7. Demand Management Incentive Allowance

Under the AER's Demand Management Incentive Scheme (DMIS) , in addition to the general annual revenue cap which TasNetworks is allowed to recover from customers in return for the provision of Tasmania's distribution network and network connection services, TasNetworks 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 2013-14, TasNetworks 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 set out in the DMIS. This information will form the basis of the AER's assessment of TasNetworks' compliance with the DMIA criteria, and its entitlement to recover expenditure on those demand management initiatives under the DMIS.

7.1 Demand management projects or programmes for which approval is sought

Direct load control of uncontrolled hot water heating

The contribution of uncontrolled electric domestic water heating to network peak demand in Tasmania is significant. Ranging from 19% - 30% on weekday mornings and 16% - 19% 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 may be achieved through the control of residential electric storage hot water systems.

The tool shall assist in the design of a future load management program which achieves the maximum peak demand reductions whilst ensuring negligible impact on customer comfort levels.

Battery storage and embedded generation on Bruny Island

The purpose of this project was to research and model an integrated solution of load management, energy storage, static voltage control and backup diesel generation, to address a specific area of the distribution network (Bruny Island) that has limited capability to meet required service levels. The integrated solution provides capability to allow modelling the connection of renewable energy resources, such as wind and solar, to determine impacts on system performance.

Commercial and industrial peak demand reduction

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. This survey 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.

7.2 Explanatory material regarding demand management projects and programmes

TasNetworks notes the AER's advice that that the information provided below is intended to satisfy TasNetworks' annual reporting obligations for the purposes of paragraph 3.1.4.1 of the AER's *Demand management incentives scheme – Aurora Energy – Regulatory Control Period commencing 1 July 2012*, October 2010.

7.2(a)(i) Compliance with DMIS section 3.1.3 criteria

Direct load control of uncontrolled hot water heating

The development of a Hot Water Demand Evaluation Tool complies with the DMIA criteria detailed in section 3.1.3 of the demand management incentive scheme in that:

- the purpose of the project is to shift and/or reduce demand for standard control services through the management of demand, rather than increase supply through network augmentation;
- the project aims to reduce demand for standard control services across TasNetworks' distribution network, rather than at a specific point in the network, by targeting a reduction in the contribution to morning and evening peaks in demand from residential network users;
- the project is designed to build demand management capability and capacity by exploring a new and potentially efficient demand management mechanisms; and
- the cost of the project was not included in the forecast capital or operating expenditure approved in the 2012 Distribution Determination, and is not recoverable under any other jurisdictional incentive scheme or other State or Commonwealth Government schemes.

Battery storage and embedded generation on Bruny Island

The use of non-network solutions to address a constrained network area on Bruny Island complies with the DMIA criteria detailed in section 3.1.3 of the demand management incentive scheme in that:

- the project's objective is to address specific network constraints by reducing demand on the network at the location and time of the constraint using non-network alternatives, rather than increasing supply through network augmentation;
- the project is designed to build demand management capability and capacity by exploring new and efficient demand management mechanisms; and
- the costs associated with the project are not recoverable under any other jurisdictional incentive scheme or State or Commonwealth Government scheme, and were not be included in forecast capital or operating expenditure approved in the distribution determination for the current regulatory control period.

Commercial and industrial peak demand reduction

The program aimed at reducing peak demand amongst commercial and industrial customers connected to the distribution network is consistent with the DMIA criteria detailed in section 3.1.3 of the demand management incentive scheme in that:

- the purpose of the project is to shift and/or reduce demand for standard control services through the management of demand, rather than increase supply through network augmentation;
- the project is designed to build demand management capability and capacity by exploring new and potentially efficient demand management mechanisms;

- the project aims to reduce demand for standard control services across TasNetworks' distribution network, rather than at a specific point in the network, by targeting a reduction in the contribution to morning and evening peaks in demand from commercial customers; and
- the costs associated with the project are not recoverable under any other jurisdictional incentive scheme or State or Commonwealth Government scheme, and were not included in forecast capital or operating expenditure approved in the distribution determination for the current regulatory control period.

7.2(a)(ii) Nature and scope of demand management projects

Direct load control of uncontrolled hot water heating

The scope of this project is to:

- gather consumption data by consumer class, undertake technical analysis of domestic hot water heating characteristics and build a model that estimates the expected demand reduction that can be achieved without inconveniencing customers; and
- verify performance of the model against consumer data.

Battery storage and embedded generation on Bruny Island

The scope of this project is to develop an understanding of the technical feasibility of short and long term non-network solutions to addressing a constrained network area. An embedded micro-grid power system solution utilising Energy Storage and Standby Diesel Generation has been conceptually developed.

The research addresses issues such as:

- frequency and voltage management which become more significant for hybrid micro-grid power systems in remote areas such as Bruny Island (encompassing both operational and control strategies);
- dynamic voltage and frequency control along with small signal stability (the ability for the network to maintain synchronism under the occurrence of a disturbance); and
- 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.

Commercial and industrial peak demand reduction

The scope of this project is to:

- evaluate the total potential peak demand reduction 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;
  - industrial customers with discretionary loads, including an evaluation of the discretion that these customers may have to modify their peak demand; and
  - Determine realistic timeframes for engagement with customers

7.2(a)(iii) Project aims and expectations

Direct load control of uncontrolled hot water heating

This project seeks to provide an efficient means to assess investment in broad based or specific area DLC programs to deliver network augmentation deferral through load curtailment.

