Low Income Energy Efficiency Program (LIEEP)

Sustainable Business Australia

Our Green Home

Final Report

9 May 2016

Prepared by Sustainable Business Australia

With Consortium Partners Apex Australia, Connection Research, Object Consulting

Final Report

Low Income Energy Efficiency Program (LIEEP)

Sustainable Business Australia (SBA)

Our Green Home project

SBA Consortium

- Sustainable Business Australia (SBA) Limited
- Apex Australia Charitable Fund Inc.
- Object Consulting Pty Ltd
- Connection Research Services Pty Ltd

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Definitions and acronyms

Control Group	The group of households whose overall electricity consumption is measured and demographics determined, but who had no other intervention. This group was called the 'Detectives'.
Demographics	The attributes of a dwelling (e.g. location, size, age) and of a household (e.g. number of people, gross household income).
The Department	The Australian Department of Industry, Innovation and Science, which funded the project.
Dwelling	A physical house, townhouse/terrace or flat/apartment occupied by a household.
Household	The group of people who live within a single dwelling.
Intervention	An action designed to measure the change in electricity consumption of a household. There were two interventions: the installation of the Our Green Home meter (the Gadgets group), and the administering of a behavioural survey (both the Gadgets and the Detectives groups).
Intervention Group	The group of households who received the installation of an Our Green Home meter, and which are called the 'Gadgets'.
Low-income household	Any household whose combined gross annual income is below: $45,000 for singles (including those with one or more dependent children), $60,000 for couples with no children), or $75,000 for a family (couples with one or more dependent children, or households with more than two adults).
Our Green Home	An in-home real-time energy monitor and its associated software platform, developed by Object Consulting.
NEM	National Electricity Market. The electricity grid and its associated management across all Australia state and territories except Western Australia and the NT.
NMI	National Meter Identifier. The unique number given to each electricity meter in Australia that enables suppliers to bill by customer.
Participant	All households taking place in the study.
RCT	Randomised control trial. A method of research which compares intervention groups with a group (the control group) which has no interventions.
Unique identifier	The field in the database that uniquely identifies each of the participating households and which is used to link the data to that household.

Executive Summary

Purpose

The Our Green Home project was part of the Australian Government's Low Income Energy Efficiency Program (LIEEP), the objectives of which were to:

- Evaluate a number of different approaches in various locations that assist low income households to be more energy efficient.
- Capture and analyse data and information to inform future energy efficiency policy and program approaches.

(Section 1.1)

Within LIEEP, the Our Green Home project had as its key objective the measurement of electricity consumption in low income households, and the effects on that consumption when a real-time electricity monitor was installed and electricity users given access to their real-time energy usage data.

The monitor was attached to the household's electricity meter, and enabled consumption data to be accessed in real time (5 minute intervals) through a dedicated web portal. The Project was designed to test the hypothesis that easy access to real-time electricity data would make households more conscious of their electricity usage and costs, leading to behavioural changes and reduced consumption.

(Section 1.2)

Outcome

The data collected from the electricity retailers shows an average quarterly electricity consumption per participating household (all participants across all quarters) of 1307 kWh. This equates to 5228 kWh per year, a figure around 10% lower than the best estimate from the Australian Energy Regulator of an average annual consumption of 5817 kWh.

At an average tariff of 25 cents / kWh, the average annual household electricity bill in Australia is $1454.25 ($363.56 per quarter). A 5.0% savings on this amount represents an annual figure of $72.71, which is the figure used in this report and in the cost effectiveness and cost benefit analyses.

5817 kWh per year for the average Australian households means a total retail electricity bill of over $1 billion ($1,118 million) across all 7.7 million households in the country. A reduction of 5.0% across all households would mean a savings of around $56 million. For stand-alone houses only (76.3% of housing stock), this equates to an annual Australia-wide savings of $42.6 million.

(Section 4.2.3)

Challenges

There were three major challenges to the delivery of the Project.

Timing

The Project was almost eight months behind the original project schedule due to the 2013 federal election. This necessitated a shortening of the Project schedule and a redesign of the collection and analysis process, which made it much more difficult to do the comparative consumption analysis upon which the Project was predicated.

Recruitment

After initial unsuccessful attempts to engage participants a renewed approach reduced reliance on 'one on one' initial interactions with the households and a significantly increased use of technology to identify and secure householder participation.

Deployment

As a flow-on from the timing challenge, the requirement to complete all installations of the energy monitors by a certain date so as to allow for a statistically significant period of monitoring and data collection had to be balanced against the need to complete every installation diligently.

(Section 1.3)

Objectives

The Project set out to achieve four key objectives, all of which were wholly or partially met:

1. Collection of detailed energy consumption data over the period of 12 months for up to 1000 low-income households and baselining that data against the past 12 months of energy consumption.
2. Trial of a real-time energy monitoring technology (the Our Green Home platform and the accompanying energy monitors) with real-time online access to energy usage and costs to assess whether that would cause behavioural change leading to a reduction in electricity consumption.
3. Assessment of behaviours and attitudes before, during and after the trial for participant households so as to identify key factors that would enhance or inhibit their ability to reduce their energy consumption.
4. Identify the main barriers in adopting energy efficiency in low-income households.

(Sections 7.1 and 7.2)

Barriers to adoption

A number of barriers to adoption were identified:

- Landlord objection to installation of the monitors
- Low digital and computer literacy amongst participants
- Poor Internet access
- Information barriers, especially poor information on the electricity bill.

(Section 7.3)

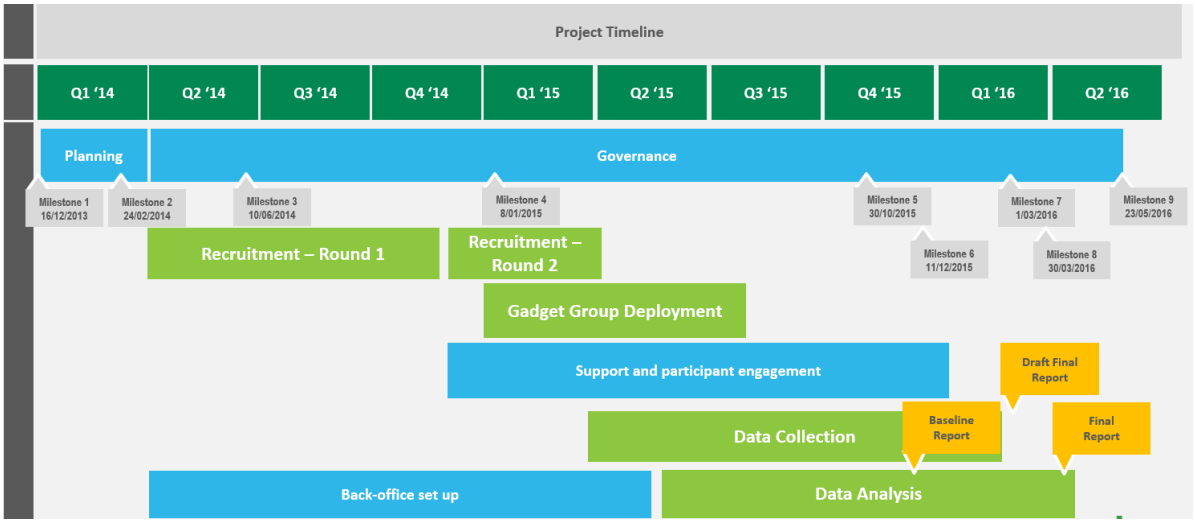
Project funding, duration and activities

The Project was funded by the Australian Government and by in-kind contributions by the consortium members. The Government, through the Department of Industry, Innovation and Science, provided $940,950, and in-kind contributions from consortium members totalled $873,554.

(Section 8.4.)

A total of 600 households took part in the project, 289 in the monitored (Gadgets) group and 311 in the control (Detectives) group. Every effort was made to ensure they were representative of the Australian population as whole.

(Chapter 3)



(Section 1.4)

Consortium members and their roles

Sustainable Business Australia

(Lead organisation, project management and liaison with the Department.

SBA is a not-for-profit membership-based organisation which has no political ties. Funding is derived from membership subscriptions and from staged events and conferences. SBA is the peak body in this country for the low carbon and environmental goods and services sector.

Apex Australia

(Participant recruitment and management)

Community services organisation which has worked extensively with low income families in the areas of child welfare, disabilities, aged care support, medical research and direct community care.

Object Consulting

(Installation and management of the energy monitors and online data platform. collection of monitor data)

IT consulting and software development company established in 1989 which has developed an energy efficiency platform called Our Green Home. The platform is designed using state-of-the-art, proven and sophisticated energy monitoring technology.

Connection Research

(Data collection of retail data, data analysis and presentation, report editing and production)
Market research company with experience in collecting, analysing and reporting on of data on energy efficiency, including in low income households.

(Section 1.5)

Methodology

The project was intended to compare three energy consumption data sets:

- Data from the energy monitors collected through Our Green Home online platform (www.ourgreenhome.com.au).
- Electricity retailer data from the 12 months preceding the trial.
- Electricity retailer data during the trial.

The project methodology was to compare these three data sets to determine if accessibility of real-time energy usage data and costs after installation of energy monitors reduced consumption or affected it in any other way. A control group, which did not have the monitors installed but which was otherwise demographically similar, was also included in the study to ensure the validity of the results.

The 600 participants in the Project were divided into two groups:

- *Gadgets Group* – the main group in which participants receive an energy monitoring device installed in their home by a qualified electrician, along with an online account for the Our Green Home platform where they could access their energy usage in real-time (289 participants)
- *Detectives Group* – the control group, which do not receive energy monitoring which allowed online access to their energy usage, but who instead provided quarterly electricity information from their electricity bills (311 participants).

All participants had to meet strict eligibility criteria:

- Their total annual household income was not to exceed $45,000 for singles, $60,000 for couples, and $75,000 for couples with dependent children
- Participants should not live in public housing – this was a program-wide requirement.
- Participants in the Gadget Group should have good broadband Internet access at home – this was a project-specific requirement.

(Section 2.1)

Recruitment

The selection process was designed to minimise any selection bias, where participants included in the project were not truly representative of the broader target population of all low-income households.

After initial problems with one-one-one recruitment, in August 2014 recruitment was augmented to include email broadcast to a large number of households already meeting the eligibility criteria, compiled from a number of sources including previous energy surveys undertaken by Connection Research in the past as well as third-party administered pay-to-complete surveys.

Over the course of the Project several additional recruitment channels were utilised with varying degrees of success. Overall, the recruitment activities of the project are estimated to have reached over 30,000 people across Australia to encourage participation in the trial.

(Section 2.2)

Costs

As the basis for the calculations, we used the sample size of the 300 households comprising the Gadgets group, rather than the total number of participants (600 households). Note that the final number in the Gadget group was 289, but more than 300 were initially in that group and were moved to the Detectives group because the monitor could not be installed.

The average total cost per household exceeded the budget for every single activity of the Project, for a number of reasons. Unless specifically stated otherwise, the costs in this analysis include both the funding and the in-kind contribution.

						Per participant	
	Funded	In-kind	Total	%			
Recruitment activities	$ 53,968	$ 46,800	$ 100,768	6%	$	336	6%
Engagement	$ 34,175	$ 16,700	$ 50,875	3%	$	170	3%
Analytics	$ 95,007	$ 19,500	$ 114,507	6%	$	382	6%
Information Technology	$ 119,900	$ 225,601	$ 345,501	19%	$	1,152	19%
Hardware and Support	$ 369,997	$ 43,500	$ 413,497	23%	$	1,378	23%
Governance	$ 111,437	$ 385,610	$ 497,047	27%	$	1,657	27%
Deployment direct cost	$ 111,185	$ -	$ 111,185	6%	$	371	6%
Deployment indirect cost	$ 45,281	$ 135,844	$ 181,125	10%	$	604	10%
Total	**$ 940,950**	**$ 873,554**	**$ 1,814,504**	**100%**	**$**	**6,048**	**100%**

(Section 7.5)

Cost Benefit Analysis

The Project had an average installation cost of $370 per household, plus the cost of hardware, software and support at $350, resulting in a total direct cost of $720 per household, on average. If viewed on a pure Return on Investment (ROI) basis, the annualised savings of 261 kWh represents a household savings of

$72.71, which translates to $508.97 over 7 years of the expected life of the equipment (holding other things constant and assuming no change to electricity prices).

From a cost-benefit perspective, the total benefit per household of $508.97 over 7 years represents a benefit ratio of 1.4:1 ($720 / $509), assuming a 7-year effective life of the asset that cost $720 per household on average including installation. It should be noted that installation costs and the cost of energy monitors deployed at each location varied significantly, and so likely did the benefits to each individual participants. The installation costs were significantly greater in non-metro areas due to travel overheads and difficulties finding suitable electricians, and the equipment costs were higher in houses due to proliferation of multi-phase supplies and solar panels.

The budgeted cost of installs was set at $170, and the cost of energy monitors per household was budgeted at $350, so that each household had a theoretical technology plus installation cost of $520, suggesting a 7.3 year payback at current tariff levels. It is significant that seven years is the accepted return on investment for many sustainability projects.

A more sophisticated alternate assessment of the payback period can be made using the Net Present Value (NPV) method. Using the weighted average cost of installations of $220 in Sydney Metro and Melbourne Metro, it can be shown that such investment has an internal rate of return (IRR) of 4.4%, achieving the a NPV of $33.61 over ten years, holding other things constant.

By comparison, an investment with the same IRR but with a theoretical installation rate of $170 at scale would have a much larger NPV of $83.61 over the same ten year period.

IRR	4.4%	Technology and installation cost = $570								
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Net Benefit	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Hardware and software	-$350									
Installation	-$220									
Net cash flow	-$497.29	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Discount factor	1.00	0.96	0.92	0.88	0.84	0.81	0.77	0.74	0.71	0.68
Discounted cash flow	-$497.29	$69.65	$66.71	$63.90	$61.21	$58.63	$56.16	$53.79	$51.52	$49.35
NPV	**$33.61**									

IRR	4.4%	Technology and installation cost = $520								
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Net Benefit	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Hardware and software	-$350									
Installation	-$170									
Net cash flow	-$447.29	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Discount factor	1.00	0.96	0.92	0.88	0.84	0.81	0.77	0.74	0.71	0.68
Discounted cash flow	-$447.29	$69.65	$66.71	$63.90	$61.21	$58.63	$56.16	$53.79	$51.52	$49.35
NPV	**$83.61**									

No consideration was given to any increases in the cost of electricity over these time periods, or for any changes in energy usage patterns due to variability of the climate. It is likely these will change significantly. As the average tariff increases the payback period declines, and vice versa.

