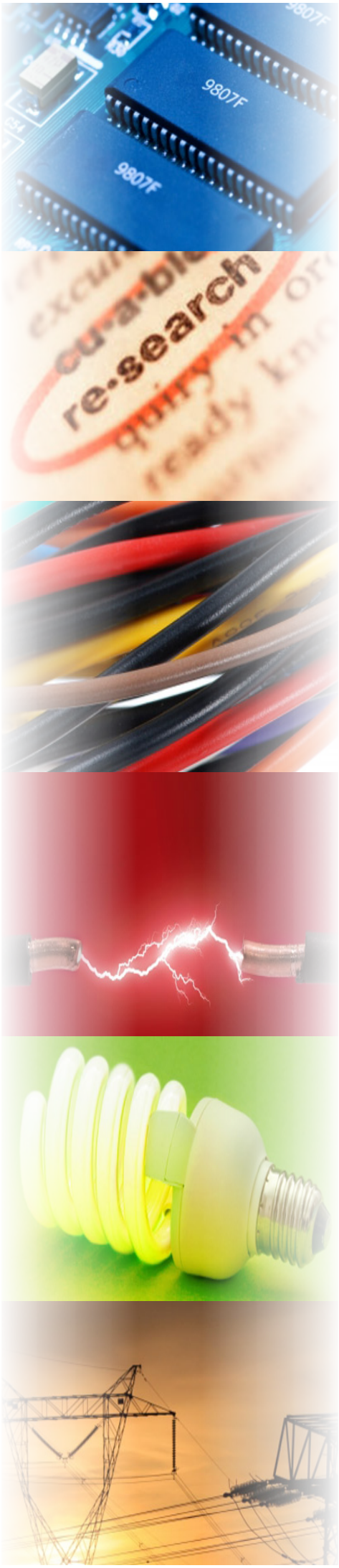

AUSTRALIAN ALLIANCE TO SAVE ENERGY

Creating an Energy-Efficient Australia

REPORT OF THE 2010 SURVEY OF ELECTRICITY NETWORK DEMAND MANAGEMENT IN AUSTRALIA

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Report #1 of the Australian Alliance to Save Energy Research Project

Scaling the Peaks: Demand Management and Electricity Networks

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energetics

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ENERGY FUTURES AUSTRALIA

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The Australian Alliance to Save Energy (A2SE) is a not-for-profit coalition of prominent business, government, environmental, and consumer leaders that has come together to raise the profile of energy efficiency and to ensure that the best possible information on energy efficiency finds its way into the hands of decision makers. The A2SE's work addresses research, awareness and policy issues relating to the reduction of all wasteful and non-productive uses of energy across the Australian economy.

DISCLAIMER

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ABBREVIATIONS

A2SE	Australian Alliance to Save Energy
DG	Distributed Generation
DM	Demand Management
EE	Energy Efficiency
ISF	Institute for Sustainable Futures
LM	Load Management
NSP	Network Service Provider

EXECUTIVE SUMMARY

This report presents findings on the first systematic national survey of Demand Management (DM) undertaken by electricity network service providers in Australia, the Survey of Energy Network Demand Management in Australia (SENDMA).

It should be recognised that the level of uptake of DM depends in part on the incentives and support for network DM both through economic regulation of the network businesses and through other policy instruments. The nature of the market in each state / territory, be they vertically integrated, disaggregated, government owned or privatized, also influences levels of DM implementation.

This report is intended to offer a template for future annual surveys.

MAJOR FINDINGS

A total of 115 DM projects were implemented and reported by 19 Network Service Providers (NSPs) for the three financial years of 2008/09, 2009/10 and 2010/11. The DM projects reported in 08/09 resulted in 328 GWh of energy savings. This energy savings is equivalent to about 0.16% of Australia's energy usage in the same year (204,301 GWh in 08/09).[1] In 2010/11, the total expected energy savings from DM projects has dropped to 51 GWh, which is 0.02% of the expected energy use for Australia in 10/11 (221,753 GWh).

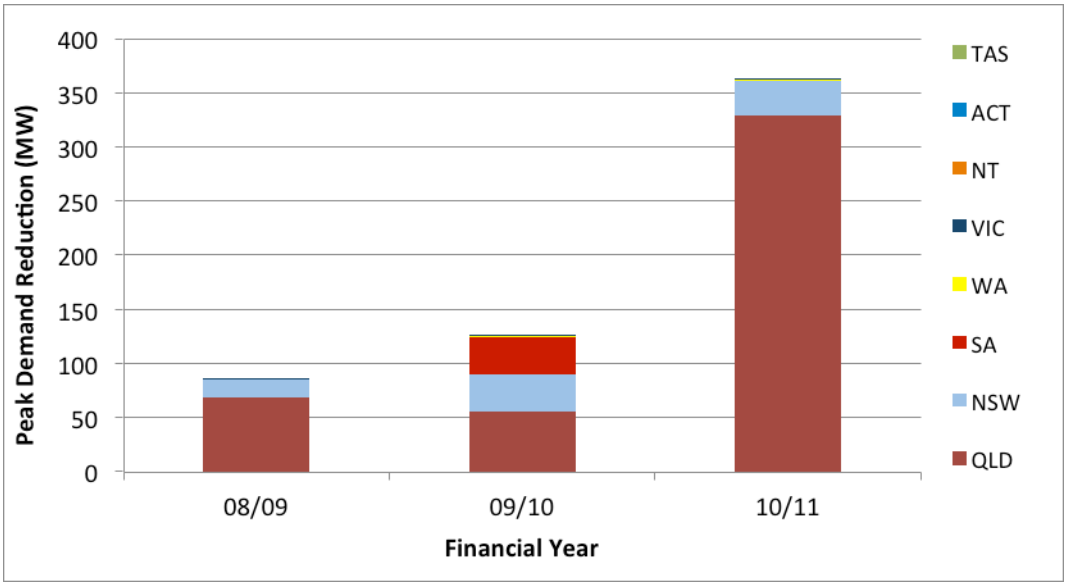
In 08/09, the peak demand reductions reported by Australian NSPs totaled 86 MW, which equates to 0.2% of Australia's total summer peak demand of 42,600 MW in 08/09. In contrast to energy, the expected peak demand reduction from DM will increase in 10/11 to 367 MW and will provide an estimated 0.8% of the total peak demand for Australia in 10/11 (44,281 MW).

By comparison, the United States Energy Information Agency (EIA) collects similar data on a state-by-state basis in their Electric Power Annual (DOE, 2009). Summer peak demand in the mainland US (excluding Alaska and Hawaii) was 726 GW in 2009. The summer peak demand reductions by DM were 31.7 GW, representing 4.4% of their summer peak. Note however that these DM reductions include contributions by retailers and integrated utilities.

As shown below in Graph 1, peak demand reduction varies across the states and territories, with the greatest contribution coming from Queensland and New South Wales.

[1] All totalled energy usage and peak demand for Australia and its states and territories is derived from Electricity Gas Australia 2010 (ESAA, 2010).

Graph 1. Peak demand (MW) reduction by state and territory



Queensland's estimated peak demand reduction for 10/11 is the largest contribution to peak demand reduction reported by any state for the three-year period of the survey (328 MW, 90.4% in 10/11), with estimates also for New South Wales (32 MW, 8.9%), Victoria (1.4 MW, 0.4%) and Western Australia (0.9 MW, 0.3%). South Australia only reported peak demand reduction in 09/10, of 34MW.

As shown in Table 1, the DM peak demand reductions reported in each state and territory for 08/09 provided up to 0.8% of the individual demand for each state and territory.

Table 1. Peak demand reduction compared to total state demand in 08/09

State	Reported peak demand reduction (MW)	State total peak (GW)	% of state total met by DM
Queensland	69	8.8	0.8%
New South Wales	16	14.5*	0.1%*
South Australia	(no reductions in 08/09)	3.49	0%
Victoria	0.95	10.5	0.01%
Western Australia	(no reductions in 08/09)	3.52	0%

*Total and percentage for NSW/ACT summer peak demand

The Australian Capital Territory, the Northern Territory and Tasmania had no reported peak demand reductions for the three-year period of the survey.

As summarised in Table 2, the DM energy savings in 08/09 provided up to 0.46% of the individual state and territory demands.

Table 2. Energy savings compared to total state consumption in 08/09

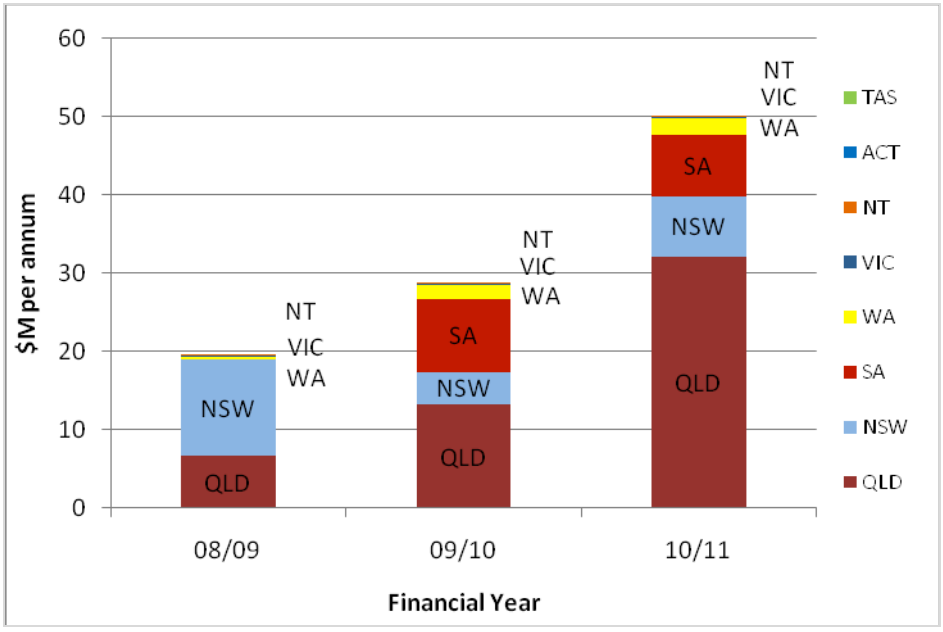
State	Reported energy savings (GWh)	State total consumption (TWh)	% of state total met by DM
New South Wales	328	71.7*	0.46%*
Queensland	0.45	47.4	0.001%
South Australia	(no savings in 08/09)	12.9	0%
Western Australia	(no savings in 08/09)	12.9	0%
Victoria	(no savings in 08/09)	44.2	0%

*Total and percentage for NSW/ACT summer peak demand

The Australian Capital Territory, the Northern Territory and Tasmania had no reported energy savings from demand management projects for the three-year period of the survey.

Expenditure also varies across the states and territories. Graph 2 shows the largest expenditures were reported by NSPs in Queensland, New South Wales and South Australia.

Graph 2. DM expenditure ($Million) by state



There were 12 of the 115 projects that reported both expenditure and financial savings. The total reported expenditure over the three reporting years for these 12 projects was $22.2M and the total reported savings was $57.2M over the same period (using a discount rate of 10% as per the AER Decisions on Cost of Capital), representing an average cost benefit ratio of 0.39.

The average reported expenditure over the three reported years was $32.4M, and equivalent to approximately 0.4% of annual electricity network capital expenditure in Australia of $9 billion per annum.

While the survey was intended to provide a comprehensive picture of DM undertaken by electricity businesses in Australia, there are several limitations including:

1. The survey does not cover all type types of DM in the Australian electricity sector. For example, DM projects established by electricity retailers or the Australian Energy Market Operator (AEMO) for system reliability purposes have not been captured by this survey.

2. The separation of functions within the electricity supply over the past two decades means that some still existing DM measures established prior to this separation are not captured. For example, there are thousands of megawatts of load management delivered though residential off peak hot water programs that have not been captured[2].

3. Network businesses do not have complete data, or even estimates, for all the DM activity they are currently running. For example, the energy savings or peak demand reduction attributable to Time of Use tariffs was not fully quantified.

4. Each NSP reported data differently, and so aggregated data may not give a true indication of the scale of the projects that have been undertaken to date. It is hoped that, should this survey become an annual event, more comparable data will be available on each reported project.

While the above limitations mean that this survey does not provide a comprehensive overview of electricity network DM, they also underline the importance of the survey both in collecting available data and in identifying gaps in our understanding of both current practice and potential for DM in Australia. As the emphasis on DM gains momentum in Australia, the need for regular and reliable data collection and reporting on DM activity increases.

