Demand Management Incentive Scheme

Power Factor Correction Project

2010-11

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1. Introduction

During the 2010-11 fiscal year, ActewAGL Distribution continued development work on the Power Factor Correction (PFC) project. ActewAGL Distribution further developed the strategy for targeting customers for the project and assessing their suitability for power factor correction based on their power consumption data. Additionally, ActewAGL Distribution commenced the development of equipment specifications. See Appendix A for details.

In June 2011, ActewAGL Distribution and TransGrid engaged in a collaboration agreement for innovative demand management. This agreement intends for both parties to co-operate, collaborate and invest in the development of demand management projects. Through this agreement, costs associated with the PFC project are to be shared equally between both ActewAGL Distribution and TransGrid.

2. Project Costs

The total amount spent on the PFC project during 2009 - 10 was $28,640 which was previously submitted to and approved by the AER.[1] For 2010-11, the total amount spent was $16,723.

Because of the retroactive nature of the collaborative agreement between ActewAGL Distribution and TransGrid, ActewAGL Distribution intends to claim $8,362 for approval under the 2010-11 DMIA. Additionally, ActewAGL Distribution may reduce its 2009-10 DMIA claim to $14,320 if TransGrid elects to contribute to half of the project costs for that year. This is currently under consideration by TransGrid.

The following table summarises project costs for 2009-10 and 2010-11.

Year	Project Costs	ActewAGL Distribution Contribution	TransGrid Contribution	Costs Claimed under DMIA	Potential Costs Claimed under DMIA
2009-10	$28,640	$28,640	*	$28,640	$14,320
2010-11	$16,723	$8,362	$8,362	$8,362	$8,362
Total	$45,413	$37,002	$8,362	$37,002	$22,682

*TransGrid has not, to date, contributed to the project costs for 2009-10. However, TransGrid may elect to contribute half of the project costs, or $14,320.

Costs incurred during 2010-11 are from direct labour and overhead costs associated primarily with two engineers over approximately two months. The calculation of costs is automatically tied to actual hours worked, gross earning and established overhead rates. This is based upon 325.05 actual hours worked at $50.54/ hour average rate inclusive of gross earnings and overheads.

3. Project Nature and Scope

[1] AER, November 2011, *ACT and NSW Electricity Distribution Network Service Providers Performance Report for 2009-10*, p. 52

The PFC Project is intended to reduce the reactive power consumption of large commercial customers whom record fifteen minute interval consumption data. Of these customers, ActewAGL Distribution will identify customers with power factors at peak load less than 0.9 whom are on network tariffs which include a demand component. ActewAGL Distribution will then determine, for each identified customer, suitable power factor correction equipment which, when installed, will reduce their demand tariff.

ActewAGL Distribution will define specifications for power factor correction equipment. The intention, at this point, is to develop wholesale contracts with multiple suppliers to reduce equipment costs. At least a portion of the equipment and installation cost will be funded by the customer. Financial subsidies may be provided to customers with longer payback periods; the threshold is yet to be established.

For each identified customer, ActewAGL Distribution will develop an individual communication regarding their consumption and compensation requirements. This communication will describe the demand component of the network tariff as well as the reactive compensation required to achieve a 0.9 power factor at peak load. The communication will also recommend the procurement and installation of appropriate power factor correction equipment and the associated cost estimates. Additionally, ActewAGL Distribution will communicate the respective demand tariff savings and payback period associated with the installation of the recommended power factor correction equipment.

4. Project Aims and Expectations

The primary objective of this project is to reduce the peak apparent demand of commercial feeders within the ActewAGL Distribution network. Preliminary modelling of the potential peak demand reduction was undertaken during the development phase of this project. This modelling indicates feeder peak demand reduction of 4 to 6 MVA is possible if the program enrols the identified 123 customers with the largest reactive compensation requirements.

The actual demand reduction will depend upon the customer participation rate. Including a financial subsidy for customers with longer payback periods may significantly increase the participation rate resulting in increased demand reduction.

In addition to increasing awareness of the identified customers, this program will also increase the awareness within ActewAGL Distribution. Implementation of this program will provide ActewAGL Distribution staff with knowledge that can be transferred immediately to the evaluation of other, existing customers. Additionally, this knowledge can be utilised during the evaluation of new customers. In this case, ActewAGL Distribution may implement a process to estimate the uncompensated peak load power factor of new developments and enforce compliance with the 0.9 power factor requirement prior to site commission.

As a result of this program, ActewAGL Distribution will gain valuable experience and knowledge of power factor correction equipment installation in existing premises.