(Section 7.6)

Findings and lessons learnt

Monitoring energy lowers consumption

The Project showed that the information on energy consumption enabled by the usage of an energy monitor, showing householders their real-time electricity consumption, reduces that consumption by 5.0%, for an annualised saving of an average of $72.71 per household. Depending on a number of variables around the cost of installing the monitors, this gives a payback period of seven to eight years.

The energy saving is consistent with the findings of a number of smart meter trials, and the payback period is typical of many sustainability technologies (e.g. solar PV panels).

There are many barriers to the use of the technology

The Project was funded to test the hypothesis that the real-time information on electricity consumption provided by monitoring hardware and software would reduce consumption. It was not designed to overcome any specific barriers, but many became apparent during the course of the project. Energy monitors are effective in many cases, but there are many barriers to their installation and effective use (see above).

It is difficult to recruit participants

The Project was overly optimistic about the recruitment process, and under-budgeted significantly. The Project had great difficulties with recruitment. Perhaps a centralised approach by a government agency or subcontractor would be more effective, perhaps followed by random allocation of participants to projects. That would be much less expensive due to significant economies of scale.

Despite the fact that the monitors are free to participants, are installed free of charge, and are left with the participants once the project is completed, it was very difficult to find suitable candidates. There were many reasons. They include:

- Difficulty in identifying and approaching candidates in the first place.
- Difficulty in convincing them of the merits and legitimacy of the project.
- Difficulty in securing the relevant permissions and privacy requirements.
- Reluctance to make the effort – “It’s all too hard.”
- Dwelling is unsuitable (e.g. old meter, poor Wi-Fi or Internet connection, remoteness).
- Property is rented and landlord will not give permission to install monitor.

It is not easy to install the monitors

The project attempted to install 421 monitors in the households of participants who expressed interest in receiving one. Of these, 300 installations were completed in the six months between February and July 2015, a 71% completion rate). Although the original plan allowed six months for installations, this was done on the basis of 800 installations.

Low income households already have below average electricity consumption and already feel they are more energy efficient

The Project focussed on reducing electricity consumption (achieving the same results by using less energy), rather than on increasing energy efficiency (using the same amount of energy to achieve a better result).

The average annual electricity consumption of the households in the study is 5228 kWh per year. The Australian average is closer to 6000 kWh per year.

Participants were asked if they felt that their household was more energy efficient than it was a year ago. Most believe that they are – Around one in five say they are much more energy efficient and nearly half say they are a bit more energy efficient. Participants in the study, by nature of their willingness to participate, have already self-selected as households interested in energy efficiency.

Many households have poor Internet connections

A third aspect which was unearthed is the significance of the digital divide, with over 5% of eligible participants being not suitable due to poor or unstable Internet or very old Internet modems. More later dropped out due to their concerns over the impact the energy monitors might have on the quality of their already unstable Internet connectivity.

Many households have a low level of computer literacy

A fourth aspect was related to the level of computer literacy amongst the target demographic. As our support overheads show, substantially more effort than anticipated was required to assist the participants in understanding how to use the online platform as well as to assist with re-connecting energy monitors if they went offline.

(Chapter 9)

Benefits

The Project concentrated only on the measurement of energy reduction – no other benefits were measured.

The main benefit as highlighted by many Gadget group users was their ability to know how much energy they used week on week, removing the information barrier. Consequently, the trial noted a statistically significant reduction in energy usage amongst these participants by 5.0% on average.

This corresponds to average annualised savings of 261 kWh per household, holding other things constant. Using an average flat rate tariff of 25 cents / kWh, this represents a household savings of $72.71 a year.

Because the second goal of the trial – to identify key factors that enhanced or inhibit households' ability to reduce their energy consumption – was achieved in full, the study has collected empirical evidence to identify these factors (both catalysts and inhibitors):

- Access to information
- Behavioural constraints
- Attitudes to renewable energy and climate change

(Section 7.4)

Recommendations

Establish strong metrics

The key to any exercise of this nature is effective metrics. Electricity consumption generates massive amounts of data, which causes its own problems. The data must be translated into meaningful metrics, which must then be applied in a relevant manner. Firm metrics must also be established for all costs involved in any project.

Keep the costs down

The name of the game is return on investment, often represented as the payback period. As electricity prices rise, payback periods will fall, but every effort needs to be made to ensure the cost of equipment, and its installation and maintenance, is minimised.

Educate consumers and create champions

Our experience during the project and in researching the case studies showed that in most households there was a 'champion' for the technology. While highly qualitative, this does highlight the fact that there are many consumers eager to understand more about, and act upon, energy efficiency. This should be further explored to understand and document the motivations to embrace this type of digital adoption.

Most users of electricity are not very sophisticated or knowledgeable about their consumption. The installation of a real-time monitor is intended to give them more knowledge, but they also need further information about how to use the system and what the information means.

Educating consumers – beyond supplying them with real-time information on their electricity consumption – was not one of the objectives of the Project. Indeed, such interventions were kept to a minimum so as to ensure only the effect of the monitor intervention was measured. To this end the Project provided participants on the monitored (Gadget) group with a user manual, and with a weekly email outline their usage for the previous week.

Test the technology on other demographics

The Program was, by definition, limited to low income households. Because their electricity consumption is already lower than that of households with a higher income, they are probably not the right demographic for this type of technology. But many low income households, especially those with low level of literacy, don't understand the connection between their energy consumption habits and their energy consumption levels.

Direct any technology rollout based on a phased and targeted program

There are many difficulties in installing the technology, particularly outside of metropolitan areas. This greatly increases the cost of installation and therefor the payback period or Return on Investment. All low income households should be entitled to the benefits of technology, but access is hampered by time, cost and resources. One way around this may be to link the technology to the rollout of the NBN or associated programs around housing upgrades.

Work with energy retailers to ensure better access to energy usage data

Information about electricity consumption is the key to its reduction, yet energy retailers provide only quarterly data long after the event. They are also extremely reluctant to share that data. Any improvement in quality of and access to that data will empower all households, including income low income households, and help reduce consumption.

(Chapter 9)

Chapter One
Introduction and Project Overview

1.1 Low Income Energy Efficiency Program

The Low Income Energy Efficiency Program (LIEEP, the Program) was part of a suite of measures announced by the Australian Government in July 2011 as part of its strategy as a response to climate change.

LIEEP was a competitive merit-based grant program established by the Government to provide grants to consortia of government, business and community organisations to explore approaches to improving the energy efficiency of low income households and enable them to better manage their energy use.

Trials under the Program were aimed at overcoming barriers to energy efficiency, such as information failure, capital constraints and split incentives, which might prevent low income households from adopting more energy efficient consumption practices. The trials were intended to explore new, creative and innovative ways to delivering approaches to implementing proven energy efficient technologies, and to assess the costs and benefits, collect and benchmark data, and establish effective administration and communication tools.

The objectives of the Program were to:

- Evaluate a number of different approaches in various locations that assist low income households to be more energy efficient.
- Capture and analyse data and information to inform future energy efficiency policy and program approaches.

In addition to these objectives, the Program sought to achieve the following benefits:

- Assist low income households to implement sustainable energy efficiency practices, to help them manage the impacts of higher energy costs and to improve their health, social welfare and livelihoods.
- Build the knowledge and capacity of consortium members to encourage long‐term energy efficiency among their clients.
- Build the capacity of Australian energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects.

The data and information collected from these trials have been submitted to CSIRO as an agent of the Department of Industry, Innovation and Science, and will be used to inform future energy efficiency policy.

1.2 The Our Green Home project

To address the LIEEP objectives, Sustainable Business Australia (SBA) proposed an approach to lower residential electricity bills by providing a real-time visibility of energy consumption through providing low income households with an online energy efficiency platform, using state-of-the-art energy monitoring technology developed in Australia.

The project, called Our Green Home, was delivered by an SBA-led consortium consisting of:

- Apex Australia (Apex): Participant recruitment and management.
- Object Consulting Pty Limited (Object Consulting): development of online platform and management of metering device installation.
- Connection Research Services Pty Ltd (Connection Research): data analysis and presentation.

The Our Green Home project differed from smart meter trials in that the monitoring device which gave the householder feedback on electricity consumption did not replace the electricity meter – it supplemented it. There are a number of other supplementary monitoring devices in existence, but none have ever been employed in a large scale study such as this.

Hundreds of low income Australian households were provided with installations of the Our Green Home energy monitoring equipment and software package (the final number in the Project was 311). Through the Our Green Home web portal at www.ourgreenhome.com.au, low income households were given access to their energy consumption and estimated costs in real time.

The key objective of the Program was to collect extensive data for analysis of energy consumption in low-income households, overcoming the barrier of information asymmetry, and to determine if the availability of that information to households would encourage them to reduce their electricity consumption. Our Green Home bypassed the perceived limitations of the data provided to householders in their existing quarterly bills, providing an online monitoring platform capturing consumption data every 5 seconds.

Figure 1 – Real-time energy monitors used in the trial (Source: Saturn South Pty Ltd)

The technology component of the project was delivered by Object Consulting, an Australian-based and Australian-owned ICT company specialising in building enterprise business solutions. Object Consulting is Microsoft's sole Australian partner for Digital Marketing and, as one of a handful of Microsoft strategic partners, it leads Australia in the development of user experience applications.

The consortium also included a feedback, monitoring and evaluation component. An Australian market research and consulting company specialising in the analysis for sustainability issues, Connection Research, provided independent feedback and analysis of the success of the program outcomes. Connection Research been surveying the Australian consumer market for ten years, over which time it has gained a unique understanding of sustainable practices within the home.

The trial invited householders from across metropolitan, regional and rural communities to participate. The intention was to gather 1000 participants to either have energy monitors installed in their homes or to take part in surveys as a control group.

After difficulties with recruitment (see section 2.2), 600 households took part in the program. The 311 participants who had electricity monitors installed reported that access to the energy information helped them to take charge of their electricity bills by being more aware of what appliances were using electricity and when. They reduced their electricity consumption by an average of 5.0%.

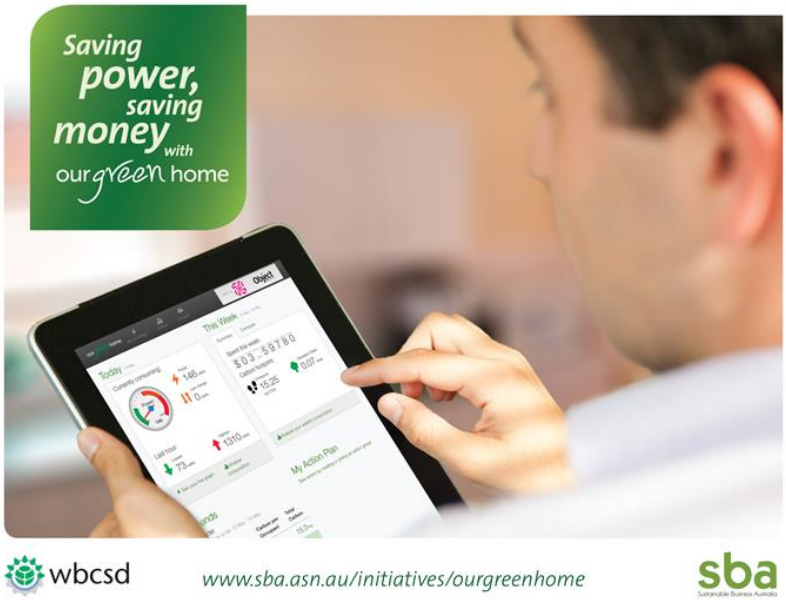


Figure 2 – Accessing real-time energy usage through Our Green Home

Householders with energy monitors installed gained online access to their real-time energy consumption, associated costs and comparison with other households, with immediate visibility of the effects of turning on and off appliances. The platform enabled householders to track their real time energy consumption and calculate cost savings.

SBA believes that the outcomes and findings from this trial will enable policymakers to assist low income households to overcome the barriers to energy efficiency, such as information failure, capital constraints and split incentives, and that it will help them adopt more efficient ways of consuming energy and protect them from risks of rising electricity prices. All data and information collected from this trial can also be used to inform future energy efficiency policy.

Participating households were selected on the basis of their income level (see section 2.1), with every attempt made to ensure that the household type (single, couple, family), dwelling type and geographic spread were largely representative of the Australian population (see Chapter 3).

1.3 Challenges

There were three major challenges to the delivery of the Project.

Timing

The single biggest challenge was timing available to deliver the Project, with the actual commencement of the Project being almost eight months behind the original project schedule, due to the 2013 federal election. This necessitated a revamp of the Project schedule and a redesign of the collection and analysis process to address CSIRO's review comments on the original Project and Data Collection and Evaluation Plans.

While neither the Department nor the Project Consortium had any control over this, it nevertheless created substantial timing challenges which necessitated variations to the Funding Agreement. It also complicated relations with the Department as to the means by which the Project would deliver on its brief when subsequent timing and funding variations were required to be made.

As the Program's own timeline did not allow for flexibility at the end, effectively setting an unmovable final completion date (for all projects in the Program), this meant that the variation to the commencement of each activities resulted in a compressed schedule for every phase of the Project.

The main effect of this compressed schedule was the inability to collect the year-on-year consumption data that would have enabled a full comparison of electricity usage over all four quarters of two years, one before the intervention and one after. Nevertheless, sufficient data was collected to make meaningful comparisons and satisfy the requirements of the project.

Recruitment

The second challenge was the pathway to engagement of the households. After initial attempts to engage recruiters a renewed approach and necessitated a rethink and a reduced reliance on 'one on one' initial interactions with the households and a significantly increased use of technology to identify and secure householder participation.

More information on recruitment and the difficulties encountered is contained in section 2.2.

Deployment

The third challenge was the difficulties encountered during the deployment of the project. As a flow-on from the first challenge, the requirement to complete all installations of the energy monitors by a certain date so as to allow for a statistically significant period of monitoring and data collection had to be balanced against the need to complete every installation diligently.

The variability of installation sites requirements due to the older than average housing stock in the sample did not allow for a one-size-fits-all approach, as the majority of sites had to be assessed on a case-by-case basis. Furthermore, the smaller number of initial expressions of interest did not leave a lot of room to de-select the more complex sites (although some sites were dropped in the end due to extreme complexity and very high remediation costs).