[2] Information derived from the Clean Energy Council website:
http://www.cleanenergycouncil.org.au/cec/technologies/solarwaterheater.html
and LPG Australia as quoted in the Gas Today website:
http://gastoday.com.au/news/gas_boosting_solar_hot_water/000175/

1 INTRODUCTION

Demand Management (DM) has been an important part of the electricity supply industry in Australia for more than 70 years. For example, residential off peak water heating has been available in Victoria since the early 1930's.[3] A renewed interest in Demand Management in Australia emerged in the mid 1980's, driven in part by concerns about the high cost and related impacts of new electricity supply infrastructure and in part by the emerging issue of "the Greenhouse Effect". For example, the Board of the State Electricity Commission of Victoria adopted a series of interim targets for DM and in 1989 committed to a $55 million Demand Management Action Plan. However, the momentum for greater DM was largely lost amid the focus on competitive reform and privatization of the industry in the 1990's and 2000's. In recent years, there has a been a resurgence of interest in DM, particularly in Queensland and New South Wales, again driven by concerns about the impacts of new electricity supply infrastructure (in particular network investment) on electricity prices and increasing concerns about climate change and the need to find low cost responses to it.

One possible reason for the stop/start nature of DM development throughout this period is that there has never been a comprehensive and consistent approach to measuring and reporting the performance of DM initiatives and the potential of DM to meet consumers' needs. This absence of measuring and reporting has impeded the capacity of utilities to learn from each other and the capacity of regulators and policy makers to design incentives to support DM activity.

In order to address this gap the Australian Alliance to Save Energy (A2SE) has contracted a consortium of organisations, including Energetics, Climate Works, Institute for Sustainable Futures (ISF) and Energy Futures Australia, to carry out a study on the role of energy efficiency and demand management in energy network planning. This study is considering the network investment currently being planned by the energy industry, the planned national trajectory for reducing emissions, and the opportunity to reduce both the required investment and emissions through implementing energy efficiency (EE) improvements, load management (LM) and distributed generation (DG).

The wider study is also investigating best practices for DM globally and the rationale for making DM the preferred investment option for the energy supply industry, including an examination of the risks of investing in stranded assets and the cost/benefits of investing in DM compared to current supply investments. The study will produce clear and specific recommended changes to the regulation relating to the Australian electricity supply industry.

This report contributes to the larger study by presenting original, comprehensive research and analysis on the level of investment in, and effectiveness of, DM.

This report covers the process and results of the Survey of Energy Network Demand Management in Australia (SENDMA). The purpose of the SENDMA is to create, as far as practically possible, a nationally consistent and comprehensive picture of current DM activity by Australian network businesses.

It is expected that this information will be valuable for electricity customers, DM service providers, policy makers and electricity network businesses themselves.

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[3] Joint SECV/DITR Demand Management Project Team (Dec 1989), Demand Management Development Program, 3 year Demand Management Action Plan, Information Paper No. 5, (available at: http://www.efa.com.au/Library/SECVDMActionPlan.pdf) p.5.

2 SURVEY METHODOLOGY

The purpose of the Survey of Energy Network Demand Management in Australia (SENDMA) is to create, as far as practically possible, a nationally consistent and comprehensive picture of current DM activity by Australian network businesses. To this end, ISF initially developed the scope of the SENDMA in collaboration with project partners and A2SE to include the following survey elements:

- Data for the previous two and the current financial years on the expenditure for DM, i.e. DM initiatives in place during 08/09 and 09/10 and plans for 10/11;
- The resulting value of savings for customers and avoided network expenditure;
- The resulting energy and demand outcomes in MWh and kW; and
- Responses from the major electricity distribution and transmission network service providers (NSPs), but not electricity retailers.

For the purposes of this study, DM is defined as "any action undertaken by the supplier of the good or service to influence the timing or overall demand by consumers, as an alternative to supplying that good or service", in particularly for energy. In the context of this research, DM includes peak load management, end use energy efficiency, distributed generation and Time of Use meters, as defined in Table 3 below.

Table 3. Definition of Demand Management

Load Management (LM)	Includes, but is not limited to direct load control, demand response, interruptible loads, load shifting, power factor correction (in customer premises, but not within the network), fuel substitution and integrated DM projects (including elements of LM, EE, DG and ToU)
Energy Efficiency (EE)	Primarily refers to end-use efficiency, e.g. delivering equal or greater levels of "energy services" with less energy supply: cooling, heating, lighting, driving motors, operating equipment and appliances, etc.
Distributed Generation (DG)	Refers to energy generators embedded within the network, typically less than 30MW, and includes, but is not limited to, solar photovoltaics, wind, small scale hydroelectric, biomass/biogas, cogeneration, trigeneration, diesel, fuel cells and standby generation.
Time of Use (ToU) Meters	These are meters that include functions to measure energy at its time of use, where data are either manually or electronically retrieved. Time of Use Tariffs are tariffs that use this time-of-use data for billing purposes, usually with the aim of influencing behaviour in regards to energy use.

In order to develop a survey that synergized with current data requirements of Australian NSPs, ISF completed a review of DM regulations applied by the relevant economic regulator and portfolio agencies in each jurisdiction across Australia and the relationship to the performance survey outlined above. This included a review of tools and instruments such as the New South Wales and Western Australian D-Factors, the DM Innovation Allowance in Victoria, South Australia, Queensland and New South Wales, the Queensland Government's Energy Conservation and Demand Management Program and the Energy Efficiency schemes such as the New South Wales Energy Savings Scheme, the South Australian Residential Energy Efficiency Scheme and the Victorian Energy Efficiency Target.

ISF also reviewed international precedents for DM surveys of electricity service providers, including the US Department of Energy's Annual Electric Power Industry Survey and Report (US DOE 08).

A draft SENDMA was then developed based on the survey elements mentioned above, the review of DM regulations in Australia and a review of international DM survey precedents. The draft SENDMA was distributed to the A2SE Steering Committee, project partners and three NSPs with a request for feedback on the survey format and content. Feedback was received from all parties and was addressed in the final version of the survey (see Appendix 1).

After the SENDMA survey was finalized and ethics had been approved, [4] ISF contacted each electricity network service provider to confirm the most appropriate contact to receive the survey. ISF attempted to have an initial phone conversation with each appropriate contact, before distributing the cover letter and survey to the NSPs. The following electricity NSPs received the SENDMA survey.

Table 4. NSPs that received and responded to the SENDMA survey

Company	State	Response received
ActewAGL	ACT	Yes
Aurora Energy	TAS	*No*
Citipower	VIC	Yes
Country Energy	NSW	Yes
Electranet Pty Ltd	SA	Yes
Energex	QLD	Yes
Energy Australia	NSW	Yes
Ergon Energy	QLD	Yes
ETSA Utilities	SA	Yes (09/10 only)
Horizon Power	WA	Yes
Integral Energy	NSW	Yes
Jemena	VIC	Yes
Power and Water Corporation	NT	Yes
Powercor Australia	VIC	Yes
Powerlink Queensland	QLD	Yes
SP AusNet	VIC	Yes
Transend Networks	TAS	Yes
TransGrid	NSW	Yes
United Energy Distribution	VIC	Yes
Western Power	WA	Yes

The SENDMA survey was circulated mid-November 2010 and ISF received the majority of responses by the end of 2010. ISF researchers were available during this response period to answer questions or support NSPs with data entry.

[4] As a research institute within the University of Technology Sydney, ISF is committed to conducting research in accordance with ethical principles. ISF therefore filed for and received approval to conduct this survey from the UTS Human Research Ethics Committee based on an adherence to the ISF Code of Ethics. The Code of Ethics were followed throughout this research project, including informed consent, privacy and anonymity, and confidentiality for respondents unless consent has been given. For example, the DM data from network service providers is included in this report but no individuals are identified (except with the specific written approval of the individual and organisation concerned).

Data analysis from the SENDMA survey is presented below. It is important to remember that NSPs are at different stages in their DM rollout, and so each organisation was not able to complete every section of the survey at this time. However, the aim of the survey is to set a baseline and to gather data annually (as is done in the US), so accordingly the format of the survey may change in future.

Based on the data received from the SENDMA survey, the following results are presented in the sections below:

- Overview of the data collected
- Energy savings by type, sector and state
- Demand reductions by type, sector and state
- Emissions reductions by DM type, sector and state
- Expenditure on DM projects
- Cost effectiveness by type and sector

3 OVERVIEW OF SURVEY DATA

3.1 ABOUT THE RESPONDING ORGANISATIONS

There are currently 20 Transmission and Distribution Network Service Providers (NSPs) in Australia's states and territories, all of which were contacted to contribute to this survey. Written responses were submitted by 19 NSPs.

The NSPs ranged widely in size (i.e. number of employees). The smallest NSP is in the 100-500 employee range, and the largest is in the 5,000-10,000 employee range. The number of Full Time Equivalent (FTE) staff working on DM within each NSP also varied from six NSPs reporting no staff dedicated to DM to two NSPs reporting a DM team of over 40 FTE staff.

Table 5. Number of full time equivalent (FTE) staff working on DM

Size range of FTE staff dedicated to DM	Number of NSPs
0 FTE	6
1 - 5 FTE	8
11 - 20 FTE	3
> 20 FTE	2 (reported over 40 FTE)

Of the 19 respondents, 16 had DM data to report, three of which had data in all four sections of the survey: Load Management, Energy Efficiency, Distributed Generation and Time of Use (See "Appendix B. Summary of respondent data" for complete summary of data submitted).

3.2 STATE REPRESENTATION

The NSPs in seven of the eight states and territories reported projects within their service areas. Table 6 summarizes the number of responding NSPs and the number of reported projects by state.

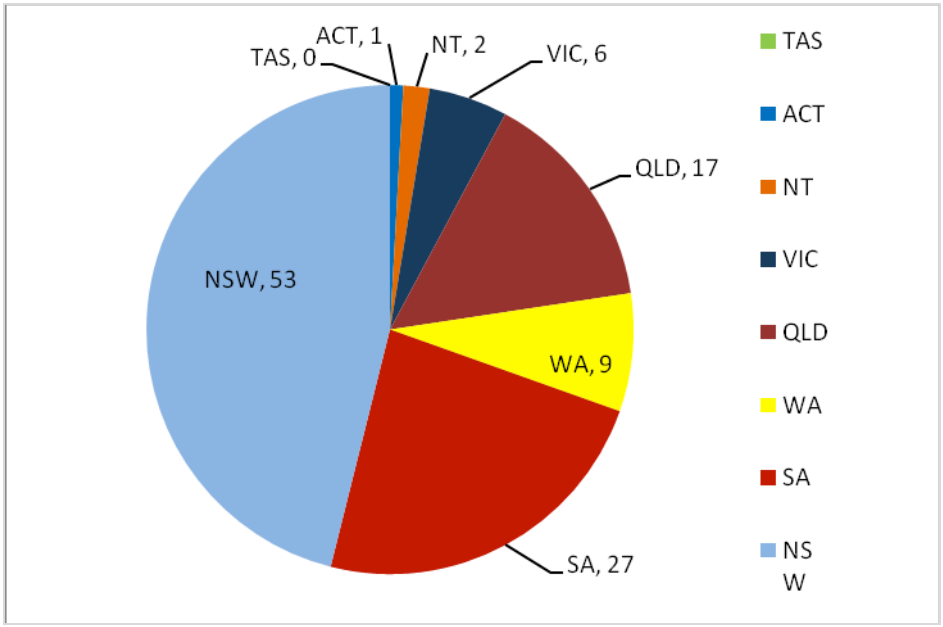
Table 6. Number of respondents and projects by state

State	Respondents per state	Total potential respondents	Projects (LM, EE, DG)*
Australian Capital Territory	1	1	1
New South Wales	4	4	53
Northern Territory	1	1	2
Queensland	3	3	17
South Australia	2	2	27
Tasmania	1	2	0
Victoria	5	5	6
Western Australia	2	2	9
Total	**19**	**20**	**115**

*Time of Use Tariffs were excluded from this summary as no data was reported on the energy or demand impacts of these measures (except, however, where specifically mentioned in an LM project).

The NSPs in New South Wales reported 53 projects (46%), followed by those in South Australia (27, 23%), Queensland (17, 15%) and Western Australia (9, 8%).

Graph 3. Number of LM, EE, DG projects by state



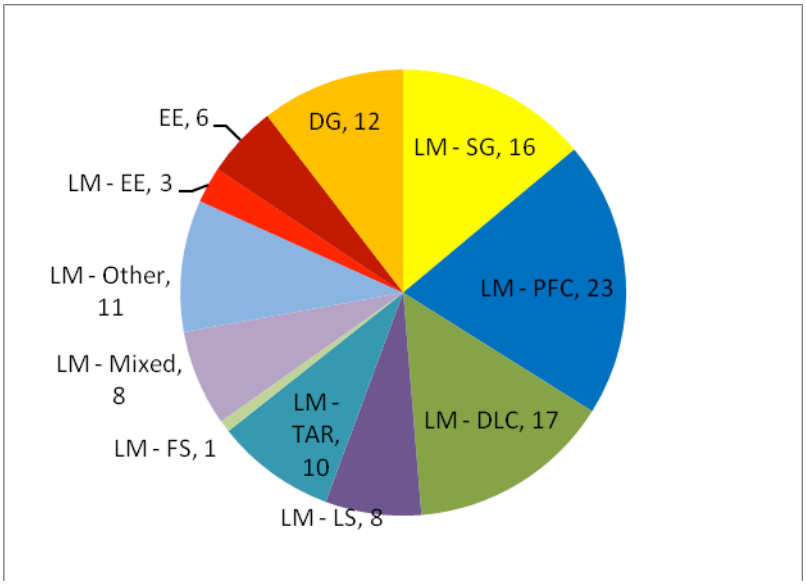
The NSPs in Tasmania did not report any projects.

