Load Control**
   - This project was undertaken in 2012-13, with a total budget allocation of $100,000 (excluding GST).
2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**
   - This project is scheduled to be undertaken in 2012-14, with a total budget allocation of $100,000 (excluding GST).
3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**
   - This project is scheduled to run from May 2013 until December 2013, with a budgeted total cost of $180,000 (excluding GST).

Paragraph 6.1(b)(vi) – any identifiable benefits that have arisen from the demand management project or program, including any off peak or peak demand reductions

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted though Direct Load Control**

    - The level of available demand reduction available through the DLC of domestic hot water heating has been identified (for all areas across the state). The results of this analysis are being fed into an economic evaluation of associated DLC programs.

2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**

    - Demand has been successfully capped to within the nominal rating of the existing submarine cable during the Easter 2013 peak load period using a non-network solution.

3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**

    - The audit has not yet been completed, so there are no firm results to report at this time.

Paragraph 6.1(c) - Provide and overview of developments in relation to the demand management projects or programs completed in previous years (and any results to date).

- There have not been any demand management programs undertaken or completed in previous years.

Paragraph 6.1(d) - The costs associated with each demand management project or program identified in 6.1(a) are not:

- recoverable under any other jurisdictional incentive scheme;
- recoverable under any other Commonwealth/State Government Scheme;
- included as part of:
    - forecast capital expenditure or forecast operating expenditure; or
    - any other incentive scheme applied by the 2012-17 Distribution Determination.

Paragraph 6.1(e) – Provide the total amount of the Demand Management Innovation Allowance spent in the Current Regulatory Control Period, and how this amount has been calculated

The total expenditure in the Current Regulatory Period against the Demand Management Innovation Allowance is $137,117.

1. **Modelling the amount of load associated with uncontrolled hot water heating that may be shifted though Direct Load Control**

    - Budgeted opex cost for this project is $100,000.
    - Actual costs incurred for 2012-13 are $71,061.
    - Final project costs of $20,000 have been invoiced in 2013/14.

2. **Research and modelling of the potential for battery storage and embedded generation to address a network constraint on Bruny Island**

    - Budgeted opex cost for this project is $100,000.
    - Actual costs incurred for 2012-13 were $40,000.

3. **Audit of the scope for peak demand reduction amongst commercial and industrial customers connected to the distribution network**

    - Budgeted opex cost for this project is $180,000.
    - Actual costs incurred for 2012-13 were $26,056.