Another aspect pf difficulty of deployment was the necessity of engaging with subcontractors for the installation of monitoring devices, due to the diversity of households' geographical locations.

More information on deployment and the difficulties encountered is contained in section 2.3.

1.4 Project Funding, Duration and Activities

The Project was funded by the Australian Government and by in-kind contributions by the consortium members. The Government, through the Department of Industry, Innovation and Science, provided $995,950, and in-kind contributions from consortium members totalled $604,483. Full details are contained in section 8.4.

A total of 600 households took part in the project, 311 in the monitored (Gadgets) group and 289 in the control (Detectives) group. Every effort was made to ensure they were representative of the Australian population as whole – see Chapter 3.

The SBA consortium's initial application to join the Lo w Income Energy Efficiency Program was made in September 2012. The initial application to the then Department of Climate Change and Energy Efficiency was not successful, but the consortium's bid was successful in the second round and the consortium was invited to join the Program in August 2013.

The Federal election and change of government in September 2013 delayed the beginning of the Project, which began in late 2013 (Milestone 1 was on 16 December 2013). The Project ran until mid 2016 (Milestone 9 was on 23 May 2016).

The following timeline outlines all significant activities during the entire term of the project:

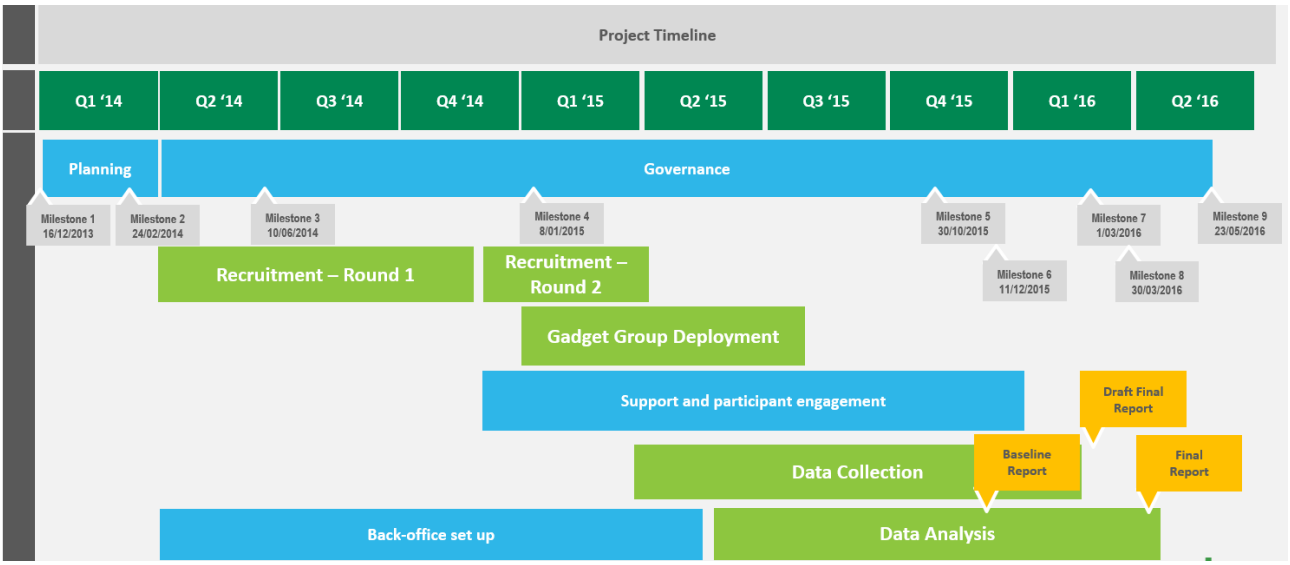


Figure 3 – Project Timeline

The table on the next page details the activities undertaken during the project

Project Activities

Activity	From	To	Description
Planning	10-01-2014	31-05-2014	Formalisation of the project management documents, including: • Project Plan • Data Collection and Reporting Plan (DCRP) • Compliance Plan • Risk Assessment and Management Plan • Consortium response to CSRIO comments on the DCRP
Recruitment – Round 1	24-02-2014	30-09-2014	Recruitment of expressions of interest and enrolment of eligible participants: • Participation eligibility checklist • Participation agreement • Project brochure • Support network training manual • Preparation of support network administration.
Recruitment – Round 2	30-09-2014	31-03-2015	Following the evaluation of the Round 1 of recruitment, an alternative recruitment strategy was developed, which required production of the following deliverables: • Dedicated project website with Frequently Asked Questions about the trial requirements • Self-service online screening engine to select eligible participants • Face-to-face presentations • A public relations campaign using an external PR agency • News coverage in local newspapers in targeted geographies with high concentration of low-income demographics
Deployment	01-02-2015	31-07-2015	Installation of the energy monitors and activation of participant's online accounts.
Support and engagement	01-01-2015	31-03-2015	All activities related to support and engagement with the participants, including: • Collection of participation agreements and Privacy Notices • Obtaining photographs of the insides of the switchboards to assess technical feasibility of installations • Email and phone support for technical issues • Face-to-face visits to selected installations sites in Sydney
Data readiness	24-02-2014	30-06-2014	Set up of the trial database and the attitudinal and behavioural surveys.
Data collection	30-06-2014	29-02-2016	Collection of the various data elements as defined by the trial data collection and reporting plan, including: • Baseline demographic data • Baseline attitudinal and behavioural data • Baseline consumption data from electricity retailers • Final demographics data • Final attitudinal and behavioural data • Energy consumption data from energy monitors.
Data analysis and reporting	01-06-2015	31-03-2016	Statistical analysis of the collected data and production of the Baseline Report and the Final Report.
Governance	31-05-2014	31-05-2016	Oversight of the project and project status reporting.

1.5 Consortium members and their roles

Sustainable Business Australia (Lead organisation)

SBA is a not-for-profit membership-based organisation which has no political ties. Funding is derived from membership subscriptions and from staged events and conferences.

Sustainable Business Australia is the peak body in this country for the low carbon and environmental goods and services sector. The organisation is also a think tank focusing on “new markets, new industries and new jobs.”

A large part of SBA's work involves raising awareness about the scale and relevance of major environmental challenges and the commercial solutions that business and industry can provide. SBA represents a rapidly growing coalition of members who will be the backbone of the next era of wealth generation by providing commercial solutions to environmental challenges.

SBA's membership is drawn from many sectors and includes investors, bankers, technology and infrastructure developers, consultancy and engineering companies involved in all areas of the economy.

Role: Project management and liaison with the Department.

Apex

The Association of Apex Clubs Inc., known as Apex Australia, has an 81 year history of active citizenship participation by members aged 18 to 45. Apex has worked extensively with low income families in the areas of child welfare, disabilities, aged care support, medical research and direct community care. Apex volunteers are a vital volunteer resource for various charitable and social justice activities.

Apex is experienced with engaging communities nationally, demonstrated by past roll-outs of national projects such as their national ‘Help a Kid Make It’ project – which sought to assist children and families impacted by leukaemia and other childhood cancers, and the current ‘Teenage Fashion Awards’ – run nationally as an opportunity for young Australians to demonstrate their abilities in a friendly competition.

Members are formally inducted and provided with guidance and awareness of policies related to governance, probity, child protection and privacy. For this reason we believed experienced Apex volunteers would be a sound pool of adult, trained and responsible outreach team members. As the majority of Apex members are commonly employed as supervisors, self-employed contractor business owners, police officers or teachers, the pool of volunteers reflect a mature and motivated workforce with relevant experience in dealing with members of the broader public.

We believe the reputation of Apex for ‘hands on’ philanthropy and a long-standing status as a champion of social justice causes, in particular in low-income communities, will assist with the recruitment and retainment of participants.

Role: Participant recruitment and management.

Object Consulting

Object Consulting is an IT consulting and software development company established in 1989. In 2009-2011 Object Consulting developed an energy efficiency platform called Our Green Home. The platform is designed using state-of-the-art, proven and sophisticated energy monitoring technology currently available from several Australian-based hardware manufacturers. Since late 2011 Object Consulting has been setting up small-scale pilot projects in locations such as ACT, Northern Territory, Sydney and Melbourne.

Object Consulting has a successful track record of delivered enterprise-scale IT solutions and information management systems for government, finance and telecommunication sectors. It has delivered a wide range of systems to government including the ECV (Electronic Conveyancing) and SPEAR (Streamlined Planning through Electronic Applications and Referrals) for Land Victoria starting in 2004 and continuing to this day, as well as the Births, Deaths and Marriages system for the NSW Government (2013-2015) and State Government of Victoria (currently being developed).

Role: Installation and management of the energy monitors, provision and administration of the Our Green Home online data platform, data collection (monitor data).

Connection Research

Connection Research has intensive experience in collecting, analysing and reporting on of data on energy efficiency, including in low income households. Connection Research has undertaken a number of large-scale consumer assessments, many of them similar in approach to that outlined in this project.

One specific example particularly relevant to this pilot is the Interconnected Home Multiclient Study (2011). It was a detailed national survey of 5,333 representative Australian households into their attitudes and actions on residential energy management. Of the 5,333 households assessed, over 1,500 homes were low income households.

Role: Data collection (retail data), data analysis and presentation, report editing and production.

Chapter Two
Methodology

2.1 Introduction and assumptions

The project was intended to compare three energy consumption data sets:

- Data from the energy monitors collected through Our Green Home online platform (www.ourgreenhome.com.au).
- Electricity retailer data from the 12 months preceding the trial.
- Electricity retailer data during the trial.

Due to a number of difficulties it was not possible to collect complete data sets, but sufficient data was collected to satisfy the requirements of the project.

The project methodology was to compare these three data sets to determine if accessibility of real-time energy usage data and costs after installation of energy monitors reduced consumption or affected it in any other way. A control group, which did not have the monitors installed but which was otherwise demographically similar, was also included in the study to ensure the validity of the results.

Extensive demographics enable the consumption patterns of subgroups of the participant base to be compared – by household type (single, couple, family), by dwelling characteristics (e.g. size, age, house vs apartment), by location, etc. Various attitudinal and behavioural characteristics were also captured and quantified, and could be used as determinants if further analysis of this nature is required.

The Project was originally designed with an intent for 1,000 low income households to take part in a national study of electricity consumption. Of these, 800 would receive an energy monitoring device (the Our Green home monitor) installed onto their electricity switchboard, and a further 200 would act as a control group and provide quarterly electricity information and complete surveys on consumption.

The two groups were given the following names, which we found to be easier for the participants to relate to:

- *Gadgets Group* – the main group in which participants receive an energy monitoring device installed in their home by a qualified electrician, along with an online account for the Our Green Home platform where they could access their energy usage in real-time.
- *Detectives Group* – the control group, which do not receive energy monitoring which allowed online access to their energy usage, but who instead provided quarterly electricity information from their electricity bills.

After great difficulties with enrolling households in the program, and with the approval of the Department, the Participant group was reduced to 600 participants. Final numbers were 289 Gadgets (not all of whose monitors were able to supply meaningful data from the monitor) and 311 Detectives.

All participants had to meet strict eligibility criteria:

- Their total annual household income was not to exceed $45,000 for singles, $60,000 for couples, and $75,000 for couples with dependent children (this was originally set to $30,000, $45,000 and $60,000 but later revised as agreed with the Department as it was harder to find eligible participants meeting these income requirements in all geographies) – this was a program-wide requirement.
- Participants should not live in public housing – this was a program-wide requirement.
- Participants in the Gadget Group should have good broadband Internet access at home – this was a project-specific requirement.

The participant recruitment methodology was designed around leveraging the volunteer networks of Apex Australia, a volunteer nation-wide service organisation. It was intended that Apex would use its extensive club network to promote the study and encourage people to take part, and also ensure people qualified under the program eligibility criteria and assist people to become participants in the study in either the Gadgets Group or the Detectives Group.

As it turned out, this recruitment method was not successful and other methods were adopted. These are covered in detail in this chapter.

2.2 Recruitment

2.2.1 Participant selection

The selection process was designed to minimise any selection bias, where participants included in the project were not truly representative of the broader target population of all low-income households.

A system was put in place to minimise the possibility of any such bias. The online selection process was based on an eligibility checklist as a means to ensure that the process was an objective one. All prospective participants received the same information, but participants were selected only if they agreed to and signed up to the program, with the return of the required documentation.

Given the practical limitations of the selection method, the following guidelines were adopted:

- The recruitment process was as uniform as possible across the different channels of selection. A standardised recruitment message (appropriate for the socio-demographic characteristics of the householder) assisted with establishing equivalency across different recruitment channels.
- Within any single recruitment method, the project attempted, as far as practicable, to ensure consenting participants had equal chance of being assigned to the intervention group or to the control group. This avoided systematic bias in allocating participants to a particular group based purely on the recruitment source.

2.2.2 The recruitment process

From April 2014 through to July 2014 Apex volunteers began engaging with their local communities, but found that the people approached were reluctant to become involved because of a number of trust and other barriers, including:

- A perceived mistrust about the use of the information collected. The Privacy Notice handed out to participants, which outlined how the data collected would be used, was too complicated for many people to understand, but even when it was explained what it meant people in this demographic expressed anxiety about providing detailed data to government of how they used electricity.
- Complexity of the paperwork involved was a deterrent – participants had to sign a Participation Agreement as well as the Privacy Notice.
- Some Apex clubs also reported that it was difficult to find households who met all of the eligibility criteria at the same time: many people did not live in public housing and had Internet but their income was in excess of the requirements (the original, lower thresholds), or they met income and housing criteria but didn't have an adequate Internet connection.

In August 2014 the project promotion and recruitment was augmented to include email broadcast to a large number of households already meeting the eligibility criteria, compiled from a number of sources including previous energy surveys undertaken by Connection Research in the past as well as third-party administered pay-to-complete surveys.

Simultaneously, the project recruitment material was made available online in form of a project website which also included electronic versions of the Participation Agreement and the Privacy Notice, and had a comprehensive Frequently Asked Questions section compiled based on the inquiries and concerns from people approached so far.

By November 2014 the project team had developed an end-to-end online screening tool that automated many of the on-boarding steps previously done as single individual steps manually. Pre-qualification of prospects, collection of their basic demographic data, electronic acceptance of the Participation Agreement and the Privacy Notice and – for the participants in the Gadget Group – opening of an online account on Our Green Home platform were automated within one online interaction of 3-5 minutes' duration.