3.3 SECTOR AND PROJECT TYPES

Of the 115 projects reported, 26 were residential, 30 commercial, 22 industrial and 38 were mixed (nine of which were reported specifically as a commercial/industrial mix). The mixed projects are mostly locational rather than sector driven and are therefore harder to categorise by sector.

The majority of projects were reported as LM (97), and were broken down into nine categories as per Table 7. Six EE projects were reported as EE, in addition to some LM projects that have been categorized as EE. Of the DG data reported, 12 were included as projects in this analysis, representing 12 data sets in the Commercial or Industrial sectors from ten NSPs.

Graph 4. Breakdown of projects by type and technology*



*For explanation of the category labels, see Table 7 below.

A fifth of the projects implemented were power factor correction projects (23, 20%), followed by standby generators (17, 15%). Three projects were reported as LM, but described as EE (denoted as LM-EE), therefore nine (8%) projects were in the area of EE, and 12 (10%) in DG. Eight projects were described as mixed (7%).

LOAD MANAGEMENT

The NSPs reported on a range of Load Management projects, summarized below.

Table 7. Number and types of load management projects

LM project type	Label	No. of projects
Power factor correction	PFC	23
Direct load control, including hot water, air conditioning and pool pumps	DLC	17
Stand-by generators for peak demand supply, including cogeneration and diesel	SG	16
Tariff trials, including time of use	TAR	10
Load shifting	LS	8
Commercial and residential energy efficiency projects	LM-EE	3
Fuel Switching	FS	1
Mixed projects, e.g. multiple elements used in a particular location	Mixed	8
Other	Other	11
Total		**97**

Of the 97 reported LM projects, 60 reported peak demand reductions (kW), 28 reported energy savings (kWh), 36 reported expenditure data ($) and 31 reported cost savings data ($). Of these, no projects had the full data set (i.e. kW, kWh, expenditure and savings reported for a single project).

ENERGY EFFICIENCY

The six energy efficiency projects included conversion of lighting to CFLs (3) and improved hot water systems in the residential and small commercial markets (1), as well as mixed energy efficiency initiatives.

DISTRIBUTED GENERATION

A total of 84,853 distributed generators were reported by ten NSPs. The majority of the DG projects (84,780) were residential distributed generators, reported mostly as small-scale photovoltaics (PV), representing 174 MW (22%). An additional 64,000 applications for connection have been made, and their connection status is not known in all cases. A total of 624 MW was reported from 73 distributed generators in the commercial / industrial sectors, and contributing 78% of the distributed generation capacity. NSPs reported owning 2.9MW (3.7%), reported under commercially operated plant.

Data was not requested on individual DG projects, but by sector for each NSP (e.g. what were the total number and capacity of distributed generators for the residential, commercial and industrial sectors in their networks). Because of the aggregated nature of the data, each group of data was analysed as a separate "project" (e.g. All industrial generators reported for a given NSP), rather than for individual generators. This means that a DG "project" could include multiple types and quantity of generators. Small scale PV was not included in this "project" analysis, but was included in the total numbers for DG.

Note that estimates of energy savings were reported for small-scale residential PV but were not included in the analysis because NSPs do not generally influence system location and energy dispatch of small-scale residential PV.

TIME OF USE METERS AND TARIFFS

Of the five NSPs who reported on Time of Use metering assets, four indicated that they offered TOU tariffs on their meters. No NSPs provided energy savings or peak demand reduction data from these metering assets or tariffs. Anecdotally it was suggested that data on the effectiveness of TOU meters or tariffs on peak demand reduction is not currently measured or collected within NSPs.

3.4 DATA ROBUSTNESS

Several NSPs are implementing multiple DM projects and are collecting valuable data. Each NSP reported data differently, so aggregated data may not give a true indication of the scale of the projects that have been undertaken to date. It is hoped that, should this survey become an annual event, more comparable data will be available on each reported project.

Each respondent had a different level of data available to report on DM projects. By way of explanation, a summary of the data available shows that of 115 projects, 66 reported expenditure associated with the project, but only 38 reported cost savings. This does not mean there were no cost savings resulting from these projects, but the savings may not have been captured by internal reporting systems.

Table 8. Number of DM projects with relevant data

Technology type	Total no. of projects	No. of projects reporting expenditure ($)	No. of projects reporting savings ($)	No. of projects reporting peak demand reduction (kW)	No. of projects reporting energy savings (MWh)
LM	97	58	31	60	28
EE	6	4	4	4	5
DG	12	4	2	4	2
Total	115	66	38	68	36

Respondents were requested to indicate whether their project data was measured, estimated or expected. The majority of project data was measured, with some also being estimated. All 10/11 data was reported either as expected or estimated, as the reporting period was not yet completed.

Table 9. Number of projects providing data as measured, estimated or expected

	Data type	08/09	09/10	10/11
No. of projects reporting energy savings (MWh)	Measured	17	18	0
	Estimated	3	3	2
	Expected	0	0	16
Projects reporting peak demand reduction (kW)	Measured	27	32	1
	Estimated	1	6	3
	Expected	1	0	29

4 ENERGY SAVINGS

Energy savings were included for 35 of the 115 projects. Savings were reported in MWh and aggregated in Table 10 below in GWh.

The reported energy savings are presented in the sections below by: the type of DM technology that produced the savings, the state or territory in which the savings occurred; and, the sector in which the savings were achieved.

4.1 ENERGY SAVINGS BY TYPE OF DM

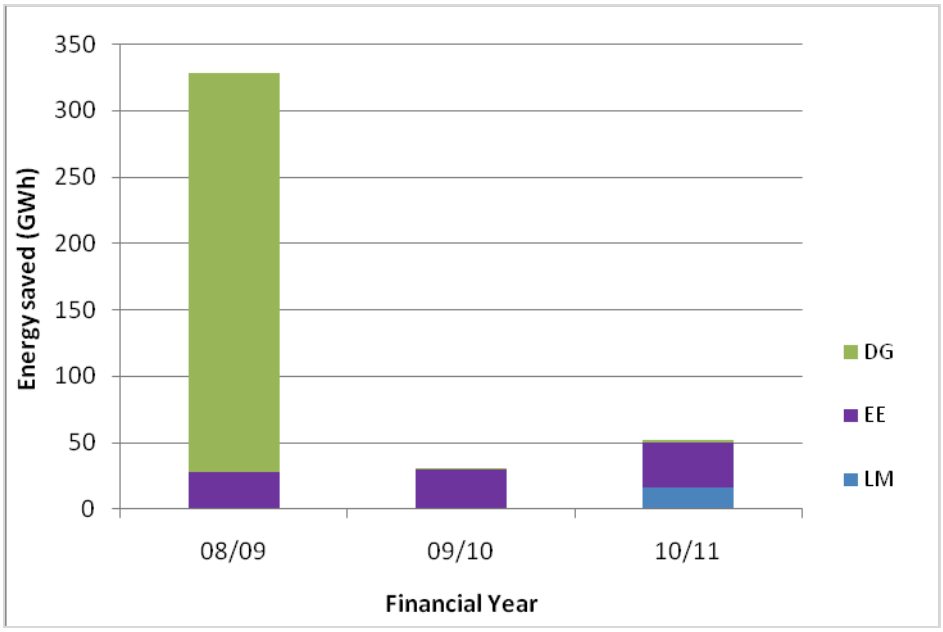
The total energy savings for the three reporting years was 410 GWh, with an average savings of 136.7 GWh per year. This average energy saving represents 0.2% of Australia's 08/09 electricity consumption (204,301 GWh) (ESAA, 2010). Note "energy savings" includes energy production from DG projects, as well as energy savings from LM and EE projects.

Table 10. Reported energy savings (GWh) resulting from LM, EE, DG and ToU

	08/09 (GWh)		09/10 (GWh)		10/11 (GWh)		No. of projects
Load Management	1.1	0.3%	1.2	4%	16.3	32%	28
Energy Efficiency	27.1	8%	28.9	96%	34.0	66%	5
Distributed Generation	300.0	91%	0.004	0%	1.1	2%	6
Total	**328.2**		**30.1**		**51.3**		**39**

The graph below compares the reported energy savings in GWh derived from DG, EE and LM.

Graph 5. Reported energy saved (GWh) by DG, EE and LM projects



Data was submitted for one large industrial DG project in 08/09 only (representing two generators), showing energy production of 300 GWh which accounts for 91% of the energy saved in that year (Note that the plant is still in operation, but generation data was only supplied for the first reporting year of the survey).

Apart from this project, the majority of reported energy savings (GWh) comes from five EE projects, delivering an average of 30 GWh for the past three reporting years.

In 08/09, 15 LM projects produced 1.1 GWh of energy savings, and in 09/10, 13 LM projects produced 1.2GWh; this figure rose to 16.3 GWh in 10/11. The energy savings from the remaining five DG projects accounted for less than 2% of total energy savings over the three reportings years.

4.2 ENERGY SAVINGS BY STATE

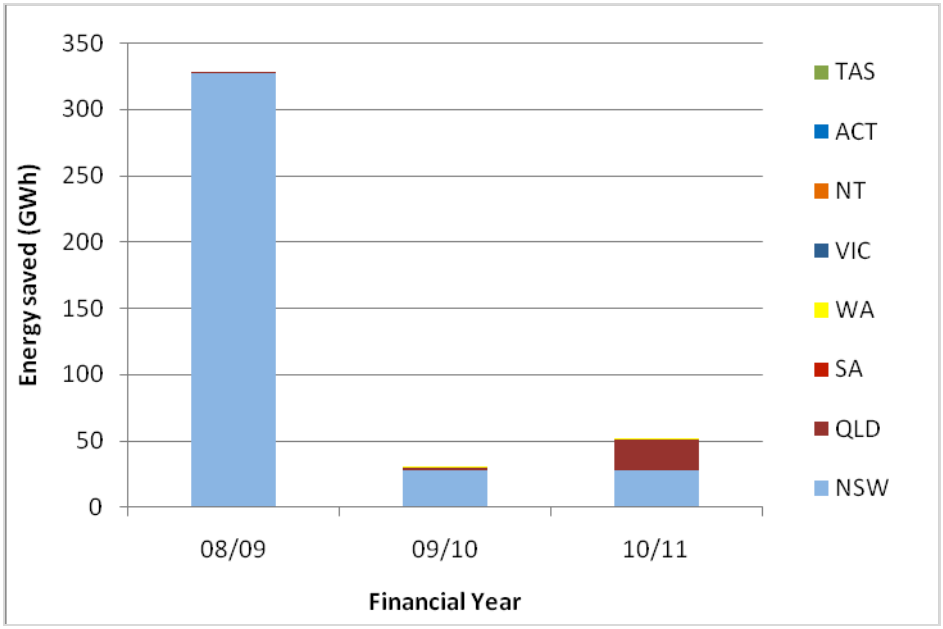
The NSPs in four of the eight states and territories reported energy savings: New South Wales, Queensland, Western Australia and South Australia.

Table 11. Reported energy savings (GWh) by state and territory

State	08/09 (GWh)		09/10 (GWh)		10/11 (GWh)		No. of projects
NSW	327.8	99.9%	27.8	92%	27.5	54%	29
QLD	0.5	0.1%	2.3	7%	22.7	44%	6
WA	0	0%	0.004	0%	1.1	2%	3
SA	0	0%	0.003	0%	0	0%	1
Total	**328.2**		**30.1**		**51.3**		**39**

The Australian Capital Territory, the Northern Territory, Tasmania and Victoria did not have any reported energy savings.

Graph 6. Reported energy savings (GWh) by state and territory



The majority of reported energy savings occured in New South Wales (99.9% in 08/09; 92% in 09/10; 54% in 10/11). Queensland NSPs reported increasing energy savings across the three reporting years from 0.5 GWh in 08/09 to 23 GWh in 10/11. Western Australia's energy savings rose from zero in 08/09 to 4 MWh in 09/10 to 1.1 GWh in 10/11.[5] South Australian NSPs reported energy savings of 3 MWh in 09/10 (but did not report for 08/09 or 10/11).

[5] Attributable primarily to a DG project in regional WA.