Studies undertaken have shown that consumer engagement is very sensitive to the information being provided; 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.

Battery storage and embedded generation 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 of future solar generation of 200kW – 1000kW in size; and
- potential of future wind generation of 200kW – 1000kW 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; and
- 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 & transmission networks.

Commercial and industrial peak demand reduction

To inform the design 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.

7.2(a)(iv) Project selection

Direct load control of uncontrolled hot water heating

This project came about through a lack of certainty within the distribution business as to the level of demand reduction that may be achieved through 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 to implement a DLC program for domestic hot water, the potential load reduction needed to be quantified. This includes assessment of both the level technically available and, as part of a separate project, assessing the level of consumer participation.

Options considered included:

- use 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.

Battery storage and embedded generation on Bruny Island

To address constraints imposed by the growing demand on the Island and the need to replace ageing infrastructure, TasNetworks is investigating alternate solutions to the network solution of replacement of one of the submarine cables serving the island.

TasNetworks has undertaken some preliminary research and evaluation of alternative non-network solutions and has concluded that, with the peak 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 network solution is significantly more cost effective.

Uncertainty does exist regarding whether long term solutions utilising alternative non-network options to manage the local network limitations and risks are technically and financially feasible.

This project was selected as a precursor to the implementation of a trial of battery storage technology combined with embedded generation. Prior to this project, Aurora Energy's (now TasNetworks) capability to model system performance was limited to static performance; it did not have the capability to model the dynamic performance of the localised distribution network. The modelling delivering the capability to assess the technical performance of the local distribution network under a range of operating scenarios. The system modelling will be used to specify the technical requirements for the proposed technology trial.

Commercial and industrial peak demand reduction

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

Aurora currently lacks adequate data to develop a comprehensive C&I demand reduction program that takes into account the following issues:

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

.2(a)(v) Project implementation

Direct load control of uncontrolled hot water heating

The project has been implemented through a collaborative research project with the University of Tasmania.

Battery storage and embedded generation on Bruny Island

The project has been implemented through a collaborative research project with the University of Tasmania.

Commercial and industrial peak demand reduction

This project was implemented with the assistance of an external service provider to undertake the audit and evaluate to findings.

7.2(a)(vi) Implementation costs

Direct load control of uncontrolled hot water heating

This project was scheduled to be undertaken in 2012-13 with a total budget allocation of $100,000 (excluding GST).

Battery storage and embedded generation on Bruny Island

This project was undertaken in 2012-14 with a total budget allocation of $100,000 (excluding GST).

Commercial and industrial peak demand reduction

This project is scheduled to run from May 2013 until December 2013 with a budgeted total cost of $180,000 (excluding GST).

7.2(a)(vi) Identifiable benefits

Direct load control of uncontrolled hot water heating

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 used to increase the accuracy of an economic evaluation of associated DLC programs.

Battery storage and embedded generation on Bruny Island

Demand has been successfully capped to within the nominal rating of the submarine cable during the Easter 2013 and 2014 peak load period using a non-network solution involving embedded diesel powered generation.

Commercial and industrial peak demand reduction

The audit has been completed.

The audit comprised interviewing 42 large C&I organisations with a total of 182 sites engaged in agriculture, manufacturing, mining, water gas and energy infrastructure, communications, retails stores, and other commercial operations across Tasmania. Based on analysis of the discussions, the total non-coincident load reduction capacity from the large C&I sector connected to the distribution network is estimated to be 38 MVA. Assuming a typical diversity factor of 80% for this sector, this DM capacity represents a potential 3% reduction in overall network winter coincident peak demand and a 20% reduction in the 148.5 MVA coincident winter peak demand from the large C&I sector.

This now forms the basis to undertake a series of local area based trials to validate the credible and cost effect level of DM available.

7.2(b)(i) Cost recovery under jurisdictional incentive schemes

7.2(b)(ii) Cost recovery under other Commonwealth or State Government schemes

7.2(b)(iii) Exclusion from approved capital and operating expenditure

The costs associated with the aforementioned DMIS/DMIA programmes are not:

(i) recoverable under any other jurisdictional incentive scheme;

(ii) recoverable under any other Commonwealth/State Government Scheme; or

(iii) included as part of the forecast capital expenditure or forecast operating expenditure included in the 2012-17 Distribution Determination or any other incentive scheme applied by the 2012-17 Distribution Determination.

7.2(c) DMIA spending in 2013-14

The total expenditure in the Current Regulatory Period attributable to the Demand Management Innovation Allowance is $186,834 (excluding amount of $90,952 invoiced in 2014-15).

Direct load control of uncontrolled hot water heating

Budgeted opex (excluding GST)	$100,000
Actual costs incurred for 2012-13	$71,061
Actual costs incurred for 2013-14	$20,000
Final total project costs	**$91,061**

Battery storage and embedded generation on Bruny Island

Budgeted opex (excluding GST)	$100,000
Actual costs incurred for 2012-13	$40,000
Actual costs incurred for 2013-14	$20,000
Final total project costs	**$60,000**

Commercial and industrial peak demand reduction

Budgeted opex (excluding GST)	$180,000
Actual costs incurred for 2012-13	$26,056
Actual costs incurred for 2013-14	$9,717
Project costs invoiced in 2014-15	$90,952
Final total project costs	**$126,725**