Channel	Outcome
Connection Research Database	Three email campaigns were run by Connection Research to over 3,000 email addresses, resulting in recruitment of approximately150 households.
Networks from Other Agencies	Several other agencies were approached seeking their help in promoting the study within their constituents: • Global Skills • Good Shepherd • Morland Energy Foundation • Queensland Council of Social Services • Sustainable Living Tasmania • Yarra Energy Foundation No households were recruited though this channel, primarily due to their demographics not meeting the project eligibility criteria (e.g. students living in shared living arrangements or households living in public housing).
Social Media	Very limited success was achieved with a paid Facebook campaign. To underpin the online strategy, a dedicated project information website with an end-to-end pre-qualification and sign up engine has been developed. Despite the social media campaign only resulting is 10 households recruited, the online screening engine has been used for enrolment through other channels.
Market Research Brokers	A market research agency was engaged on a pay-to-complete basis to target and recruit households of a specified demographic through their email databases. Although, this method has resulted in finding 600 expressions of interest, only 50% of those were subsequently qualified as fully meeting the study criteria. The level of engagement from participants recruited through this method was lower than those recruited via other channels (e.g. printed media).
Job Agencies	We have partnered with a job agency Global Skills to promote the project to job seekers who are long term unemployed. Face-to-face presentations and Q&A sessions were run in several Global Skills offices in Western Sydney (Penrith, Parramatta and Blacktown) to promote the study and seek expressions of interest, however none were received through this channel. Anecdotally, the feedback from attendees of those sessions was that whilst energy costs was an issue for them, their prime concern was finding a job (some were unemployed for several years) and as such initiative like this was seen as a distraction.
Printed Media	The project has engaged a PR agency to design a printed media campaign targeting local news outlets such as newspapers. This has been successful, resulting in recruitment of additional 150 qualified participants. A series of articles showcasing the project in have been run in 4 local newspapers based in areas with high numbers of people in our demographic: Central Coast (NSW), Sydney, Geelong (VIC). Printed media campaigns in the local newspapers have proven to get the highest yield, for example one news article in the NSW Central Coast Advocate alone generating over 60 new qualified expressions of interest.

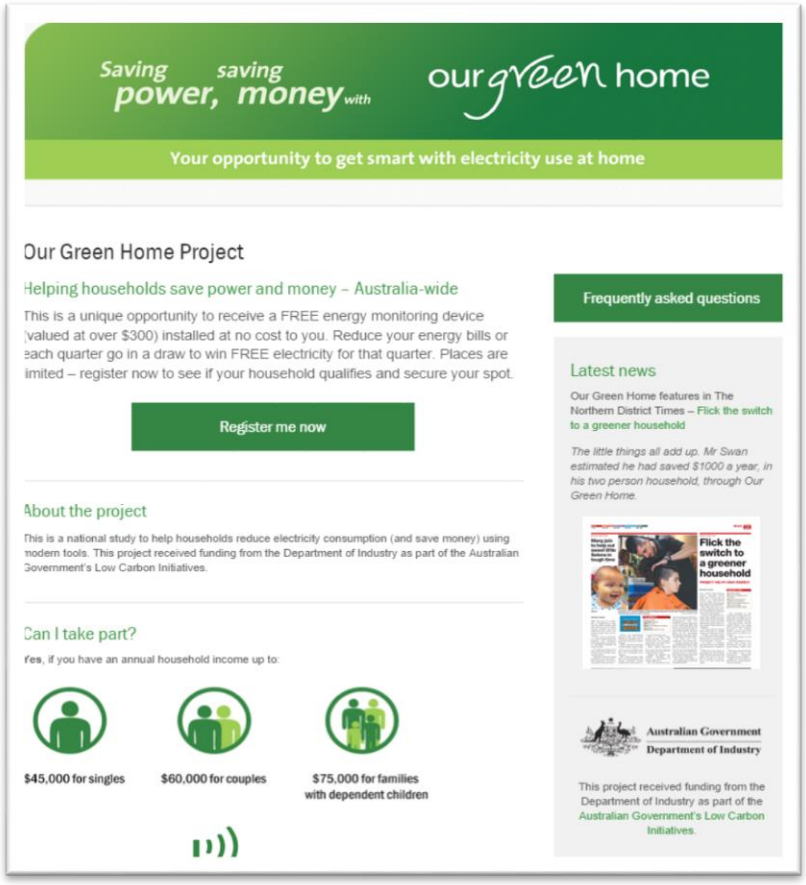


Figure 4 - Our Green Home project website

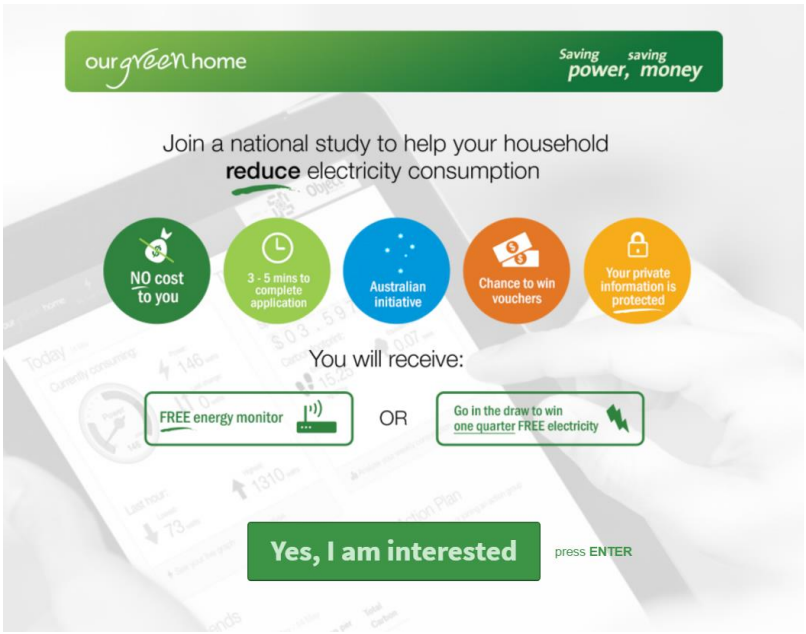
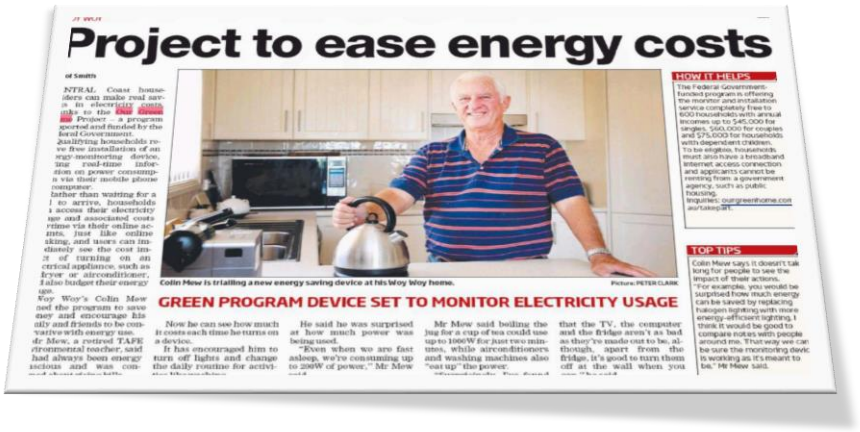


Figure 5 - Participant online screening survey

In December 2014 a second attempt at promoting the project through social media was launched. In January 2015 the team has engaged an external Sydney-based public relations agency to help crafting a pitch about the project to local media outlets within the geographies that that project was targeting.



Project to ease energy costs

HOW IT HELPS

TOP TIPS

GREEN PROGRAM DEVICE SET TO MONITOR ELECTRICITY USAGE

Figure 6 - News coverage on NSW Central Coast (Woy Woy)

Overall, the recruitment activities of the project are estimated to have reached over 30,000 people across Australia to encourage participation in the trial. Recruitment numbers are summarised below:

Responses to recruitment drives	
Wanted to be Detectives	431
Wanted to be Gadgets	850
Happy to be in either group	224
Total	**1505**

Able to participate	665
Not able to participate	840
Total	**1505**

Reasons for not participating	
Did not qualify	386
Responded, but subsequently withdrew	159
Qualified but never responded to request to participate	288
Email address unreachable, no phone number	7
Total	**840**

Participants first cut (5 April 2015)	
Detectives	303
Gadgets	362
Total	**665**

Participants second cut (19 Sep 2015)	Number
Detectives	333
Gadgets	267
Total	**600**

Participants final adjustment (16 March 2016)	Number
Detectives	311
Gadgets	289
Total	**600**

In summary we have found that the use of market research databases provided a much greater geographical distribution for the sample size than might have otherwise occurred through Apex Clubs. As a consequence, this required changes to the deployment and support strategies to reflect the wider range of household locations than originally planned and the greater likelihood that households will be outside the range of Apex clubs for support.

It was more successful to engage households who are already warm to the idea of being involved in sustainability or who have been previously been engaged in market research, as was proven by the use of Connection Research email database of people surveyed in the past on the issues related to sustainability and climate change.

The messaging for recruiting households needed to be straightforward and benefits focussed, with links to more detailed information. The trust element increases with the use of personal communication channels, such as printed news media. It appears those channels are more trusted than the pure online and social media channels.

2.3 Deployment

The project attempted to install 421 monitors in the households of participants who expressed interest in receiving one. Of these, 300 installations were completed in the six months between February and July 2015, a 71% completion rate).

Although the original plan allowed six months for installations, this was done on the basis of 800 installations. The slower completion rate of installations can be attributed to:

- **Identified risks and complexities during the installations** that necessitated a slow-down in the rate of installations. Many installations were pre-qualified by electricians for safety and suitability using photographs of the insides of switchboards provided by the householders. But 30% of households could not provide photos so an inspection visit was arranged.
- **Multiple visits.** For those participants who were unable or unwilling to provide photos of their switchboards, we arranged on-site pre-assessment followed by an installation as a repeat visit if the site were to be found suitable.
- **The predominance of older style switchboards** in the non-metro areas increased the complexity of the installations as decisions on the extent of upgrades required has to be made on a case by case basis.
- **The degree of travel required to remote sites in non-metro areas**. Electricians were reluctant to travel long distances to complete single jobs where it required a 4-5 hour round trip. On a case by case basis, additional costs to cover travel overheads have been allowed so as not to exclude remote participants.
- **The reliance on Internet connectivity** for the energy monitors to be installed. We have found at the time of installation householders with their Internet accounts disconnected for various reasons, and other householders who have unsuitable port connections or unsuitable type of Internet access (e.g. 3G and not permanent broadband).

- **Householder availability** resulted in additional overhead required to contact and confirm installations. In some extreme cases we had to make over ten follow-ups with the same participant. Also, despite our best efforts it was not always possible to complete a confirmed booking. In some extreme case an installer travelling in regional Victoria had confirmed times in advance with the participants, but after travelling several hours learned that one participant was not in town while another refused to open the door**.**

The higher than anticipated drop-out rate (29%) during the deployment phase was due to the technical issues of the sites as well as due to the remoteness of some participants and the difficulties of finding suitable local electricians.

Among the technical difficulties that prevented installations were:

- Switchboard requiring major overhaul (including older switchboards with asbestos)
- Lack of space in the switchboards to install energy monitors (especially on sites where several monitors were required)
- Outdated Internet modems (e.g. lack of spare ports to connect the energy base station)
- Poor or unsuitable Internet connection (e.g. only 3G modems that do not support the type of energy monitoring system used in the project).

Subsequently, about 30 households requested to be removed from the monitoring group and out of the project (a not unusual 10% natural attrition) due to change in circumstances (e.g. moving out, health reasons).

A significant number of installed sites required more than one energy monitor wired to monitor each circuit, such as in 3-phase houses, houses with solar hot water or solar PV systems. An unexpectedly high proportion of houses in this demographic were found to operate solar PV systems (30% of all households installed). Consequently, this resulted in 492 individual energy monitors being deployed across the Gadgets Group households.

2.4 Participant retention and communication

2.4.1 A wider geographic spread

Even when the original project design centred on Apex clubs, it had a national focus. But as the recruitment methods changed, so did the demographic spread – more widely-dispersed households that were not concentrated around participating Apex clubs were recruited. Whilst such a spread is more representative, it created additional logistical challenges for the project team during deployment.

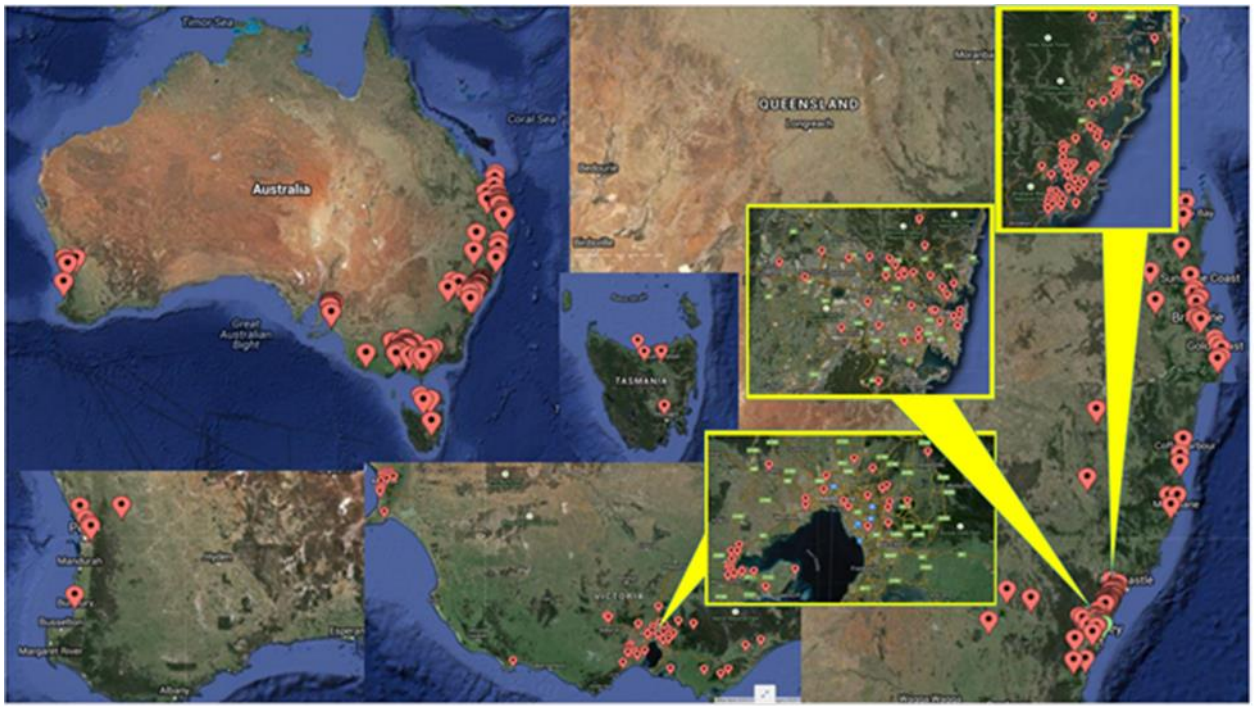


Figure 7 – Geographic spread of installations for the Gadgets Group across Australia.