4.3 ENERGY SAVINGS BY SECTOR

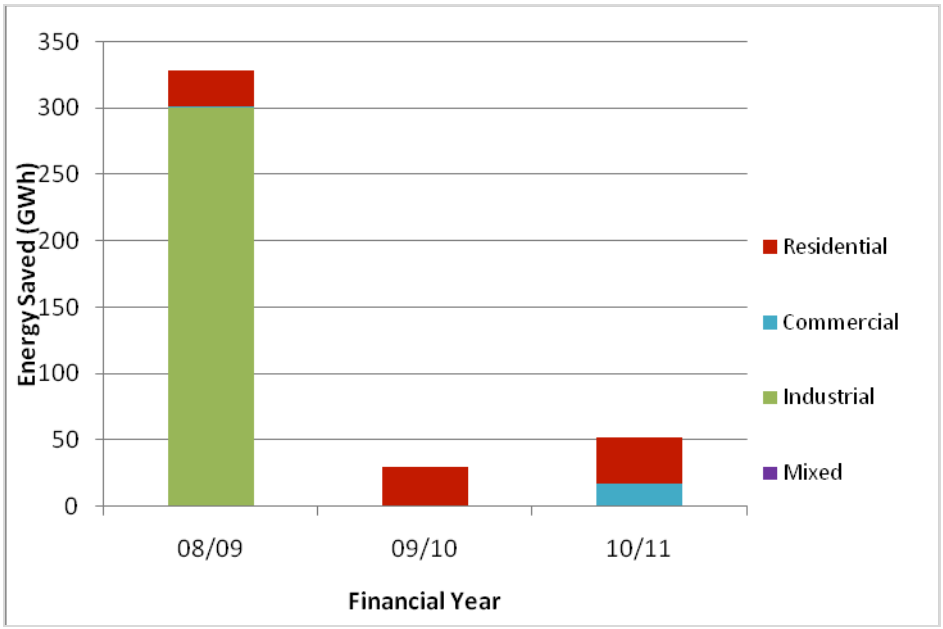
The energy savings were attributed to the sector where the savings occurred: residential, commercial, industrial or mixed ('mixed' refers to DM projects where both industrial and commercial sectors were engaged and the energy savings have not been separated).

Table 12. Reported energy savings (GWh) by sector

	08/09 (GWh)		09/10 (GWh)		10/11 (GWh)		No. of projects
Residential	27.5	8%	29.3	97.7%	34.4	67%	6
Commercial	0.048	0%	0.007	0%	16.5	32%	11
Industrial	300.1	91%	0.039	0.1%	0.05	0.1%	12
Mixed	0.5	0.2%	0.66	2.2%	0.35	0.7%	10
Total	**328.2**		**30.1**		**51.3**		**39**

Industrial energy savings ranged from 300 GWh (08/09) (due to one large DG project with data only for that year) to 39 MWh (09/10) and 50 MWh (10/11).

Graph 7. Reported energy savings (GWh) by sector



In the past three reporting years, the residential sector has provided consistent energy savings (28 GWh in 08/09 via two reported projects; 29 GWh in 09/10 and 34 GWh in 10/11 via four reported projects). The commercial sector provided 48 MWh (0.2%) in 08/09, and 7 MWh in 09/10 (0.02%), before rising to 16.5 GWh (32%) in 10/11, via seven projects. The energy savings from "mixed" sector projects averaged 510 MWh for the three reporting years (520 MWh in 08/09; 660 MWh in 09/10; 350 MWh in 10/11).

4.4 COST EFFECTIVENESS OF ENERGY SAVINGS

Cost effectiveness (expenditure [$]/MWh/year) was calculated for DM types, the state or territory in which the project occurred and the sector in which the project occurred.

Seven of the 115 DM projects reported both expenditure (CAPEX and OPEX) and energy savings and only these seven projects are analysed in this section and summarised in Table 13 below. Data was summated for the three reporting years where available.

Table 13. Cost effectiveness (expenditure/MWh) of DM projects for 10/11

Project Name	DM Type	State	Technology	Cost ($M)	Energy Savings (MWh/year)	Cost Effectiveness ($/MWh/yr)
Network Demand Management	LM	QLD	Mixed	2.31	15,402	150
Powersavvy	EE	QLD	EE	7.00	7,250	966
Energy Savers Pilot	EE	QLD	EE	1.78	1,400	1,272
Nelson Bay Relocatable 11kV Generators*	LM	NSW	SG	0.01	700	7
Ravensthorpe Community Energy Project	EE	WA	EE	0.035	56	625
DG - Commercial	DG	WA	DG	0.24	8	30,000
Standby Generation	LM	SA	SG	0.53	3	175,000

* The majority of expenditure occurred in years prior to reporting period.

The total reported cost of these seven projects over the three-year data collection period was $11.9M and the total savings over these three years was 25 GWh.

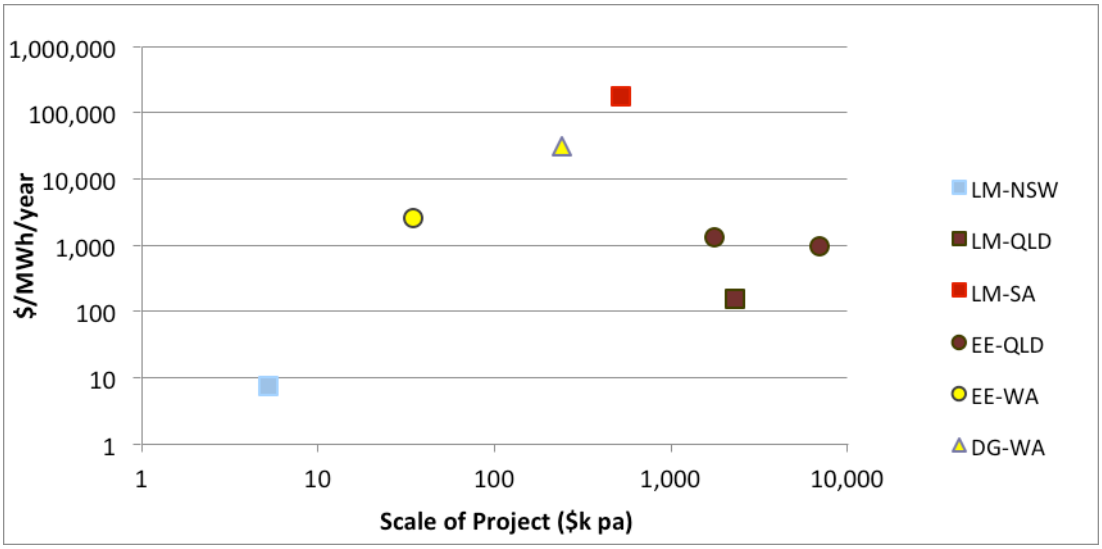
Four of the projects have a cost effectiveness value of less than $1,000/MWh, accounting for 79% of the value of the projects (two LM and two EE projects). One EE project has a cost effectiveness between $1,000/MWh and $10,000/MWh, while the other two projects have a cost effectiveness of greater than $10,000/MWh.

The LM project in South Australia, with a cost-effectiveness measured at $175,000/MWh, also reported 760kW reduction in peak demand with a cost-effectiveness of $691/kW, indicating that this project was carried out for peak load reduction rather than energy savings purposes. The DG project in WA, with a cost-effectiveness measured at $30,000, also reported a cost-effectiveness of $8,000/kW. This project is a utility-owned solar PV power system, and these costs are consistent with the cost of this technology.

By way of comparison, the AEMC sets it Maximum Market Price (MMP) at $12,500/MWh (AEMC, 2009).

The logarithmic graph below illustrates the cost benefit ratio of DM energy savings projects by comparing the cost effectiveness of these projects to the overall expenditure for each project. The state in which the project was implemented is also noted by colour.

Graph 8. Cost effectiveness of DM energy savings compared to total project cost[6]



As mentioned above, the LM project in South Autralia (LM-SA) was likely to be carried out for peak load reduction rather than energy savings purposes. The DG project in Western Australia (DG-WA) project had a cost effectiveness of $30,000/MWh, and also reported 30kW in pead demand reduction, having a cost effectiveness of $8000/kW.

5 DEMAND REDUCTION

A large proportion of the projects reported were implemented for peak demand reduction purposes (97 of 115 projects), and were measured in kW or kVA peak reduced, aggregated here in MW. Of the 97 projects reported as Load Management projects, 60 reported peak demand reductions.

There were several methods used to report demand reduction. For example, demand was reported as reductions in summer load only (40 projects), reductions in winter load only (four projects), reductions in both summer and winter load (18 projects) and available reserve demand (two projects). The differing methods of reporting demand have implications for aggregating the data. In regards to the 18 projects that provided summer and winter peak reductions, adding the winter to the summer peak reductions would have involved doubling up of data and therefore impact of the project. Of the 115 DM projects, 22 reported winter peak load reductions accounting for 16% of the total demand reduction (based on 10/11 data). To avoid double counting, only the summer reductions and annual reductions have been included in the analysis, as this represents the majority of the data. However projects with winter data have been included in the project by project analysis in Section 5.4, where relevant data is available.

The average total demand reduction for the past three reporting years was 193 MW. The reported demand reduction is presented in the sections below by: the type of DM technology, the state or territory in which the project was implemented; and, the sector in which the reduction was achieved.

[6] Cost effectiveness (CE) was calculated using the following factors, including cost ($), energy (MWh), and the reporting years (08/09, 09/10, 10/11) and equation:

$CE = (\$_{08/09} + \$_{09/10} + \$_{10/11}) / (MWh_{08/09} + MWh_{09/10} + MWh_{10/11})$

5.1 PEAK DEMAND (MW) REDUCTION

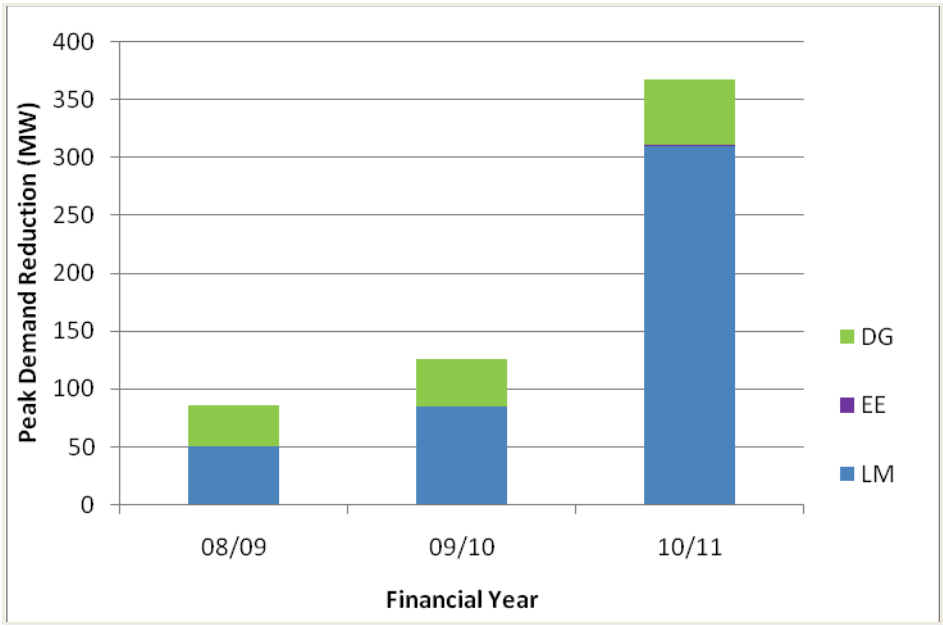
As shown in the table below, all of the demand reduction is reported from LM, EE and DG projects (with none reported under ToU).

Table 14. Reported demand reduction (MW) by LM, EE and DG

	08/09 (MW)		09/10 (MW)		10/11 (MW)		No. of projects
Load Management	50.9	59%	85.1	67%	310.1	84%	60
Energy Efficiency	0.0	0%	0.0	0%	1.1	0%	4
Distributed Generation	35.3	40.9%	41.1	33%	56.4	15%	6
Total	**86.2**		**126.2**		**367.5**		**70**

Below, Graph 9 summarizes the peak demand reduction (MW) for the past three reporting years as a result of the reported DG and LM projects.

Graph 9. Peak demand (MW) reduction by DG and LM



For the three years of this study, the majority of peak demand reduction was achieved through LM projects (51 MW [59%] in 08/09; 85 MW [67%] In 09/10; 310 MW [85%] in 10/11). Over the three reporting years, DG contributed an average of 44 MW of demand reduction, contributing an increasing amount over time (35 MW [41%] in 08/09, 41 MW [33%] in 09/10, 56 MW [15%] in 10/11).

In addition to the peak demand reduction data presented in this section, one transmission NSP reported a project implemented for available reserve of 100 MW (08/09), and one distribution NSP reported available reserve of 16.5 MW (09/10). For the purposes of this survey, “available reserve demand” was defined as “reserve capacity available for peak demand management that could have been dispatched” (as opposed to reserve demand that was dispatched, which would have been entered as annual summer and winter peak demand reduction). In other words, available reserve demand reduction is equal to the total capacity of reliable peak load management minus the peak load reduction that was actually dispatched.

5.2 PEAK DEMAND REDUCTION (MW) BY STATE

Five of the eight states and territories provided data on peak demand reduction. As mentioned above, only the summer reductions and annual reductions have been included in the analysis.