5. Project Business Case

5.1 Option Selection Criteria

Four demand management project options were considered. Selection of the project was based on the following criteria:

1. Estimated cost;
2. Potential magnitude of the total demand reduction achieved within the $500,000 allocation; and
3. Permanency and reliability of the project.

5.2 Option 1: Power Factor Correction Equipment

This project concept includes the partial subsidisation of power factor correction equipment and installation for commercial customers where a benefit is identified.

This project assumes the full enrolment of 123 customers identified with the largest reactive compensation requirements. In this case, 4-6 MVA of feeder peak demand reduction may be possible. This project does provide a relatively permanent and reliable solution.

5. 3 Option 2: LED Replacements

This project concept includes the subsidised replacement of halogen down lights with LED alternatives. This project concept targets large commercial customers in an effort to maximize concentrated demand reduction.

Current costs of LED retrofit options indicate the cost of demand reduction is approximately $1750/ kW. Utilising the full $100,000/ annum allowance and assuming a 100% subsidy, the total demand reduction attainable is limited to 57 kW/ annum. The project does provide a relatively permanent and reliable solution.

5. 4 Option 3: Commercial Load Curtailment

This project concept includes monitoring and generation of a signal from the ActewAGL Distribution network to the Building Management System (BMS) of large commercial buildings to initiate a reduction in the load of that building for a determined period of time.

The estimated cost of the demand reduction via this project is relatively high at $260 to $540 per kVA. This cost is very difficult to estimate including the costs to enrol building owners/ managers and the ongoing costs associated with the interface. The total demand reduction is also very difficult to predict as the project is highly dependent upon building owner/ manager participation. As there is very minimal financial benefit and several dis-benefits to building owners/ managers, there is concern that the participation rate may be low. While a robust interface may provide sufficient reliability, the demand reduction associated with this project is deemed temporary.

5.5 Option 4: Residential Interval Meters

This project concept includes the subsidised installation of interval meters in residential premises to facilitate customer transition to a time of use (TOU) network tariff. The transition to a TOU network tariff increases customer awareness and provides financial incentive to customers to reduce consumption during peak times.

At a cost of $150 per meter for equipment and installation, approximately 666 meters could be subsidised within this project. The total demand reduction, however, is difficult to predict. Because large customers with consumption > 100MWh per annum are currently required to have TOU meters installed, this project targets residential customers only. Therefore, this project does not address the

commercial peak demand which presents greater and more localised peak loads. Additionally, the permanency and reliability of peak demand reduction associated with this project is difficult to predict.

5.6 Selected Option

The PFC Project is determined the most suitable option. The PFC Project has the best potential cost per kVA of network demand reduction in comparison with the other project options. Therefore, the PFC Project has the highest likelihood of producing a noticeable demand reduction. All project concepts were developed based upon cost allocation of the $100,000 per year allowance. With this fixed funding, each project was considered with respect to the total potential demand reduction. In this case, the PFC Project was deemed the most suitable option. The PFC Project provides a permanent and reliable solution, assuming minimal ongoing equipment monitoring and maintenance by the customer.

In addition to the selection criteria, the PFC Project provides the following advantages over the other project concepts:

- The magnitude of the demand reduction is predictable.
- The likelihood of achieving a noticeable demand reduction is high.
- There is minimal impact to customer operation.
- The project can be managed with minimal administration.

6. Project Implementation Plan

Implementation of the PFC Project is simplified into the following steps:

1. Identify customers suitable for the project.
2. Compile detailed information on the real, reactive and apparent power consumptions of each identified customer.
3. From the load profiles, estimate the required reactive compensation magnitude, associated peak apparent power demand reduction and the corresponding savings on the demand tariff associated with the network component of the customer's bill.
4. From the cumulative estimates, determine a payback period threshold, for example 2.5 years, where a financial subsidy will be offered.
5. Initiate a tender process to establish wholesale contracts via multiple suppliers for PFC equipment procurement.
6. Develop individual communications for all identified customers. Inform customers of their obligations regarding compensation requirements. Inform customers of their respective demand tariff savings and payback period associated with the installation of the recommended PFC equipment.

7. Project Implementation Costs

The project scope and delivery is based upon the fixed cost allocation of $200,000/ annum or $1,000,000 total. This includes the DMIA contributions from both ActewAGL Distribution and TransGrid. Project costs include the following components:

1. ActewAGL Distribution project management
2. Equipment/ installation subsidies to customers.

Project management and data processing are estimated at approximately $100,000. Of this, $37,002 is being submitted by ActewAGL Distribution for the 2009-2010 and 2010-2011 financial years as discussed in Section 2, Project Costs. Also, as discussed in Section 2, ActewAGL Distribution may reduce its 2009-10 DMIA claim to $14,320, pending determination of TransGrid.