2.4.2 Communication with Expressions of Interest

In the first round of recruitment activities, a project brochure was designed with intention to be distributed by Apex representatives to their members and general public.

Following the implementation of an end-to-end online screening engine to support the second round of recruitment, a dedicated email address was established for inbound as well as outbound email communication with all expressions of interest.

A series of email campaigns have been run to convert the expressions of interest into active participants, using an online campaign management tool. The table below lists all the outbound email campaigns undertaken during the second round of recruitment.

Campaign Name	Date	Description	Targeted	Responded	Unsubscribed
Participation Agreement 1st Reminder	10-10-2014	Asking participants to review the electronic versions of the Participation Agreement and the Privacy Notice and email with 'I Agree' in the subject or body of the email.	353	64 (18.1%)	10
Participation Agreement 2nd Reminder	10-10-2014		265	52 (19.6%)	3
Participation Agreement 3rd Reminder	04-11-2014		340	33 (9.7%)	15
EOIs Friends and Family Referral	03-02-2015	Seeking referrals from the Expressions of Interest by providing a unique referral registration link to the screening engine to forward to friends and family members.	324	17 (5.2%)	4
Expressions of Interest Registration Reminder	06-03-2015	A reminder to the Expressions of Interest to complete the screening and accept the Participation Agreement and Privacy Notice if eligible	84	25 (29.8%)	1
EOIs Grocery Voucher Promotion	07-04-2015	A promotion to receive a $50 grocery voucher to eligible Expressions of Interest if they complete their registration.	269	34 (12.6%)	1
EOIs Grocery Voucher Promotion (Reminder)	14-04-2015		179	10 (5.6%)	1

The response rate for each of these email campaigns varied between 10% and 30%, with an average of around 20%. Responses to repeat mail-outs to those users who did not open the first email resulted in diminishing returns between 5% and 10% on average, which is normal in an email campaign of this nature.

All email campaigns were executed in the same style for consistency. Samples of the email campaigns listed above are given below.

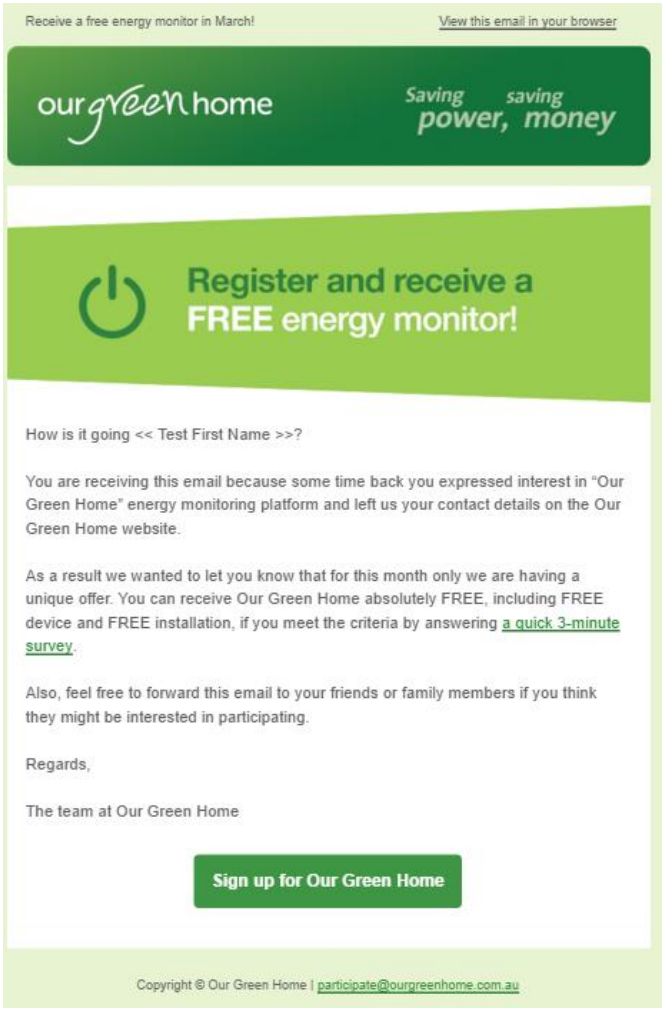


Figure 8 - Expression of Interest registration reminder

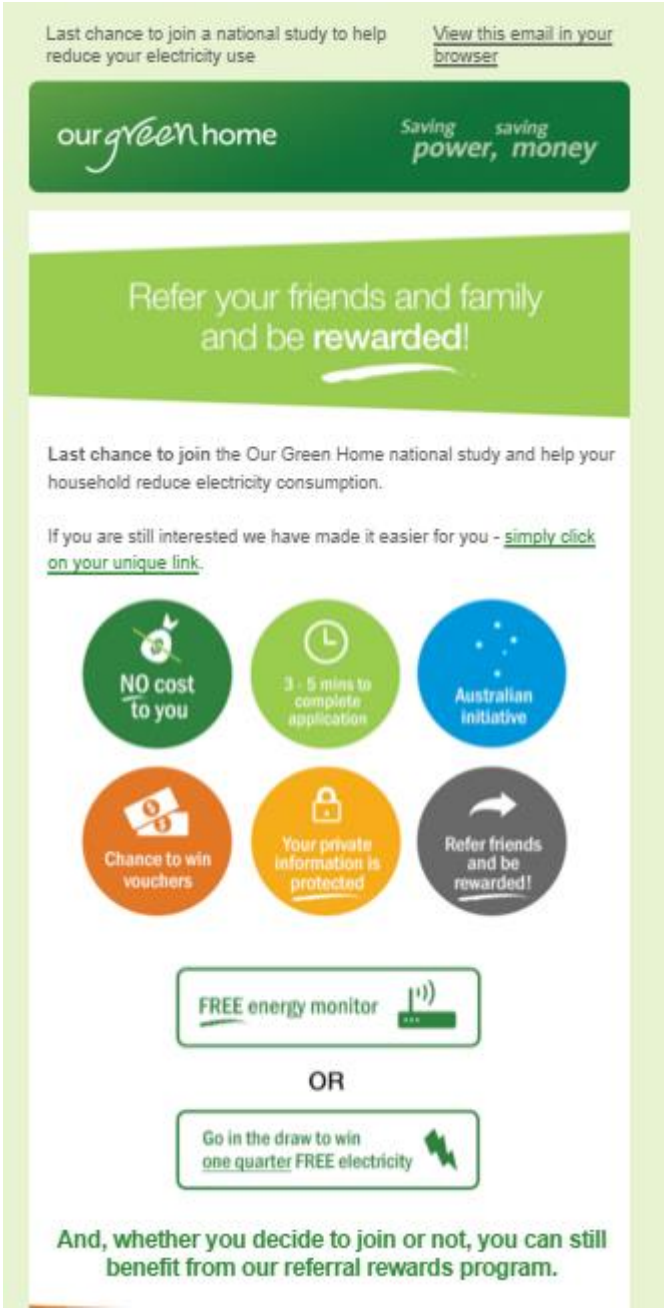


Figure 9 - Expressions of Interest referral campaign

2.4.3 Communication with participants

A series of email campaigns was also sent out to the participants, using the same online-based campaign management tool. The table below lists all the outbound email campaigns to the participants of both the Gadgets and the Detectives groups.

The response rate to these email campaigns was higher on average than to those sent to Expressions of Interests. This might be explained by the higher level of involvement of those who already decided to take part.

Campaign Name	Date	Description	Targeted	Responded	Unsubscribed
Gadget Group Account Activation	24-11-2014	Requesting the gadget Group Participants to complete activation of their online account.	137	15 (10.9%)	3
Gadget Group Friends and Family Referral 1	03-02-2015	Seeking referrals from the Gadgets Group participants by providing a registration link to the screening engine to forward to family and friends.	315	23 (7.3%)	5
Detectives Group Friends and Family Referral 2	03-02-2015		115	8 (6.9%)	6
Gadget Group Account Activation Reminder	03-02-2015	A reminder to the Gadget Group participants to complete activation of their online account.	120	39 (32.5%)	0
Gadget Group Installation Request Reminder	17-03-2015	A reminder to Gadget Group participants without photos of switchboards and without installation requests to complete those online.	40	7 (17.5%)	3
Gadget Group Baseline Survey	02-04-2015	An email to the Gadget Group participants with a link to complete a baseline survey	291	159 (54.6%)	0
Gadget Group Baseline Survey (Reminder)	10-04-2015		71	19 (26.7%)	0
Gadget Group Baseline Survey (2nd Reminder)	17-04-2015		136	58 (42.6%)	2
Missing Energy Retailers Reminder	17-04-2015	A reminder to supply the name of the energy retailer to those participants who have not done it yet	284	25 (8.8%)	3
Participants Demographic Survey	23-04-2015	An email to all subscribed participants with a link to complete a demographic survey	172	90 (52.3%)	2
Gadget Group Final Call	1-06-2015	A final call to the subscribed participants enrolled in the Gadgets Group to activate their accounts and request installations	101	29 (28.7%)	5
Gadget Group Installations	18-06-2015	A reminder to the subscribed participants in the Gadgets Group to be cooperative with the installers to arrange installations before 30-06-2015.	155	120 (77.4%)	0
Gadget Group Website Enhancements	19-01-2016	A notice to the subscribed participants in the Gadgets Group to be cooperative with the installers to arrange installations before 30-06-2015.	221	171 (77.7%)	0

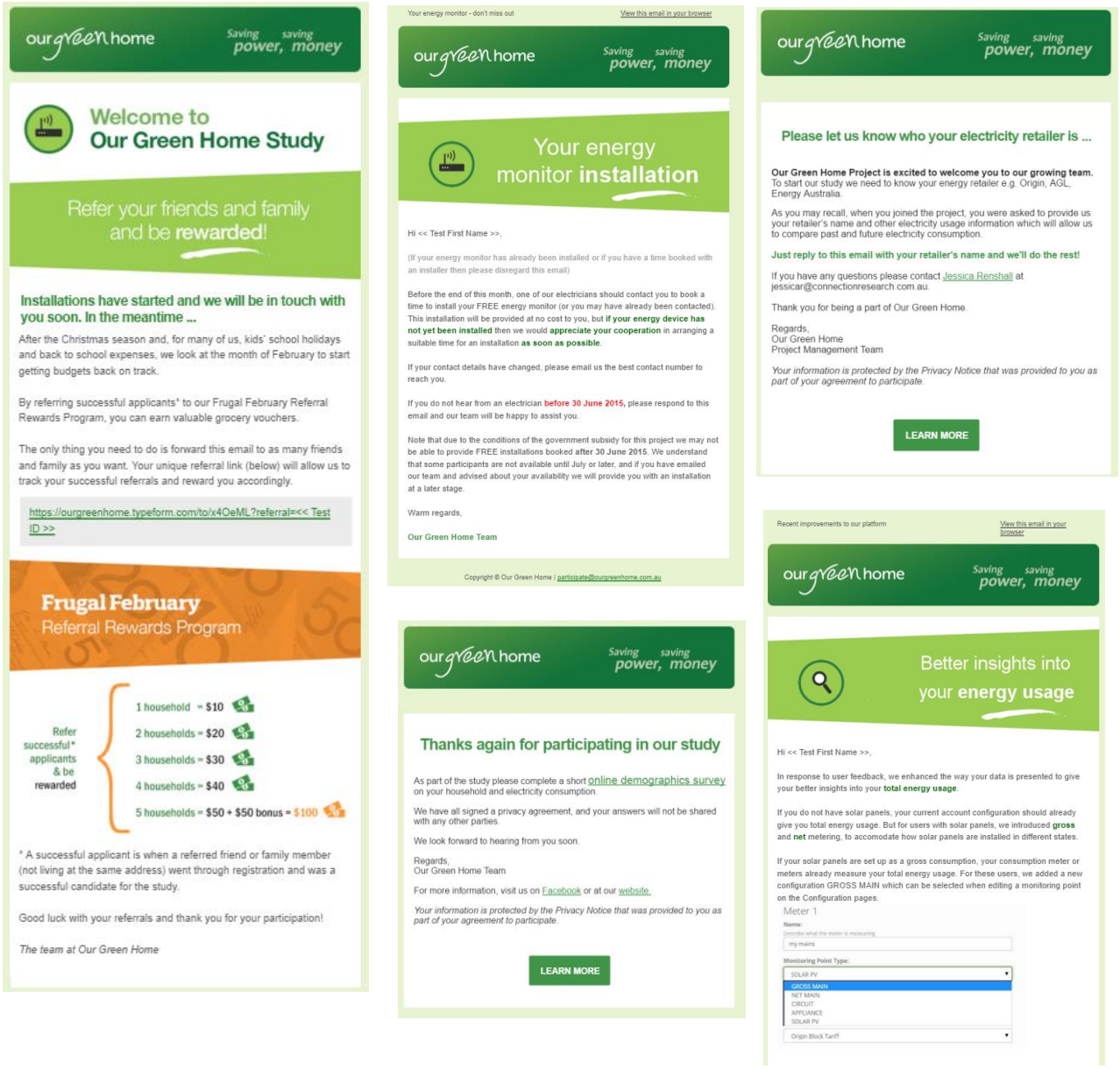


Figure 10 – Samples of email campaigns

2.5 Data collection

As much as was practicable, data collection methods were standardised and were consistent across all participants. All data was collected in a single consolidated database to provide for aggregated reporting. All households were assessed using the same measures, including those participants in the control group.

The project used Australian Bureau of Statistics definitions where possible, so data could be easily compared to ABS data and other government and private research that use those definitions. All data formats comply with the Database Schema to meet the project objectives and demonstrate the success of our approach, the following data was collected.