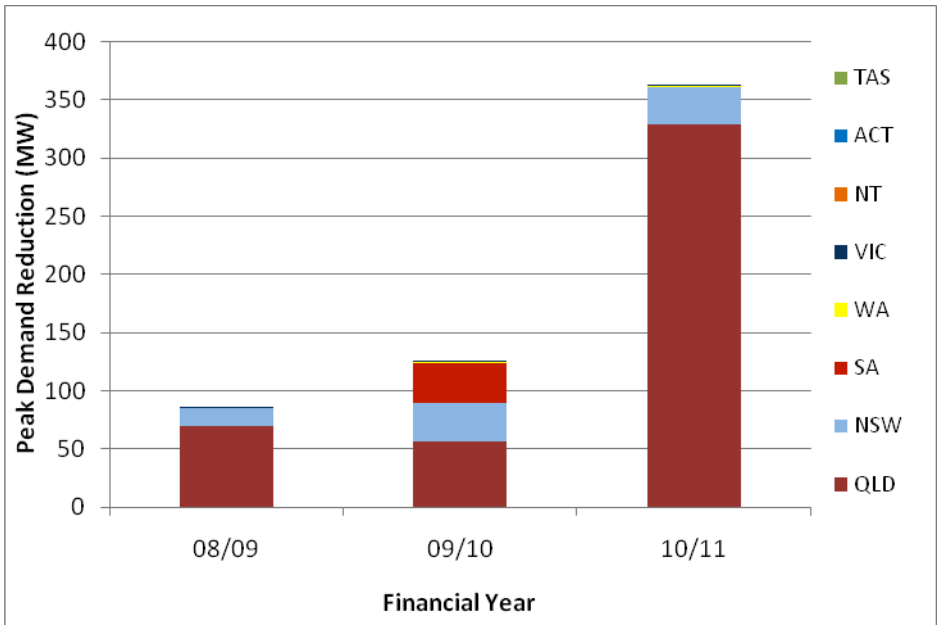
Table 15. Reported peak demand reduction (MW) by state and territory

	08/09 (MW)		09/10 (MW)		10/11 (MW)		No. of projects
NSW	16.1	18.7%	33.4	26%	32.6	9%	38
QLD	69.2	80.2%	56.2	45%	332.6	90%	17
SA	0	0%	34	27%	0	0%	8
WA	0	0%	1	1%	1	0%	6
VIC	1	1%	1	1%	1	0%	1
Total	**86.2**		**126.2**		**367.5**		**70**

The Australian Capital Territory, the Northern Territory and Tasmania did not have any reported peak demand reductions.

Queensland NSPs reported the majority of peak demand reduction for the three reporting years (69 MW in 08/09; 56 MW in 09/10; 332 MW in 10/11). New South Wales NSPs reported 16 MW in 08/09 and then relatively consistent peak demand reduction for 09/10 (33 MW) and 10/11 (33 MW).

Graph 10. Reported peak demand (MW) reduction by state and territory



South Australia contributed a quarter of the peak demand reduction in 09/10 (34 MW, 27%). Victorian NSPs reported increasing demand reduction over the three-year period from 1 MW in 08/09 to 1.3 MW in 09/10 and 1.4 MW in 10/11. Western Australian NSPs reported 0.9 MW demand reduction in both 09/10 and 10/11.

In 08/09 an available reserve demand reduction project accounted for two thirds of New South Wales reported peak demand reduction for that reporting year. This project did not report any dispatched peak reduction, and therefore it is not included above.

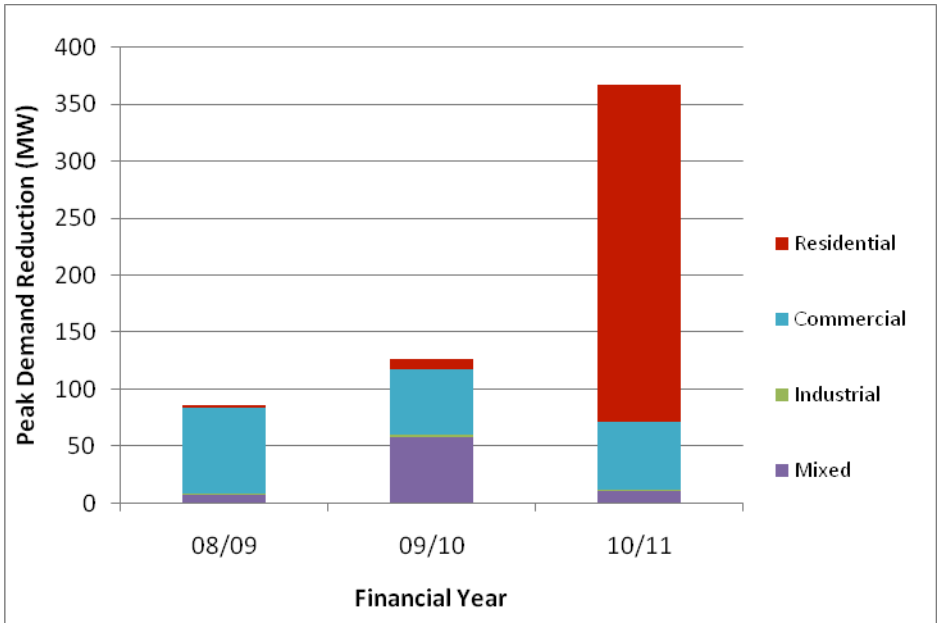
5.3 PEAK DEMAND REDUCTION BY SECTOR

Total peak demand increased over the three-year reporting period from 86.2 MW to 367 MW.

Table 16. Reported peak demand reduction (MW) by sector

	08/09 (MW)		09/10 (MW)		10/11 (MW)		No. of projects
Residential	2.8	3%	8.5	6.7%	296.1	81%	18
Commercial	75.0	87.0%	57.9	46%	59.4	16%	17
Industrial	1.0	1%	2.0	1.6%	1.4	0.4%	15
Mixed	7.5	8.7%	57.8	45.8%	10.7	2.9%	20
Total	**86.2**		**126.2**		**367.5**		**70**

Graph 11. Peak demand (MW) reduction by sector



Residential projects accounted for 296 MW (81%) of peak reductions in 10/11, up from 8.5 MW in 09/10, and 2.8 MW in 08/09. Commercial projects accounted for around 75 MW of peak demand reduction in 08/09, dropping to 57.9 MW in 09/10 and 59.4 MW in 10/11. Industrial projects made up 950 kW of peak reductions in 08/09, up to 2 MW in 09/10 and dropping to 1.4 MW in 10/11. Mixed projects made up 7.5 MW of peak reductions in 08/09, up to 57.8 MW in 09/10 and dropping to 10.7 MW in 10/11.

5.4 COST EFFECTIVENESS OF PEAK DEMAND REDUCTION

Cost effectiveness of peak demand reduction was the more widely reported combination of data compared to the cost effectiveness of energy savings (expenditure/MWh), and cost benefit ratios (cost effectiveness/total project expenditure).

Cost effectiveness of peak demand reduction (expenditure/kW) was calculated for DM types and by project. Cost effectiveness represents the sum of expenditures ($) versus the total of all peak reductions (kW). A total of 33 projects, summarized in the table below, had both peak reduction and expenditure data, therefore only these projects are included in the cost effectiveness analysis. Data for all years was used for cost effectiveness calculations, giving cost effectiveness in [$]/kW/year.

Table 17. Cost effectiveness ($/kW/year) of DM projects

Project Name	DM Type	State	Technology	Cost ($M)	Peak reduction (kW)	Cost Effectiveness ($/kW/year)
Western 500kV Conversion	LM	NSW	Other	7.58	100,000	76
Load control upgrades	LM	NSW	DLC	2.64	7,100	371
Warringah STS DM Project	LM	NSW	Mixed	1.60	7,400	216
Greenacre – DM Project 2009/10	LM	NSW	Mixed	0.79	3,700	214
Nelson Bay Relocatable 11kV Generators*	LM	NSW	SG	0.01	14,000	0.4
Terrey Hills PFC and Generator Project	LM	NSW	Mixed	0.73	3,080	237
Willoughby STS DM Project	LM	NSW	Mixed	0.59	4,700	126
Adamstown DM Project*	LM	NSW	SG	0.03	2,500	11
Eastern St George PFC Project	LM	NSW	PFC	0.01	840	15
Kurri 33kV Feeder & Kurri Zone PFC Project	LM	NSW	PFC	0.02	450	46
Summer Preparedness	LM	QLD	Other	6.81	71,000	96
Cool Change 2	LM	QLD	DLC	3.39	225	15,083
Energy Conservation Communities	LM	QLD	EE	9.12	3,000	3041
Residential Targeted Initiative	LM	QLD	Other	6.38	5,000	1275
DM for Commercial & Industrial	LM	QLD	Mixed	7.74	10,000	774
Network Demand Management	LM	QLD	Mixed	2.31	2,500	926
Solar City	LM	QLD	EE	0.44	1,008	437
Air Con Trial	LM	QLD	DLC	0.25	16,651	15
Power Factor Correction	LM	SA	PFC	0.68	33,064	21
Standby Generation	LM	SA	SG	0.53	760	691
Direct Load Control	LM	SA	DLC	14.20	275	51,619
Voluntary & Curtailable Load Control for Large Customers	LM	SA	LS	0.30	303	1,000
Peak Demand Management	LM	VIC	TAR	0.28	3,615	78
Community Energy Project	LM	WA	EE	0.26	510	518
Fuel switching	LM	WA	FS	0.03	108	254
AC Direct Load Control Trial	LM	WA	DLC	0.64	300	2,125
Neutral Bay Residential DM Project*	EE	NSW	EE	0.001	335	1.7
Powersavvy	EE	QLD	EE	7.00	904	7,743
Energy Savers Pilot	EE	QLD	EE	1.78	494	3,606
DG – Commercial	DG	NSW	DG	0.95	7,800	122
DG – Commercial	DG	QLD	DG	0.67	3,000	223
DG – Residential	DG	WA	DG	3.00	1,695	1,770
DG – Commercial	DG	WA	DG	0.24	30	8,000

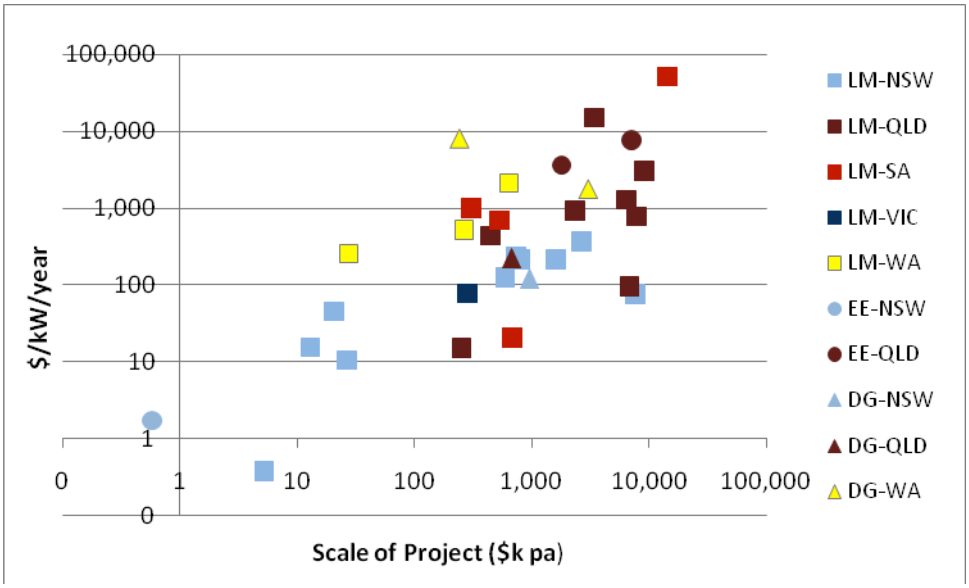
* The majority of expenditure occurred in years prior to reporting period.

Ten of the projects in Table 17 had a cost effectiveness lower than $100/kW/year, thirteen projects were between $100 and $1000 kW/year, and ten projects had a cost effectiveness of $1000 or greater.

The cost effectiveness values illustrated in Table 17 can be compared to 30 other projects that explicitly reported $/kVA reduction incentives (note these 30 projects were not included in the analysis because they did not provide a full data set). Of these 30 projects, 23 reported customer incentives for load reductions of $70 to $190/kVA and the other seven did not provide incentive data.

The graph below shows the cost effectiveness of peak demand reduction for the 33 analysed projects compared to their total project cost.

Graph 12. Cost effectiveness of peak demand reduction compared to total project cost[7]



The average cost effectiveness was $264/kW.