Remaining funding under the DMIA is intended to provide additional project management costs incurred during 2011-12 as well as equipment/ installation subsidies to selected customers. This allocation will provide financial incentive to identified customers and, in some cases, reduce the customer payback period.

8. Identifiable Benefits

Since developing the project concepts, no identifiable benefits have been achieved. The project has not yet entered the implementation phase.

9. Completed Projects Overview

No projects have been completed under this scheme.

10. DMIA Assessment

In accordance with the DMIS, ActewAGL Distribution confirms this project fulfils the DMIA criteria as below.[2] ActewAGL Distribution's assessment of the 2010-11 DMIA expenditure is consistent with the AER's assessment of the 2009-10 DMIA expenditure.[3]

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 other management of demand in some other way rather than increasing supply through network augmentation.

ActewAGL Distribution's PFC project will reduce peak apparent demand on commercial feeders thereby reducing demand for standard control services through non-network alternatives.

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

[2] AER, November, 2008, *Demand management incentive scheme for the ACT and NSW 2009 distribution determinations*, p. 4
[3] AER, November 2011, *ACT and NSW Electricity Distribution Network Service Providers Performance Report for 2009-10*, p. 53

network users, such as residential or commercial customers, and may include energy efficiency programs, and/ or (b) peak demand projects or programs - which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.

ActewAGL Distriubtion's PFC project is a broad based demand management project targeting commercial customers.

3. Demand management projects or programs may be innovative, and designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms, including but not limited to new or original concepts.

ActewAGL Distribution's PFC project explores potentially efficient demand management mechanisms in terms of power factor correction equipment installation in existing premises.

4. Recoverable projects and programs may be tariff or non-tariff based.

ActewAGL Distribution's PFC project is tariff based.

5. Costs recovered under this scheme: (a) must not be recoverable under any other jurisdictional incentive scheme; (b) must not be recoverable under any other state or Australian Government scheme; (c) must not be included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

Costs recovered under this scheme are not recoverable under any other jurisdictional incentive scheme; are not recoverable under any other state or Australian Government scheme; and are not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

6. Expenditure under the DMIA can be in the nature of capex or opex.

ActewAGL's DMIA expenditure for the PFC project is opex.

Appendix A

Customer targeting and data modelling strategy

Continuing work carried out during the 2009/10 fiscal year, a strategy was developed for targeting customers and assessing their suitability for the PFC project based on their power consumption data. This strategy consisted of the following key steps:

1. Customer identification
2. Ideal reactive compensation calculations
3. Customer suitability evaluation
4. Incentive structure determination

A summary of each step, including the current status of each step, is provided below.

Step 1: Customer identification

This step is complete.

All ActewAGL Distribution customers with the following profile were considered for the project:

- On a network tariff that incorporates a maximum demand (kVA) component.
- Have a power factor of less than 0.9 at peak annual load.
- Require more than 50kVAr compensation to improve their power factor at peak yearly load to 0.95.

Step 2: Ideal reactive compensation calculations

This step is in-progress.

For each applicable customer, consumption data from 1 July 2010 to 30 June 2011 will be extracted from ActewAGL Distribution's interval metering database. A macro will be developed to estimate the ideal reactive compensation magnitude and predicted payback period (for PFC equipment installation) for each customer based on this metering data.

Step 3: Customer suitability evaluation

This step is in-progress.

Using the results of step 2, evaluation will be undertaken to determine the suitability of each originally targeted customer. Customers identified with low overall kVA reduction, long payback periods or inconsistent loads are to be removed from the targeted customer list.

Step 4: Incentive structure determination

This step is in-process.

Two solutions for the customer incentive structure were proposed based on the expected payback periods for each remaining customer: the first being a flat incentive amount for all customers and the second being an incentive amount that would reduce the predicted payback period of each customer to a certain time period (e.g. 2.5 years).

PFC equipment specification development

To ensure the integrity of ActewAGL Distribution's network, a complete technical specification is required for PFC equipment to be installed on customer premises. The specification will be used to compile a list of preferred suppliers which will assist customers to identify sources of technically compliant PFC equipment. Drafting of the specification commenced in 2010-11, with relevant Australian and IEC standards used as the basis for development. Completion of the specification, including peer review, is expected during the 2011-12 financial year.