- Trial Characteristics: Details of the project
- Energy Efficiency Measure Characteristics: EE measures undertaken during the project.
- Household Characteristics: Demographics of household composition and people within it.
- Location: Metro and non-metro by state, plus ACT (all metro) and NT (all non-metro).
- Dwelling characteristics: Type, location, age, etc. of dwelling.
- Energy Supply Characteristics: Retailer, tariffs, etc.
- Energy Usage: Actual electricity usage before and during the program (from retailer data and from the Our Green Home monitors).

The data collected for the project complied with the field names, descriptions and values contained in Annexure B, Schedule 4 of the Funding Agreement executed between the Department and SBA, with adjustments as agreed with the Department. They are contained as Appendix IV of this report, with a fourth column added for comments.

These formats conform with the CSIRO LIEEP Database Schema, which notes that “this document is evolving, and it is expected that over the life of LIEEP there will be a need to modify aspects of the schema.” (p2). As the document notes:

> *Due to the diverse designs and methodologies of the various LIEEP projects, the schema outlined in this document will, in a number of circumstances, not match the data design of each Grant Recipient project; it is necessarily a compromise between the very different aims of each Grant Recipient project, as well as the project goals of the Department. It is expected that Grant Recipients will convert their data to the appropriate format where necessary in order to conform with the schema design.*

The data required for analysis was collected through three major methods, or channels:

- **Online platform.** This was a unique advantage of our approach. Energy usage for the Gadget group was automatically collected by the online Our Green Home platform and aggregated into 5 minute intervals, allowing for over 100,000 data points per household per year. For the purpose of analysis, these were aggregated to 30 minute intervals (as used by electricity retailers).
- **Participant surveys.** Over the period of the project we collected those demographic aspects required for successful data segmentation: dwelling characteristics, household composition, household income, age of all household members, tenure type, household technology, etc. This also included questions on attitudes and behaviours.

- **Energy billing.** Energy billing data (kWh) from retailers formed the baseline of the research. For each participant, we attempted to collect the energy billing data for the previous 12 months, to use this data for comparison with the time after the intervention occurred. We also collected energy billing for the control group which did not have access to Our Green Home monitors.

All data from all sources was placed into a single flat file database in Microsoft Excel, allowing for segmentation based on a range of demographic criteria. The data was analysed using Excel's statistical capabilities, which are extensive.

2.6 Interventions and intervention groups

An intervention is, technically speaking, any interaction with a participant. By this definition, there were six interventions throughout the trial:

- Initial engagement and agreement to participate – all participants (including the control group).
- Installation of the Our Green Home electricity monitor – the Gadget group only.
- Provide households with energy efficiency information materials and user manual for the monitoring devices – the Gadget group only.
- Demographic survey – all participants (including the control group).
- Attitudinal and behavioural survey - all participants (including the control group).
- Collection of historical (previous 12 months) and current (12 months minimum during project) electricity consumption – all participants (including the control group).

These interventions are summarised in the table:

	Engagement	OGH monitor	OGH User Manual	Demographic Survey	Attitudinal / Behavioural Survey	Collection of Retailer Data
Detectives (Control group)	Yes	No	No	Yes	Yes	Yes
Gadgets (Monitored group)	Yes	Yes	Yes	Yes	Yes	Yes

2.7 Participant surveys

There were two types of survey, demographic and behavioural. The surveys were designed to maximise the collection of the data itemised in Appendix IV. The survey design utilised standardised survey methods that were appropriate for the target population – particularly in terms of sociodemographic, cultural, education, learning and literacy requirements.

- **Demographic survey**: Information about household type dwelling type, and the types of appliances installed. This were taken from items 18-13, 36-49 and 50-68 of the LIEEP data items (see Appendix IV).
- **Behavioural survey:** The surveys ask the participants to self-report on a range of attitudes and behaviours through factor ratings on a sliding scale (1-5). This comprised items 29-32 of the LIEEP data items (Appendix IV), with some other questions added at the time of survey design.

2.8 Statistical analysis

The analysis techniques enabled the segmentation of participants across several demographic factors (e.g., dwelling characteristics, household composition, location, retailer, etc.) to determine how (or if) the effectiveness of the interventions differed across various segments of low-income households.

Analysis was conducted on the raw data providing metrics (frequency analysis and weighted averages) on household energy consumption, time-of-day usage, seasonal variation and energy consumptions trends.

Relatively simple statistical analysis techniques were used, but the rigour of the data ensure that sophisticated analysis could be conducted if necessary. Because all data was quantitative, no qualitative analysis tools were necessary.

The prime analysis method was by cross-correlation of demographic variables. This simple but powerful technique allowed very detailed comparisons between all segment. Results are expressed as percentages of that respondent group compared to the overall respondent group.

The use of more sophisticated statistical techniques was not done, but is certainly possible. Most such analysis (e.g. standard deviations, regression analysis, the various ANOVA techniques) are not readily accessible by the layman, so were of limited use in expressing key findings.

The raw data was supplied to the CSIRO as an agent of the Department (with respondent identity fields removed), to allow for any further analysis.

Chapter Three
Participant Demographics

This chapter presents the demographics of the participant households and dwellings. Some demographic data (e.g. household type, location) was gathered as part of the recruitment process, and is complete. Some demographic data is incomplete, but sufficient was gathered for all demographics to ensure the statistical validity of cross-tabulated analysis based on demographics.

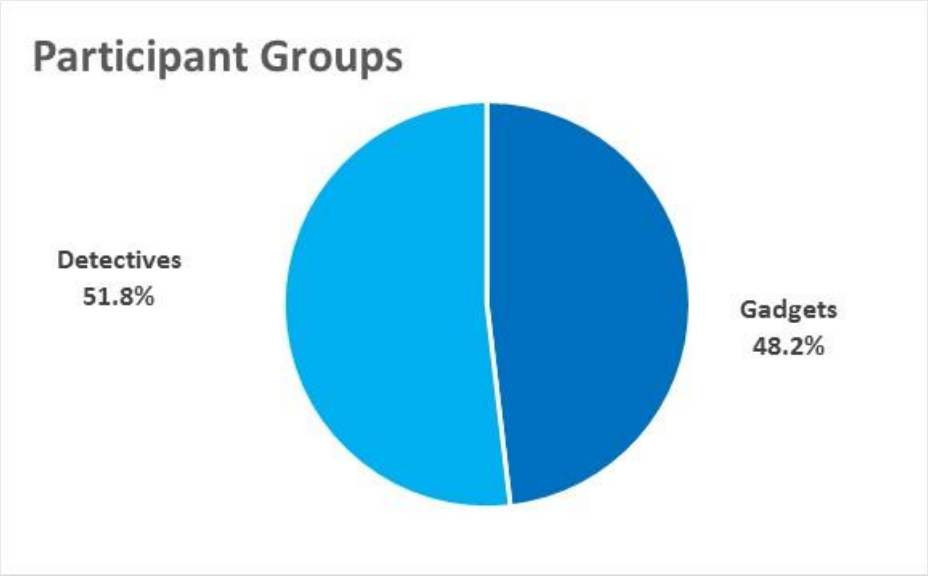
3.1 Sample size

The original planned sample size was 1000 households: two groups of 400 households selected for different combinations of intervention, plus a control group of 200 households.

Due to difficulties with recruitment (see Chapter Two), this was changed to a target of 200 in the control group and 400 in the monitored group (600 in total). Many in the monitored group were migrated to the control group because the monitor could not be installed for various reasons (e.g. unsuitable meter, lack of suitable Wi-Fi). Some participants chose to discontinue their participation post-installation of energy monitors due to change of circumstances. The final numbers were 289 in the monitored group (48.2%) and 311 in the control group (51.8%).

All participants with an Our Green Home Monitor installed were called 'Gadgets', and those in the Control Group were called 'Detectives'.

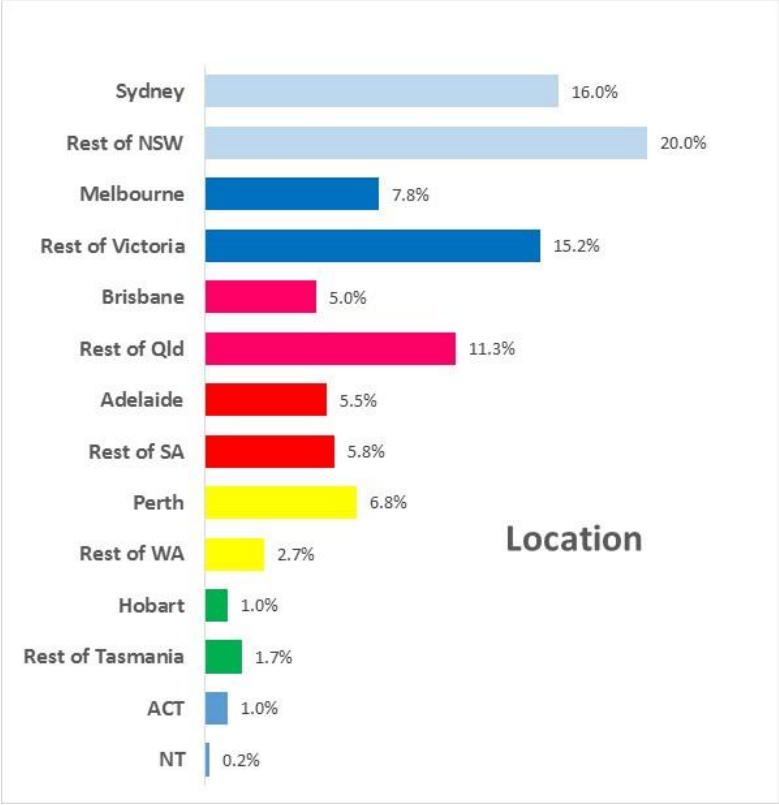
Participant Groups	%	Number
Gadgets	48.2%	289
Detectives	51.8%	311
Total	100%	**600**



3.2 Location

Participants were well distributed geographically. Every effort was made to have the geographic spread representative of Australia's population, but it was not possible to match it exactly. The six state capitals were defined by postcode to match the ABS definition of metropolitan areas (e.g. NSW's Central Coast is included in the Sydney metropolitan area).

Location	%	Number
Sydney	16.0%	96
Rest of NSW	20.0%	120
Melbourne	7.8%	47
Rest of Victoria	15.2%	91
Brisbane	5.0%	30
Rest of Qld	11.3%	68
Adelaide	5.5%	33
Rest of SA	5.8%	35
Perth	6.8%	41
Rest of WA	2.7%	16
Hobart	1.0%	6
Rest of Tasmania	1.7%	10
ACT	1.0%	6
NT	0.2%	1
Total	**100%**	**600**



The following tables contains the breakdown by Gadget and Detective by Region and Household Type, while Figures 11 and 12 highlight the national focus of the project.

Total	Single	Couple	Family	Total
Sydney	24	33	39	**96**
Rest of NSW	44	34	42	**120**
Melbourne	17	6	24	**47**
Rest of Victoria	30	37	24	**91**
Brisbane	10	10	10	**30**
Rest of Qld	25	17	26	**68**
Adelaide	12	14	7	**33**
Rest of SA	11	16	8	**35**
Perth	15	10	16	**41**
Rest of WA	6	5	5	**16**
Hobart	3	3		**6**
Rest of Tasmania	6	2	2	**10**
ACT	3	1	2	**6**
NT	1			**1**
Total	207	188	205	**600**

Detectives	Single	Couple	Family	Total
Sydney	6	5	10	21
Rest of NSW	27	15	19	61
Melbourne	15	3	16	34
Rest of Victoria	19	14	13	46
Brisbane	6	5	7	18
Rest of Qld	13	10	18	41
Adelaide	9	6	3	18
Rest of SA	8	5	6	19
Perth	9	6	11	26
Rest of WA	5	3	3	11
Hobart	2	2		4
Rest of Tasmania	4	2		6
ACT	3	1	1	5
NT	1			1
Detectives	**127**	**77**	**107**	**311**

Gadgets	Single	Couple	Family	Total
Sydney	18	28	29	75
Rest of NSW	17	19	23	59
Melbourne	2	3	8	13
Rest of Victoria	11	23	11	45
Brisbane	4	5	3	12
Rest of Qld	12	7	8	27
Adelaide	3	8	4	15
Rest of SA	3	11	2	16
Perth	6	4	5	15
Rest of WA	1	2	2	5
Hobart	1	1		2
Rest of Tasmania	2		2	4
ACT			1	1
NT				
Gadgets	**80**	**111**	**98**	**289**