It is difficult to compare projects on the basis of some of the data provided. Project cost-effectiveness calculations varied for reported reasons such as:

- Three projects are known to have had expenditure in previous years that were not collected by the survey, giving low results;
- Some projects only had data for one year, where expenditure was given, but not all the savings (or vice versa);
- Some projects were biased by weather conditions, meaning that the kW demand reduction was lower than expected, leading to a higher $/kW/year calculation than anticipated by project proponents; and
- Some projects were implemented to reduce the likelihood of losing load, as network capacity was already reached.

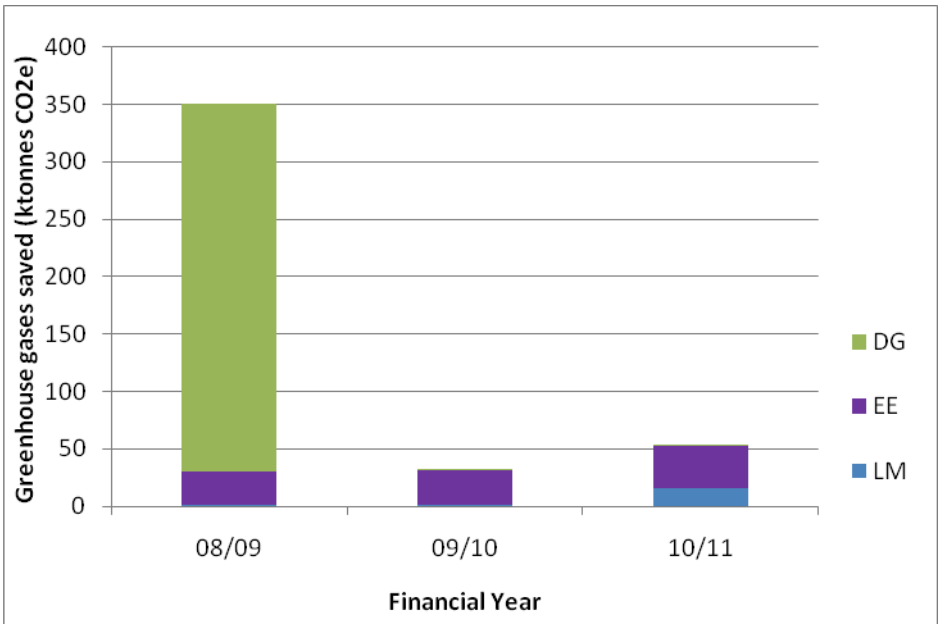
[7] Cost effectiveness (CE) was calculated using the following factors, including cost ($), demand (kW), and the reporting years (08/09, 09/10, 10/11) and equation:

$CE = (\$_{08/09} + \$_{09/10} + \$_{10/11}) / (kW_{08/09} + kW_{09/10} + kW_{10/11})$

6 EMISSION REDUCTIONS

Although emission savings data was not requested from the NSPs, this data was estimated from the energy savings data and greenhouse data published in the National Greenhouse Accounts (NGA) Factors Report (DCCEE, 2010).

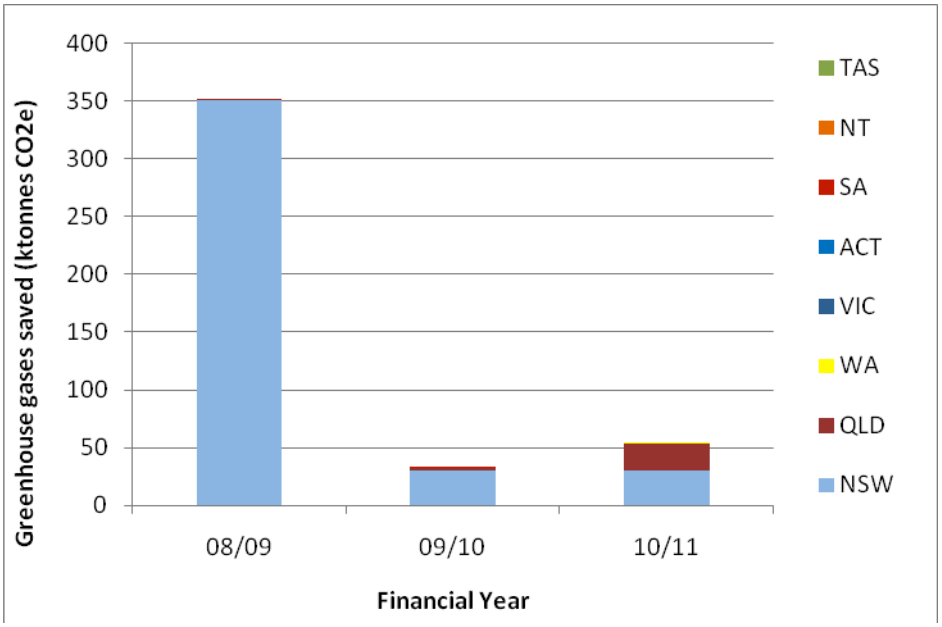
Graph 13. Greenhouse gas emission savings by DM type



One distributed generation projects (comprising of two generators) saved 321 kilotonnes (kt) of greenhouse gas emissions in 08/09, and three projects will save 1.5 kt in 10/11. Three EE projects consistently saved approximately 31 kt of greenhouse gas emission each year (8% in 08/09, 97% in 09/10 and 68% in 10/11). Load management projects accounted for 16 kt of greenhouse gas emission savings in 10/11, up from 1.0 kt in 08/09 and 0.8 kt in 09/10.

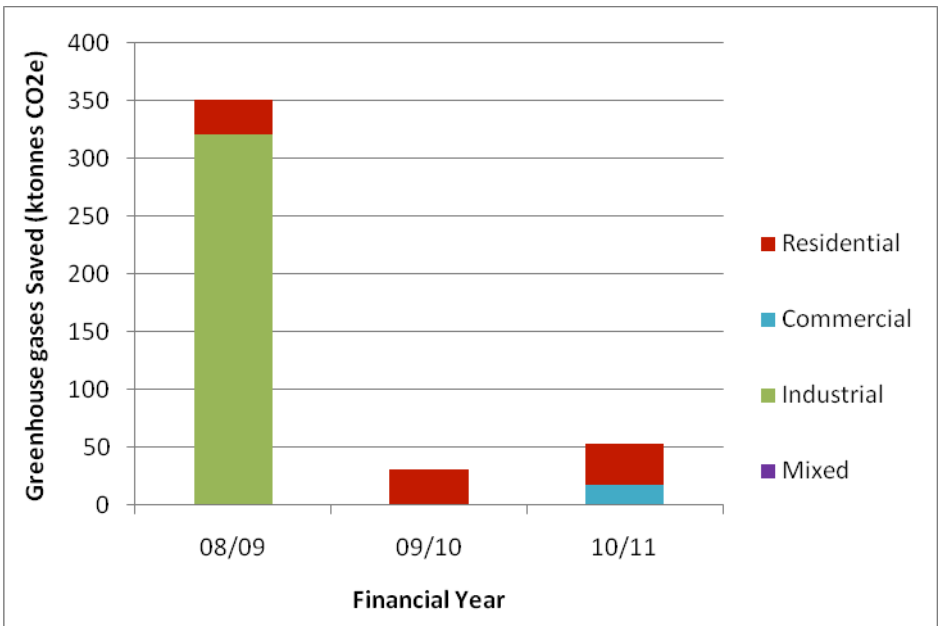
Note that load shifting projects were not included in the greenhouse gas emission savings calculations.

Graph 14. Greenhouse gas emission savings by state



Three states had estimates of greenhouse gas emissions savings (New South Wales, Queensland and Western Australia). Apart from one large project reporting in 08/09 (321 kt), New South Wales accounted for an average of 30 kt of emissions savings, representing 99% of total emissions savings in 08/09, 93% in 09/10 and 55% in 10/11, based on reported energy savings. Queensland's emissions savings were 460 tonnes in 08/09 (1.5%), 2.3 kt in 09/10 (7.2%), and up to 23 kt in 10/11 (43%). Western Australia greenhouse gas emissions savings were estimated at 1.0 kt in 10/11.

Graph 15. Greenhouse gas emission savings by sector



The industrial sector had one large project reporting 321 kt of emissions savings for 08/09.

The residential sector accounted for an average of 32 kt of greenhouse gas emissions savings per year (29 kt in 08/09, 31 kt in 09/10, 36 kt in 10/11). The commercial sector accounted for 17 kt in 10/11, up from less than 60 t in 08/09 and 09/10.

7 EXPENDITURE ON DM PROJECTS

Expenditure was reported as Capital Expenditure (CAPEX) costs and Operating Expenditure (OPEX) costs. OPEX was reported specifically as either incentive costs or employee and other costs. Total DM expenditure on LM, EE and DG increased from $20M in 08/09 to $29M in 09/10 and $50M in 10/11. It was estimated that an additional $3M and $162M was to be spent on the New South Wales Feed in Tariff in 09/10 and 10/11 respectively (not included in the graphs below).

Savings were reported on an annual basis as the value of the CAPEX deferred, and OPEX savings achieved. A discount rate of 10% (as per the AER Decisions on Cost of Capital) was applied to the reported deferred CAPEX values to give a sense of savings achieved.

7.1 DM EXPENDITURE BY TYPE

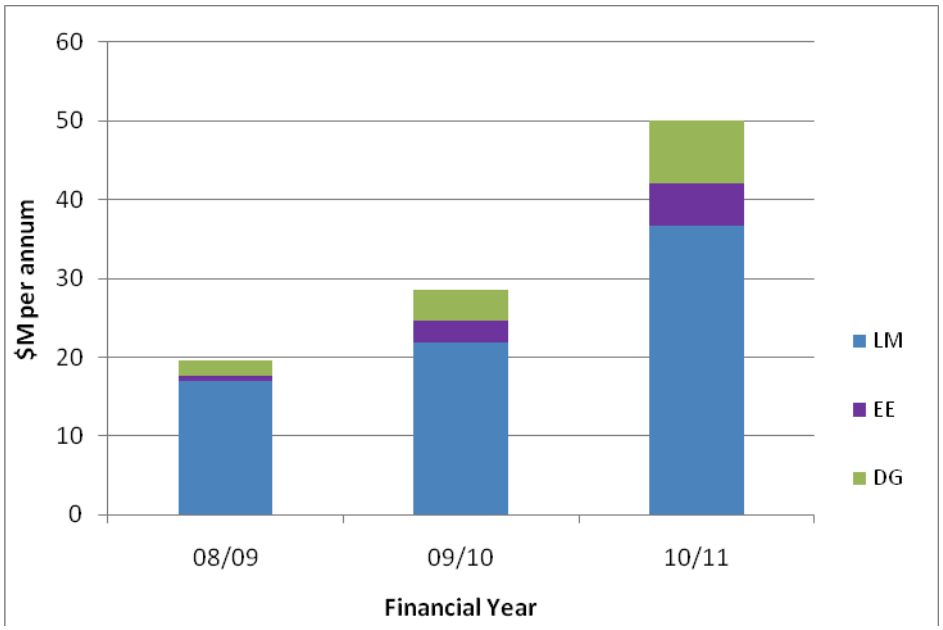
DM expenditure was reported for 44 DM projects. Note this section does not include the estimated expenditure spent on the New South Wales Feed in Tariff.

Table 18. Reported DM Expenditure by project type

	08/09 ($M)		09/10 ($M)		10/11 ($M)		No. of projects
Load Management	16.9	87%	21.3	76%	36.7	73%	36
Energy Efficiency	0.7	3%	2.8	10%	5.4	11%	6
Distributed Generation	2.0	10.0%	3.9	14%	7.9	16%	6
Total	**19.5**		**28.0**		**49.9**		**44**

The expenditure on these 44 LM projects increased over the three reporting years ($16.9M, $21.3M, $36.7M, respectively).

Graph 16. DM Expenditure by project type



An increasing trend was reported for expenditure on the four DG projects ($2.0M in 08/09; $3.9M in 09/10; $7.9M in 10/11), and on six EE projects ($0.7M in 08/09; $2.8M in 09/10; $5.4M in 10/11).

7.2 DM EXPENDITURE BY STATE

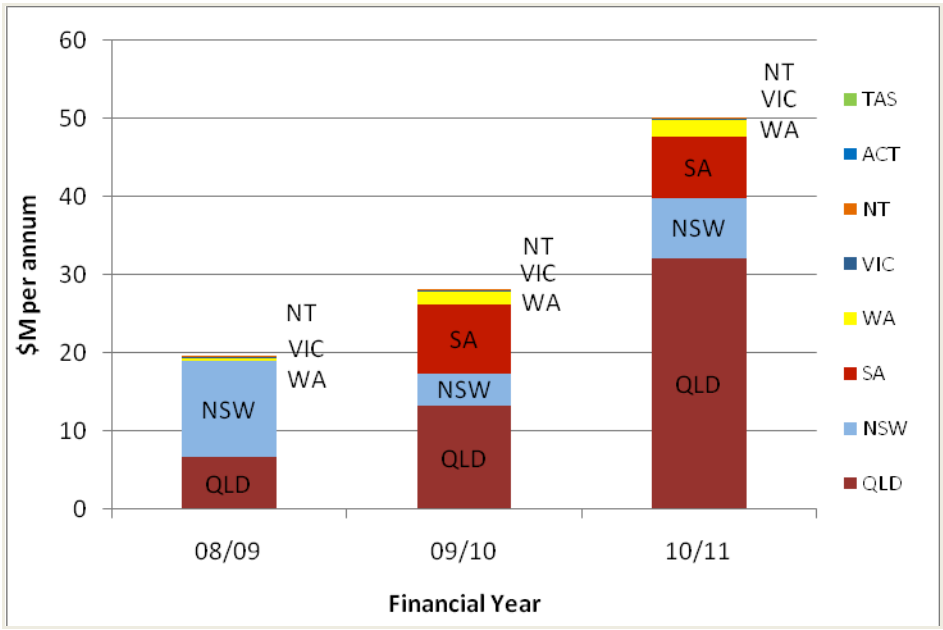
The total DM expenditure over the three reporting years was close to $100M. Queensland NSPs reported the largest expenditure ($52M) over the three-year period, followed by New South Wales ($24M) and South Australia ($16M). The Australian Capital Territory and Tasmania did not have any reported DM expenditure.

Table 19. DM expenditure by state (excluding the NSW FiT)

	08/09 ($M)		09/10 ($M)		10/11 ($M)		No. of projects
QLD	6.7	34.1%	13.3	47%	32.1	64%	14
NSW	12.4	63.3%	4.1	15%	7.7	15%	15
SA	0	0%	9	31%	8	16%	6
WA	0	1%	2	6%	2	4%	6
NT	0	1%	0	0%	0	0%	2
VIC	0	0%	0	0%	0	0%	1
Total	**19.5**		**28.0**		**49.9**		**44**

As shown in the graph below, Queensland and Western Australia had increased expenditure on DM in each successive reporting year.

Graph 17. DM expenditure by state



7.3 EXPENDITURE BY SECTOR

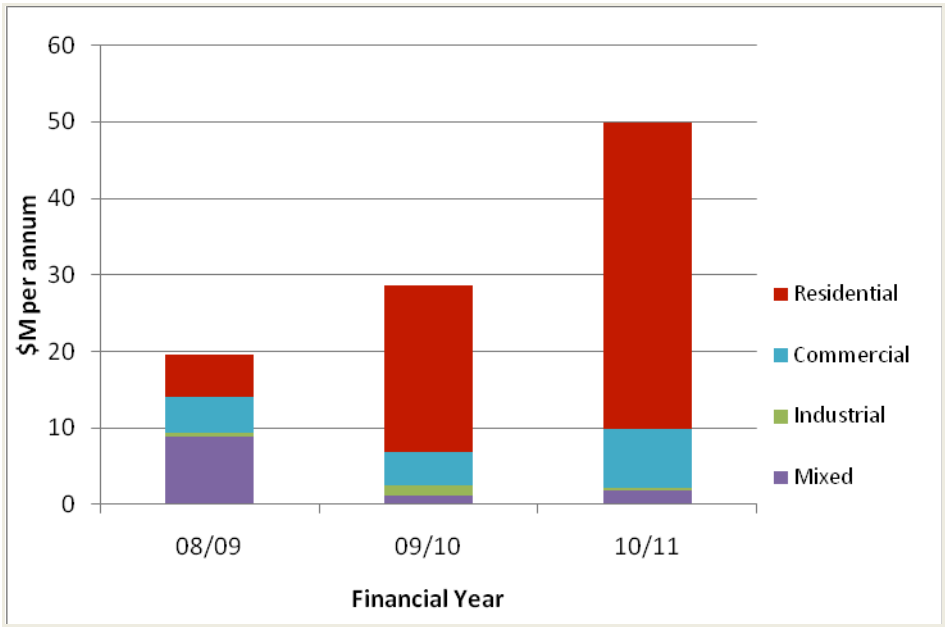
Overall, the greatest amount of expenditure was reported in the residential area. In 10/11, expenditure on residential DM projects was reported as $40M, accounting for 80% of DM expenditure, up from $22M in 09/10, and $5.5M in 08/09.

Table 20. Reported DM Expenditure by sector

	08/09 ($M)		09/10 ($M)		10/11 ($M)		No. of projects
Residential	5.5	28%	21.1	75.6%	40.0	80%	19
Commercial	4.6	23.7%	4.3	15%	7.7	15%	9
Industrial	0.5	3%	1.3	4.7%	0.3	0.6%	3
Mixed	8.9	45.6%	1.2	4.4%	1.9	3.8%	13
Total	**19.5**		**28.0**		**49.9**		**44**

Expenditure on commercial DM projects in 10/11 was reported as $7.7M (16%), up from $4.3M in 09/10 and $4.6M in 08/09. Industrial project expenditure averaged $0.7M over the 3 years ($0.5M in 08/09, $1.3M in 09/10 and $0.3M in 10/11). Projects in the mixed category accounted for $8.9M in the 08/09 reporting year (45%), dropping to $1.2M in 09/10 and $1.9M in 10/11.

Graph 18. DM expenditure by sector



7.4 COST BENEFIT ANALYSIS

The Cost benefit ratio (expenditure/savings) was calculated for 12 projects, submitted by five NSPs, that had both expenditure (cost) and savings (benefit) data.

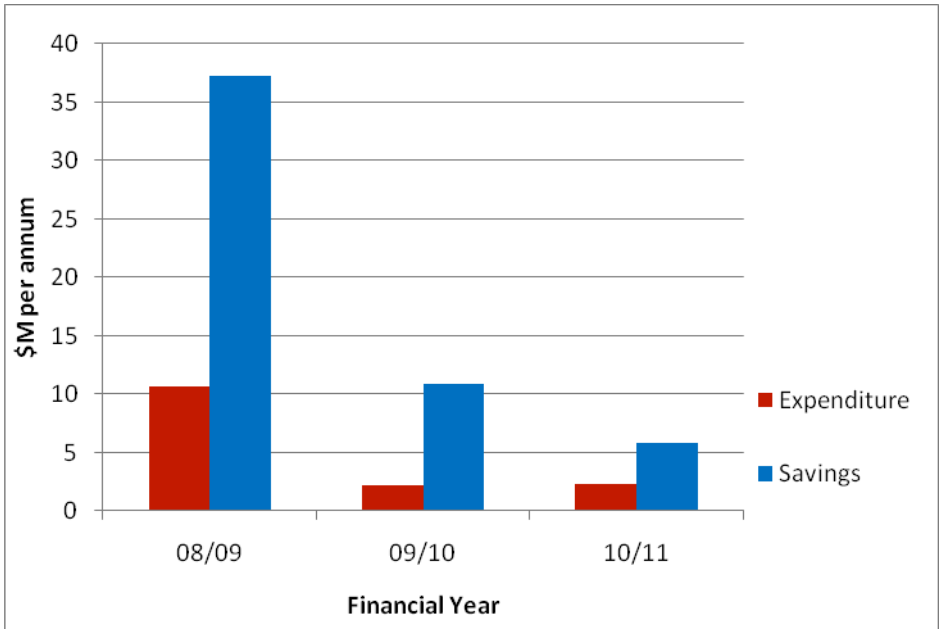
Table 21. Cost benefit ratio of DM projects

Project Name	DM Type	State	Technology	Cost ($M)	Benefit ($M)	Cost benefit ratio
Peak Demand Management	LM	VIC	TAR	0.28	0.60	0.47
Western 500kV Conversion	LM	NSW	Other	7.58	40.00	0.19
Load control upgrades	LM	NSW	DLC	2.64	1.05	2.51
Warringah STS DM Project	LM	NSW	Mixed	1.60	2.52	0.63
Greenacre – DM Project 2009/10	LM	NSW	Mixed	0.79	5.90	0.13
Terrey Hills PFC and Generator Project	LM	NSW	Mixed	0.73	0.72	1.01
Willoughby STS DM Project	LM	NSW	Mixed	0.59	0.70	0.84
Eastern St George PFC Project	LM	NSW	PFC	0.01	0.17	0.08
Kurri 33kV Feeder & Kurri Zone PFC Project	LM	NSW	PFC	0.02	0.07	0.29
Powersavvy	EE	QLD	EE	7.00	3.28	2.13
Neutral Bay Residential DM Project*	EE	NSW	EE	0.001	0.004	0.14
DG – Commercial	DG	NSW	DG	0.95	2.22	0.43

* The majority of expenditure occurred in years prior to reporting period.

The total expenditure over the three reporting years for these 12 projects was $22M and the total savings was $57M. The expenditure and savings for these 12 projects for the three reporting years is presented below.

Graph 19. Expenditure and savings for all DM projects

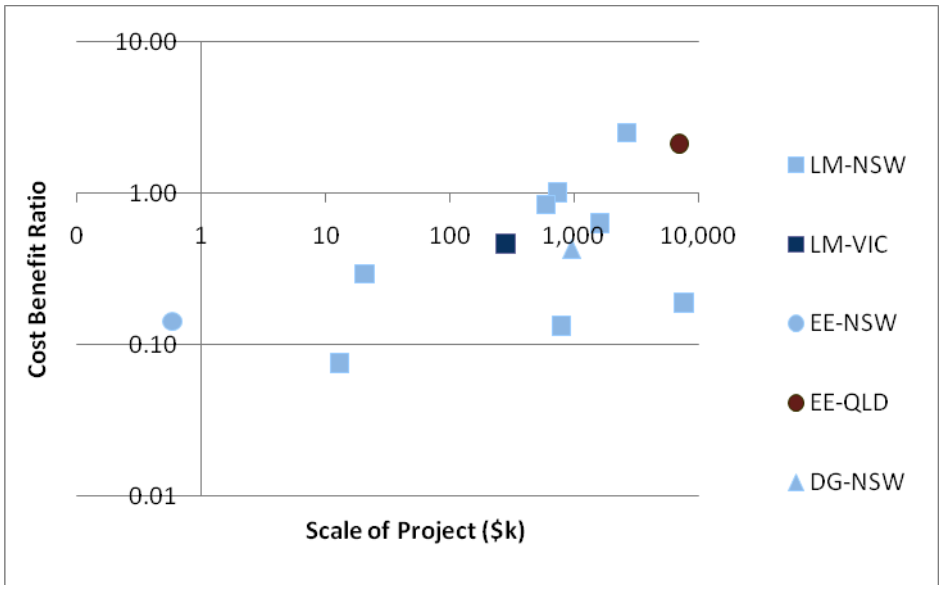


One large reserve capacity project reported expenditure and savings from infrastructure deferral, accounting for 50% of total expenditure and 74% of total savings.

Without this significant project, the average yearly expenditure was $2.5M ($3.1M in 08/09, $2.2M in 09/10 and $2.3M in 10/11), and the average yearly savings were $4.7M ($2.3M in 08/09, $5.8M in 09/10 and $5.9M in 10/11)

The graph below shows the cost benefit ratio for the 12 DM projects compared to the total cost of each project.

Graph 20. Cost benefit ratio for DM projects compared to total cost of project

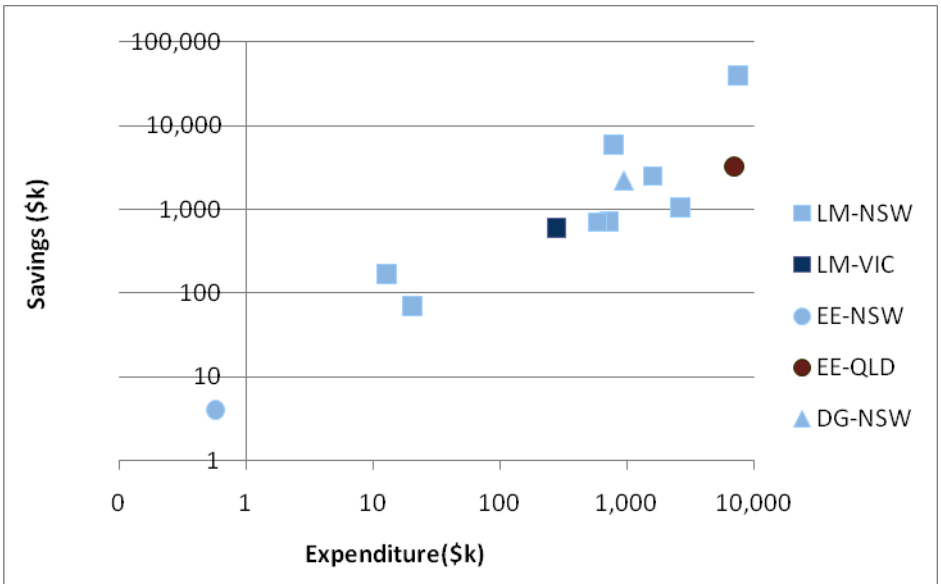


Nine of the projects had a cost benefit ratio of less than 1, indicating that measured or expected benefits exceeded the reported costs of undertaking the project.