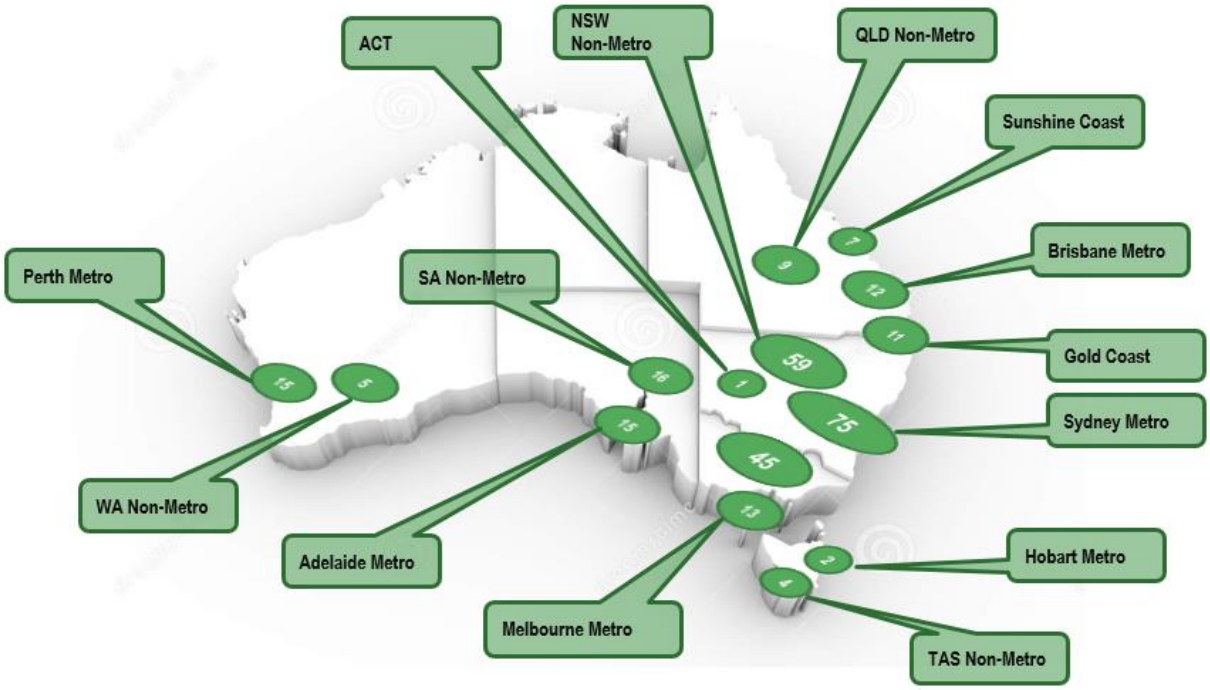


Figure 11– National focus: Indicative geographical spread of the Gadgets Group

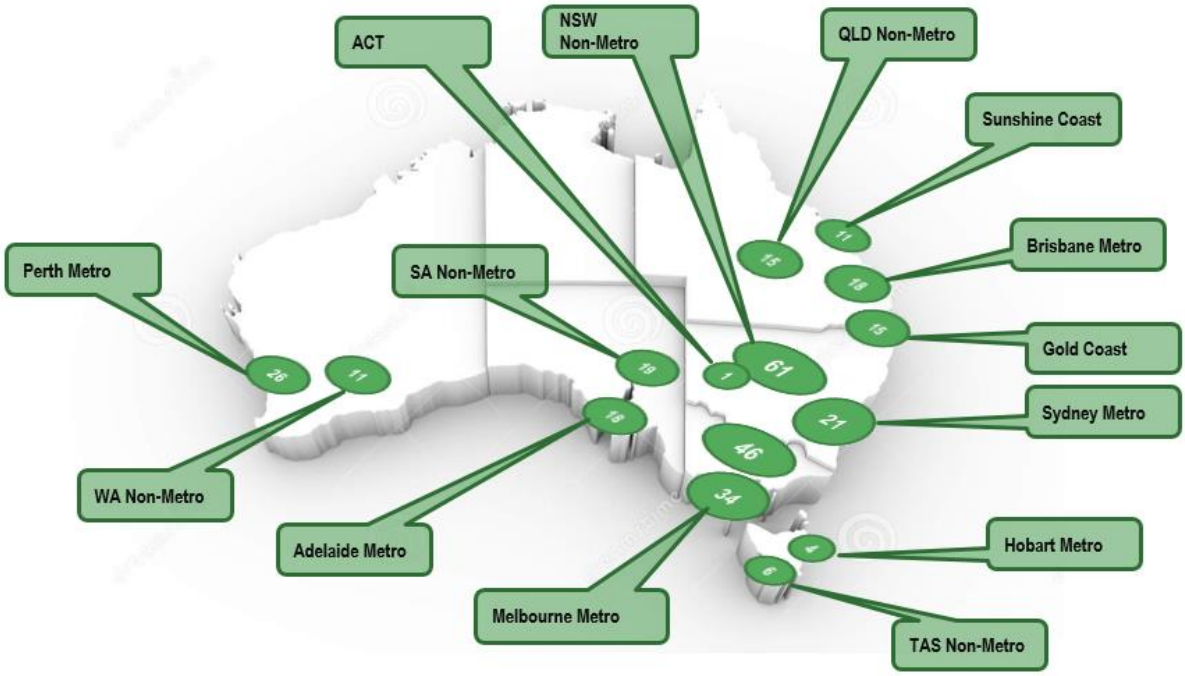
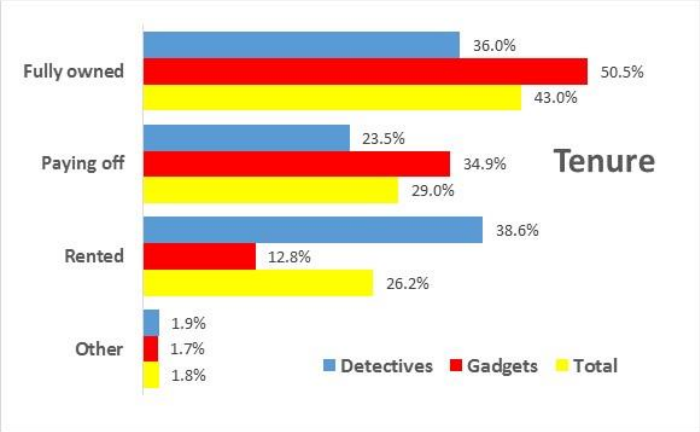


Figure 12 – National focus: Indicative geographical spread of the Detectives Group

3.3 Tenure

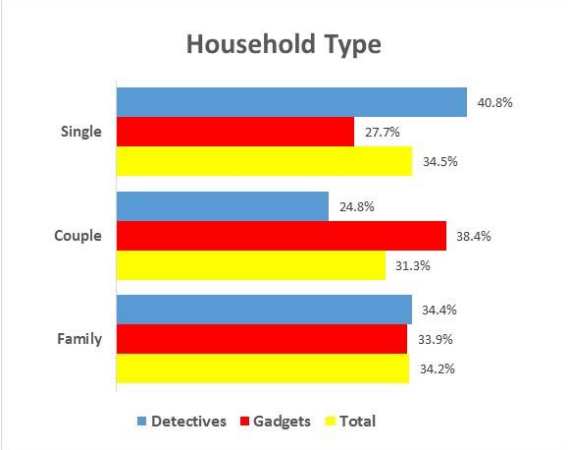
Nearly half (43.0%) of participants owned their homes outright. This was higher among Gadgets (50.5%) than Detectives (36.0%).

Detectives were three times as likely to be renters (38.6%) than were the Gadgets (12.8%), because many renters who wished to join the Gadget group were unable to do so because of the necessity of asking their landlord's permission before the energy monitoring device could be installed.



Tenure	Detectives	Gadgets	Total	Detectives	Gadgets	Total
Fully owned	36.0%	50.5%	43.0%	112	146	258
Paying off	23.5%	34.9%	29.0%	73	101	174
Rented	38.6%	12.8%	26.2%	120	37	157
Other	1.9%	1.7%	1.8%	6	5	11
Total	**100%**	**100%**	**100%**	**311**	**289**	**600**

3.4 Household type



Household type was very evenly split between singles (34.5%), couples (31.3%) and families (34.2%), which each comprised around one third of participants. Note that Singles includes all households with only one adult, regardless of number of children.

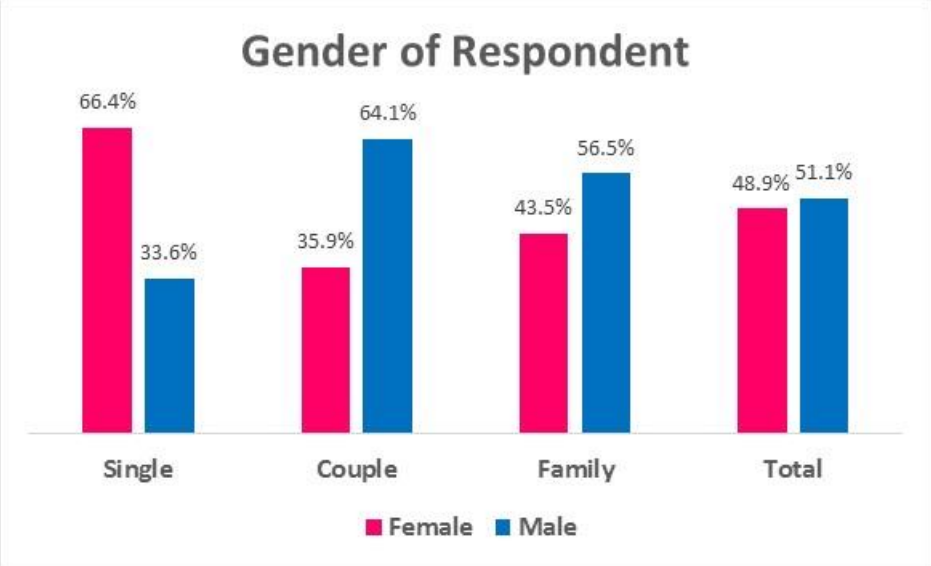
Singles are better represented in the Detectives group, as they were more likely to be renters, many of whom were not able to install the monitoring devices.

Household Type	Detectives	Gadgets	Total	Detectives	Gadgets	Total
Single	40.8%	27.7%	34.5%	127	80	207
Couple	24.8%	38.4%	31.3%	77	111	188
Family	34.4%	33.9%	34.2%	107	98	205
Total	**100%**	**100%**	**100%**	**311**	**289**	**600**

3.5 Gender of respondent

Each participating household had a primary respondent, responsible for answering demographic and attitudinal surveys administered as part of the project.

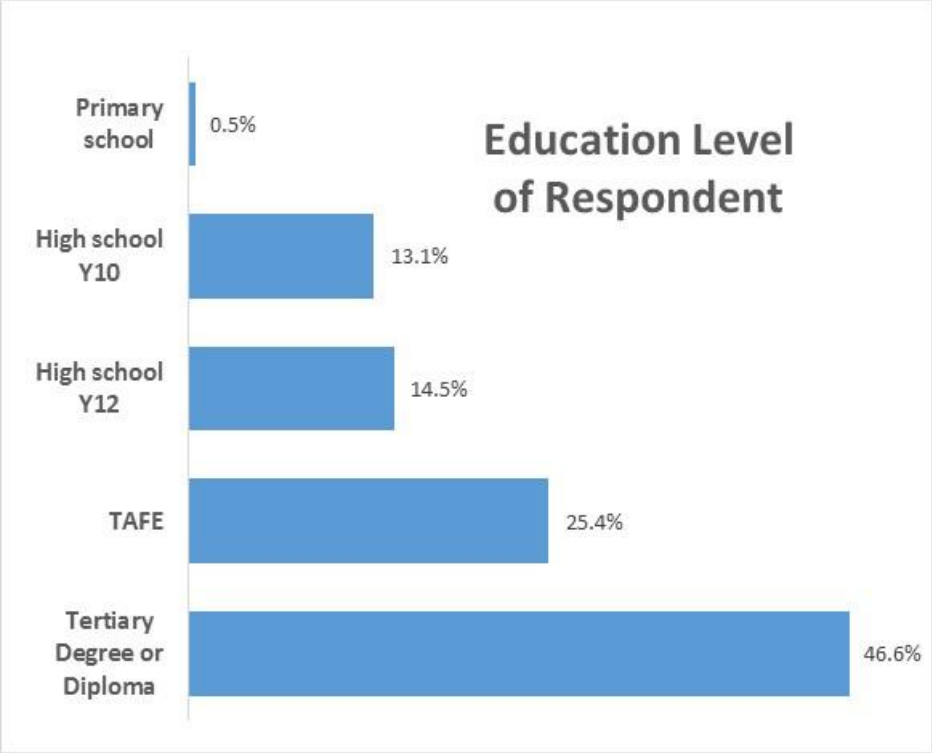
There was a roughly even split between males (51.1%) and females (48.9%) overall. But females comprise two thirds (66.4%) of respondents in single person households, while being under-represented in couple (35.9%) and family (43.5%) households.



Gender of Respondent	Female	Male	Total	Female	Male	Total
Single	66.4%	33.6%	**100%**	101	51	152
Couple	35.9%	64.1%	**100%**	55	98	153
Family	43.5%	56.5%	**100%**	57	74	131
Total	**48.9%**	**51.1%**	100%	**213**	**223**	**436**

3.6 Education level of respondent

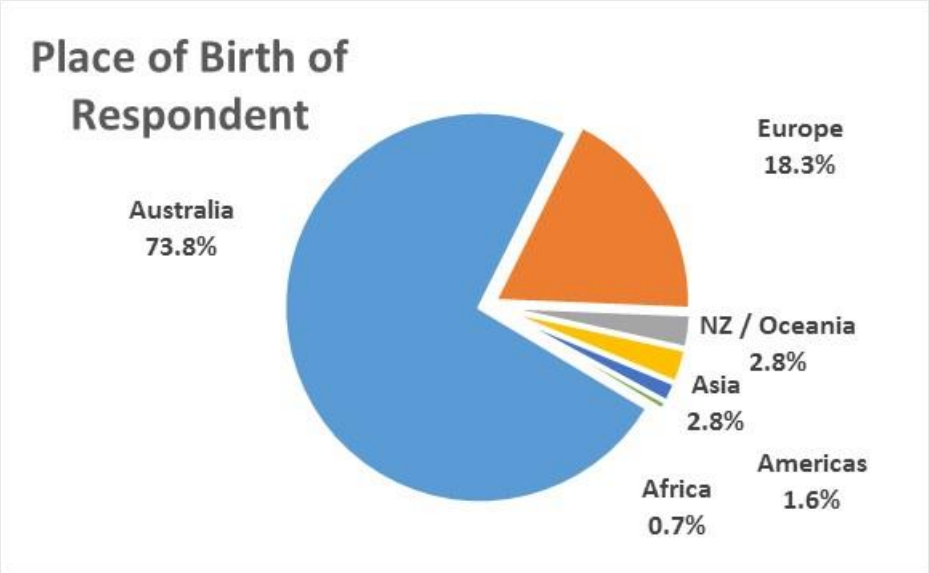
Primary respondents were generally well educated, with nearly half (46.6%) holding a tertiary degree or diploma. Just two respondents (0.5%) had primary school education only.



Education Level of Respondent	%	Number
Primary school	0.5%	2
High school Y10	13.1%	55
High school Y12	14.5%	61
TAFE	25.4%	107
Tertiary Degree or Diploma	46.6%	196
Total	**100%**	**421**

3.7 Place of birth of respondent

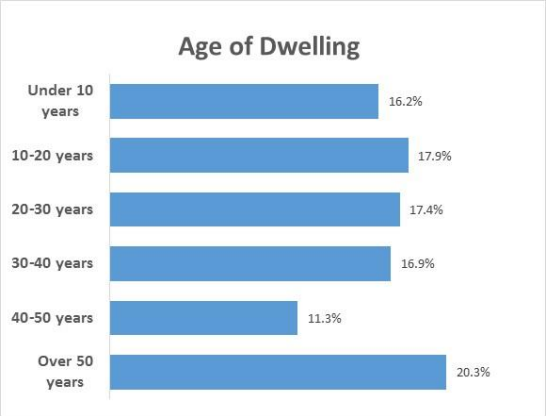
Primary respondents were predominantly born in Australia (73.8%), with strong representation from other regions.