Three of the projects had a cost benefit ratio of greater than 1, ranging from 1.01 to 2.5, indicating that the reported costs were greater than the measured or expected benefits.

Graph 21 presents savings verses expenditure, or the cost benefit, of these 12 projects.

Graph 21. Savings vs. Expenditure



There are projects that have had costs or benefits measured in years other than those reported in 08/09 to 10/11. Additionally, some organisations did not provide data for each reporting year, which may have impacted some of the reported projects included in the cost benefit analysis.

8 CONCLUSION

The majority of DM projects implemented in Australia are in the area of peak demand management. The goals of these peak demand projects are primarily peak load reduction, rather than energy savings, and so greenhouse gas emission savings are quite low.

An annual survey would be highly beneficial to increase the validity of the data and subsequent reports. Subsequent surveys could also take on suggestions for improvements of the survey, making the data collection more robust and less patchy. It could also set a precedent for reporting of future projects, to allow more relevant data to be collected.

Additionally, the survey could be expanded to cover DM projects undertaken by electricity retailers, and where relevant, integrated utilities.

9 REFERENCES

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APPENDIX A. SURVEY QUESTIONS

SECTION 1. LOAD MANAGEMENT

For specific instructions on completing this sheet of the survey, see the notes below this table.

	Question	Answer format	Total	Project 1	
1	Project Name				
2	Project Description				
3	Project Code (if applicable)				
4	What financial year did the project start delivering savings?*	Choose one			
5	Sector of Project	Choose one			
6	Name of Responsible Project Officer**				
7	Officer's Contact Phone Number or Email				
8	Annual Energy Savings (as result of LM project)	08/09 MWh pa	0		Measured
		09/10 MWh pa	0		Measured
		10/11 MWh pa	0		Expected
9	Summer Peak Demand Reduction (as result of LM project)	08/09 kW	0		Measured
		09/10 kW	0		Measured
		10/11 kW	0		Expected
10	Winter Peak Demand Reduction (as result of LM project)	08/09 kW	0		Measured
		09/10 kW	0		Measured
		10/11 kW	0		Expected
11	Available Reserve Demand Reduction (as result of LM project)	08/09 kW	0		Measured
		09/10 kW	0		Measured
		10/11 kW	0		Expected
12	Total CAPEX Expenditure on LM Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
13	Total OPEX Spent in Employee Hours and Other Costs on LM Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
14	Total OPEX Spent on Incentives for LM Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
15	Value of CAPEX Projects Deferred (as a result of LM project)	08/09 $	0		Estimated
		09/10 $	0		Estimated
		10/11 $	0		Estimated
16	Total Annual OPEX Savings (as a result of LM project)	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected

SECTION 2. ENERGY EFFICIENCY

For Specific Instructions on completing this sheet of the survey, see the notes below this table.

	Question	Answer format	Total	Project 1	
17	Project Name				
18	Project Description				
19	Project Code (if applicable)				
20	What financial year did the project start delivering savings?	Choose one			
21	Sector of Project	Choose one			
22	Name of Responsible Project Officer**				
23	Officer's Contact Phone Number or Email				
24	Annual Energy Savings (as result of EE project)	08/09 MWh pa	0		Measured
		09/10 MWh pa	0		Measured
		10/11 MWh pa	0		Expected
25	Summer Peak Demand Reduction (as result of EE project)	08/09 kW	0		Measured
		09/10 kW	0		Measured
		10/11 kW	0		Expected
26	Winter Peak Demand Reduction (as result of EE project)	08/09 kW	0		Measured
		09/10 kW	0		Measured
		10/11 kW	0		Expected
27	Total CAPEX Expenditure on EE Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
28	Total OPEX Spent in Employee Hours and Other Costs on EE Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
29	Total OPEX Spent on Incentives for EE Project	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected
30	Value of CAPEX Projects Deferred as a Result of this EE Project	08/09 $	0		Estimated
		09/10 $	0		Estimated
		10/11 $	0		Estimated
31	Total Annual OPEX Savings (as result of EE project)	08/09 $	0		Measured
		09/10 $	0		Measured
		10/11 $	0		Expected

SECTION 3. DISTRIBUTED GENERATION

	Question	Answer format	Sum of all Residential DG Projects	
32	Sector of Projects	Choose one	Residential	
33	Number of Generators	#		
34	Total Combined Capacity	MW		
35	Portion Owned by your Organisation*	%		
36	Name of Responsible Project Officer**			
37	Officer's Contact Phone Number or Email			
36	Annual Energy Savings (as a result of these DG projects)	08/09 MWh pa		Measured
		09/10 MWh pa		Measured
		10/11 MWh pa		Expected
37	Summer Peak Demand Reduction (as a result of these DG projects)	08/09 kW		Measured
		09/10 kW		Measured
		10/11 kW		Expected
38	Winter Peak Demand Reduction (as a result of these DG projects)	08/09 kW		Measured
		09/10 kW		Measured
		10/11 kW		Expected
39	Total CAPEX Expenditure on DG Projects	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
40	Total OPEX Spent in Employee Hours and Other Costs on DG Projects	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
41	Total OPEX Spent on Incentives for DG Projects	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
42	Value of CAPEX Projects Deferred as a Result of these DG Projects	08/09 $		Estimated
		09/10 $		Estimated
		10/11 $		Estimated
43	Total Annual OPEX Savings (as a result of these DG projects)	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected

SECTION 4. TIME OF USE METERS

	Question	Answer format	Residential ToU Meters	
44	Sector of Projects	Choose one	Residential	
45	Number of Time of Use Meters	#		
46	Number of TOU meters with network TOU tariff*	#		
47	Total number of Network Customers	#		
48	Name of Responsible Project Officer**			
49	Officer's Contact Phone Number or Email			
50	Annual Energy Savings (as a result of these ToU projects)	08/09 MWh		Measured
		09/10 MWh		Measured
		10/11 MWh		Expected
51	Summer Peak Demand Reduction (as a result of these ToU projects)	08/09 kW		Measured
		09/10 kW		Measured
		10/11 kW		Expected
52	Winter Peak Demand Reduction (as a result of these ToU projects)	08/09 kW		Measured
		09/10 kW		Measured
		10/11 kW		Expected
53	Total CAPEX Expenditure on ToU Meters	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
54	Total OPEX Spent in Employee Hours and Other Costs on ToU	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
55	Total OPEX Spent on Incentives for ToU Projects	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected
56	Value of CAPEX Projects Deferred as a Result of these ToU Projects	08/09 $		Estimated
		09/10 $		Estimated
		10/11 $		Estimated
57	Total Annual OPEX Savings (as a result of these ToU projects)	08/09 $		Measured
		09/10 $		Measured
		10/11 $		Expected

APPENDIX B. SUMMARY OF RESPONDENT DATA

Table 22. Summary of respondent data by DM type for the 10/11 reporting year

Organisation	DM type											
	LM			EE			DG			TOU		
	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. systems reported*	Demand savings (kW)	Energy savings (MWh)	No. of meters	No. of customers on tariffs	Total no. of customers
ActewAGL	0	0	0	0	0	0	unknown	0	0	27,936	1,100	-
Aurora Energy	-	-	-	-	-	-	-	-	-	-	-	-
Citipower	1	1,265	0	0	0	0	0	0	0	-	-	-
Country Energy	1	400	0	0	0	0	2	60	300,000	162,641	20,694	796,614
Electranet Pty Ltd	0	0	0	0	0	0	0	0	0	-	-	-
Energex	8	24,175	450	0	0	0	20	32	0	4,200	0	4,200
Energy Australia	21	18,720	350	3	0	27,095	43	0	0	340,509	326,744	1,584,113
Ergon Energy	5	16,521	0	2	1,348	6,850	3	0	0	110,357	111,298	790,074
ETSA Utilities	27	34,402	3	0	0	0	0	0	0	-	-	-
Horizon Power	1	0	0	0	0	0	1	500	0	1	0	43,000
Integral Energy	23	5,978	348	0	0	0	1	1,300	0	-	-	-
Jemena	0	0	0	0	0	0	0	0	0	-	-	-
Power and Water Corporation	2	0	0	0	0	0	0	0	0	-	-	-
Powercor Australia	Included in Citipower											
Powerlink Queensland	0	0	0	0	0	0	0	0	0	-	-	-
SP AusNet	3	0	0	0	0	0	1	0	0	-	-	-
Transend Networks	0	0	0	0	0	0	0	0	0	-	-	-
Transgrid	Data not available											
United Energy Distribution	1	0	0	0	0	0	0	0	0	-	-	-
Western Power	3	117	0	1	0	14	5	0	0	-	-	-
TOTAL	**96**	**101,578**	**1,151**	**6**	**1,348**	**33,959**	**76**	**1,892**	**300,000**	**645,644**	**459,836**	**3,218,001**

- designates no survey received

* not including small scale PV

Table 23. Summary of respondent data by DM type for the 09/10 reporting year

Organisation	DM type											
	LM			EE			DG			TOU		
	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. systems reported*	Demand savings (kW)	Energy savings (MWh)	No. of meters	No. of customers on tariffs	Total no. of customers
ActewAGL	0	0	0	0	0	0	unknown	0	0	27,936	1,100	-
Aurora Energy	-	-	-	-	-	-	-	-	-	-	-	-
Citipower	1	950	0	0	0	0	0	0	0	-	-	-
Country Energy	1	600	0	0	0	0	2	60	0	162,641	20,694	796,614
Electranet Pty Ltd	0	0	0	0	0	0	0	0	0	-	-	-
Energex	8	37,175	450	0	0	0	20	32	0	4,200	0	4,200
Energy Australia	21	400	0	3	0	27,095	43	0	0	340,509	326,744	1,584,113
Ergon Energy	5	129	0	2	50	1,800	3	0	0	110,357	111,298	790,074
ETSA Utilities	27	0	0	0	0	0	0	0	0	-	-	-
Horizon Power	1	0	0	0	0	0	1	500	0	1	0	43,000
Integral Energy	23	11,790	655	0	0	0	1	1,300	0	-	-	-
Jemena	0	0	0	0	0	0	0	0	0	-	-	-
Power and Water Corporation	2	0	0	0	0	0	0	0	0	-	-	-
Powercor Australia	Included in Citipower											
Powerlink Queensland	0	0	0	0	0	0	0	0	0	-	-	-
SP AusNet	3	0	0	0	0	0	1	0	0	-	-	-
Transend Networks	0	0	0	0	0	0	0	0	0	-	-	-
Transgrid	Data not available											
United Energy Distribution	1	0	0	0	0	0	0	0	0	-	-	-
Western Power	3	0	0	1	0	0	5	4	787	-	-	-
TOTAL	**96**	**51,045**	**1,105**	**6**	**50**	**28,895**	**76**	**1,896**	**787**	**645,644**	**459,836**	**3,218,001**

- designates no data received

* not including small scale PV

Table 24. Summary of respondent data by DM type for the 08/09 reporting year

Utility summary 2008/09

Organisation	DM type											
	LM			EE			DG			TOU		
	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. of projects	Demand savings (kW)	Energy savings (MWh)	No. systems reported*	Demand savings (kW)	Energy savings (MWh)	No. of meters	No. of customers on tariffs	Total no. of customers
ActewAGL	0	0	0	0	0	0	unknown	0	0	27,936	1,100	-
Aurora Energy	-	-	-	-	-	-	-	-	-	-	-	-
Citipower	1	0	0	0	0	0	0	0	0	-	-	-
Country Energy	1	2,000	0	0	0	0	2	60	0	162,641	20,694	796,614
Electranet Pty Ltd	0	0	0	0	0	0	0	0	0	-	-	-
Energex	8	800	0	0	0	0	20	32	0	4,200	0	4,200
Energy Australia	21	350	0	3	1,235	27,095	43	0	0	340,509	326,744	1,584,113
Ergon Energy	5	276,265	0	2	0	0	3	3,000	0	110,357	111,298	790,074
ETSA Utilities	27	0	0	0	0	0	0	0	0	-	-	-
Horizon Power	1	0	0	0	0	0	1	500	1,048	1	0	43,000
Integral Energy	23	50	0	0	0	0	1	1,300	0	-	-	-
Jemena	0	0	0	0	0	0	0	0	0	-	-	-
Power and Water Corporation	2	0	0	0	0	0	0	0	0	-	-	-
Powercor Australia	Included in Citipower											
Powerlink Queensland	0	0	0	0	0	0	0	0	0	-	-	-
SP AusNet	3	0	0	0	0	0	1	0	0	-	-	-
Transend Networks	0	0	0	0	0	0	0	0	0	-	-	-
Transgrid	Data not available											
United Energy Distribution	0	0	0	0	0	0	0	0	0	-	-	-
Western Power	3	137	0	1	0	0	5	4	8	-	-	-
TOTAL	**95**	**279,602**	**0**	**6**	**1,235**	**27,095**	**76**	**4,896**	**1,056**	**645,644**	**459,836**	**3,218,001**

- designates no survey received

* not including small scale PV