Place of Birth of Respondent	%	Number
Australia	73.8%	315
Europe	18.3%	78
NZ / Oceania	2.8%	12
Asia	2.8%	12
Americas	1.6%	7
Africa	0.7%	3
Total	**100%**	**427**

3.8 Age of dwelling

The dwellings in the study were very evenly distributed by age of construction, with no one group dominating. This distribution is significantly different to Australia's housing stock as a whole – only one in six is less than ten years old. The over-representation of older dwellings was one reason why installation of monitors was slower and more expensive than originally anticipated.

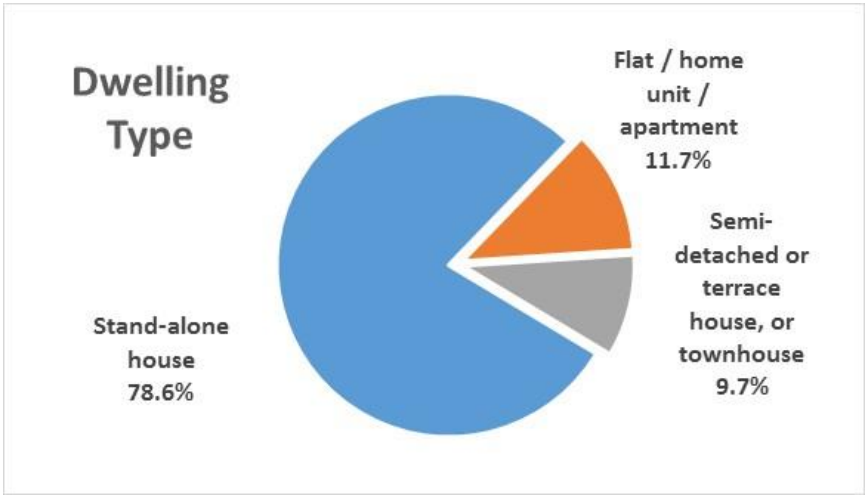


Age of Dwelling	%	Number
Under 10 years	16.2%	63
10-20 years	17.9%	70
20-30 years	17.4%	68
30-40 years	16.9%	66
40-50 years	11.3%	44
Over 50 years	20.3%	79
Total	**100%**	**390**

3.9 Dwelling type

More than three quarters (78.6%) of the dwellings included in the study were stand-alone houses, with the rest split between other dwelling types. Most (73.3%) were single story, with 21.3% two story. Dwelling with more stories were almost always flats or apartments.

Dwelling type	%	Number
Stand-alone house	78.6%	342
Flat / home unit / apartment	11.7%	51
Semi-detached or terrace house, or townhouse	9.7%	42
Total	**100%**	**435**



Chapter Four
Electricity Consumption

4.1 Introduction

The key objective of the Project was to determine whether real-time access to data from a household electricity consumption monitoring device would reduce electricity consumption. The hypothesis was that this would be the case.

Other considerations or co-benefits, such as comfort levels, attitudinal changes, the effect of educational programs, etc., were not part of the Project's aims, though some such outcomes could be determined as a result of the Project (these are mostly covered in chapters 5 and 6).

The project used two key measurements of household electricity consumption:

- Electricity consumption as measured by the household's electricity retailer. This was in the form of quarterly bills, with consumption for the quarter measured in kWh.
- Electricity consumption as measured by the Our Green Home online electricity monitors – kWh in 30 minute intervals (consumption was measured at 5 minute intervals, and converted into 30 minute intervals for reporting). This was used in its raw form and also aggregated to give weekly and quarterly consumption figures, for comparison with the data from electricity retailers.

To test the hypothesis, it was necessary to collect consumption data from all households in the project – both the Gadget (monitored) group and the Detective (control) group, for as long as possible. The initial intention was to compare consumption by Gadgets with that of Detectives over a two year period – the first year before the installation of the monitor, and the second year after the installation of the monitor.

Unfortunately, because of the late start to the Project, this was not possible. Only 18 months (six quarters, Autumn 2014 – Winter 2015) of retailer data was collected, and that was incomplete, and only nine months (three quarters, Winter 2015 – Summer 2015-16) of monitor data was collected.

Detailed analysis was thus severely limited by access to suitable data and limitations in the duration of the trials. The period in which electricity consumption was measured through the monitors was limited to three quarters (nine months), although the original trial was designed to operate over 12 months. Similarly, it was not possible to get retail data for eight quarters over two years (ideally ten quarters would have been necessary, to take into account the staggered beginning and endings of quarterly retailer data).

The recruitment process proved to be very difficult (see section 2,2), which meant the commencement of the installation phase was delayed by over nine months. In addition, the energy retailers refused access to granular meter data – only some of them provided any data at all, and that was all limited to quarterly data.

During the data collection period of the Project, confusion about changes to privacy laws in Australia led many electricity retailer to believe they were not allowed to provide household meter data. This was not the case, but it was difficult to convince retailers that it was not so. Even when they did provide consumption data, it was limited to quarterly data, even though the networks collect more granular data than the retailers make available to their clients.

The two data collection timeframes overlapped for only one quarter (Winter 2015):

Autumn 2014	Winter 2014	Spring 2014	Summer 2014-15	Autumn 2015	Winter 2015	Spring 2015	Summer 2015-16
Retailer data							
					Our Green Home platform data		

The only direct comparison that can be made, therefore, is of that of consumption in Winter 2015 with that of Winter 2014. Winter was the only quarter where there are two years of retail consumption data, and which also occurred after the installation of the monitors. It is not meaningful to directly compare data from different quarters, as electricity consumption varies significantly by quarter owing to changes in the weather.

Comparisons of Spring and Summer could only be made of the monitored (Gadget) group, and then only of monitored data versus retailer data. This limitation, and the absence of any control (Detective) group data for this period makes any measure based on these comparisons significantly less meaningful.

The later sections in this chapter analyse both retailer data (section 4.3) and monitor data (section 4.4) in depth, by group, location and a range of other demographics. The next section (4.2) looks at overall consumption over the course of the project, comparing consumption of the two groups by location (for Winter only), to determine whether the intervention of the installation of the monitors meant that the electricity consumption patterns of the monitored group (Gadgets) differed from the control group (Detectives).

The average monitored data across all participants for the quarter Winter 2015 was 1405 kWh, and the average retailer data for this quarter (by definition for the Gadgets group only) was 1359 kWh, a statistically insignificant difference of just 3.4%, giving a high degree of confidence in the accuracy of the Our Green Home platform data. Average retailer data for the control group for this quarter was slightly lower at 1288 kWh, but this group had lower consumption overall, due to its higher proportion of flat and apartment dwellers.

The Baseline consisted of both Detectives (project participants without monitors) and Gadgets (project participants with monitors). The data was provided from participating energy retailers, as quarterly totals, for approximately half of all participants (See 4.3 below).

4.2 Reduction in usage due to monitoring

4.2.1 Inclusion of stand-alone houses only

The Project was able to determine average quarterly consumption by a range of demographics, including the standard ABS three dwelling types (flats/apartments, semi-detached/townhouse/terrace, stand-alone houses). Both groups (Detectives and Gadgets) were treated equally as participants in the baseline data, since neither group had yet had any exposure to any form of energy management intervention beyond accepting an invitation to participate in the Project.

The baseline analysis showed that households in flats and semi-detached dwellings) have a much lower energy consumption than the latter two dwelling types (see 4.3.7), largely because they tend to be smaller households. Within the study, 11.7% of the participants resided in flats or apartments, but only 7.6% of Gadgets resided in flats or apartments.

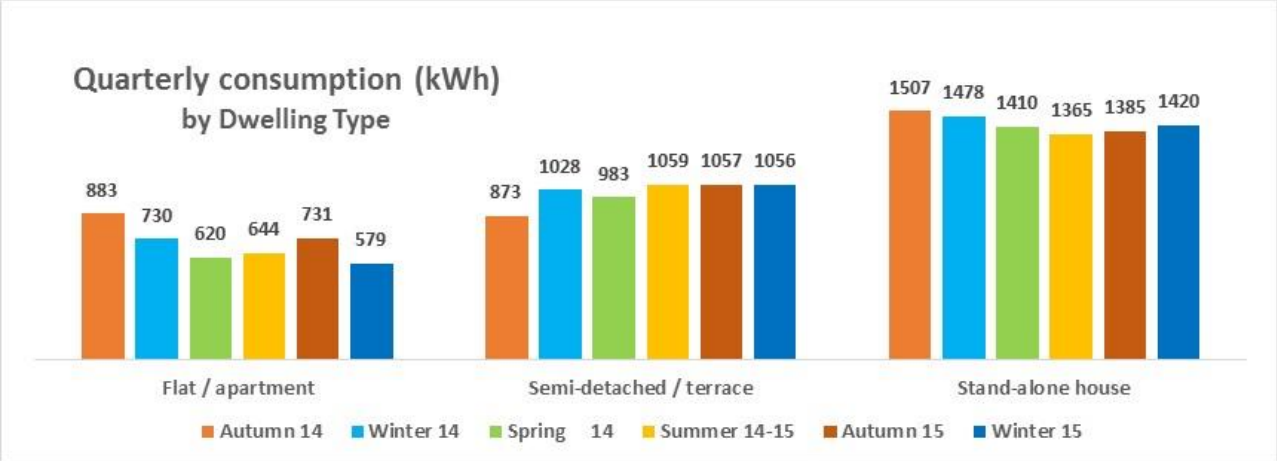
The table shows the proportion of households in different dwelling types, for Detectives, Gadgets, Participants (the total of these two groups), and the figures from the ABS 2011 Census.

Proportion of Households in Dwelling Type

Dwelling type	Detectives	Gadgets	Participants	ABS
Stand-alone house	74.5%	81.7%	78.6%	76.3%
Semi-detached or terrace house	8.2%	10.8%	9.7%	10.0%
Flat / home unit / apartment	17.4%	7.6%	11.7%	13.7%
Total	**100%**	**100%**	**100%**	**100%**

Households in stand-alone houses consumed significantly more electricity (maximum of 1507 kWh) than those in semi-detached or terrace houses (maximum of 1059 kWh) or those in flats or apartments (maximum of 883 kWh). This is largely because stand-alone houses tend to be occupied by more people.

This meant that apartments consumed only 48.9% of the average energy consumption for stand-alone houses, and semi-detached houses consumed only 77.2% of the average energy consumption for stand-alone houses, over the six quarters where retailer consumption was gathered.



By Dwelling Type	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Flat / apartment	883	730	620	644	731	579	**698**	19
Semi-detached / terrace	873	1028	983	1059	1057	1056	**1009**	22
Stand-alone house	1507	1478	1410	1365	1385	1420	**1427**	181
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**222**

That means the inclusion of the flat and apartment dwelling consumption data, and semi-detached and terrace consumption data, had the effect of significantly reducing the consumption averages across all three dwelling categories. The comparatively low proportion of participants in these two dwelling types meant that the samples sizes were very small, making statistical analysis unreliable.

Therefore the analysis in this section is of consumption data for stand-alone houses only, to provide a more representative sample. Since the study is Australia wide, and apartment and semi-detached occupants tend to be concentrated in metropolitan areas, the inclusion of only stand-alone houses – for this comparative analysis only – provides for a more representative sample across Australia. The opportunities to limit consumption are also greatly reduced in apartments and semi-detached dwellings.

4.2.2 Measure of reduction in consumption

The detailed table on the next page shows the measured changes in electricity consumption for Gadgets and Detectives for each of the three quarters (Winter, Spring, Autumn) for which there is consumption data (retail or monitored) year-on-year, broken down by state.

Notes:

- All consumption figures are in kWh for the entire quarter. Counts are the number of households included in that data set.
- Only Winter shows a comparison of retailer data from 2014 and 2015. This is the only quarter for which there are two years of retailer data, and for which the quarter in the second year occurred after the intervention of the installation of the monitors.
- Consumption figures for Spring 2014 and Summer 2014-15 are from retailer data only. These are for both Detective and Gadget groups. Consumption figures from Spring 2015 and Summer 2015-16 are from monitored data only These are only for the Gadget group. They are therefore from different data sets, and the comparisons must be treated with caution.
- Only data from households in NSW, Victoria, Queensland and South Australia is included. Tasmania, the ACT and the Northern Territory had too few households to be statistically reliable, and very little retailer data was collected from Western Australia, due to the refusal of the dominant retailer (Synergy) to supply any data.
- Only data from households living in stand-alone houses is included, as explained in section 4.2.1.

The only statistically reliable measure of change in consumption is that from Winter 2014 to Winter 2015. Between these two quarters Gadgets (the monitored group) showed a reduction in consumption of 5.4%, while the Detectives (the control group) showed a reduction in consumption of just 0.4%.

The difference (5.0%) is therefore the reduction in consumption that can be attributed to behavioural changes due to the installation of the monitors.

The data also shows a reduction in consumption amongst the Gadget group from Spring 2014 to Spring 2015 of 8.3%, and an increase in consumption amongst the Gadget group from Summer 2014-15 to Summer 2015-16 of 4.1%. These figures are less reliable because they are measuring retailer data (in the first year) against monitored data (in the second year), and are less useful because there is no data from the Detective (control) group to compare it to.

Note that the summer quarter in 2015-16 in most of Australia was unusually and consistently hot and humid, with daily temperatures above average for more than 40% of the country. This may explain all or some of the rise from the first summer to the second.

(see http://www.bom.gov.au/climate/current/season/aus/summary.shtml)

Comparison of consumption by state, year-on-year

WINTER Consumption (kWh)

Winter 2014	Detectives	Gadgets	All
NSW	1303	1733	1645
Vic	1652	831	1230
Qld	1585	1394	1505
SA	1595	1107	1243
Total	**1540**	**1424**	**1466**

WINTER Count

Winter 2014	Detectives	Gadgets	All
NSW	13	51	64
Vic	18	19	37
Qld	19	13	32
SA	5	13	18
Total	**55**	**96**	**151**

Winter 2015	Detectives	Gadgets	All
NSW	1204	1573	1513
Vic	1697	916	1377
Qld	1551	1115	1320
SA	1571	1106	1191
Total	**1535**	**1347**	**1408**

Winter 2015	Detectives	Gadgets	All
NSW	7	36	43
Vic	13	9	22
Qld	8	9	17
SA	2	9	11
Total	**30**	**63**	**93**

% Change	Detectives	Gadgets	All
NSW	-7.6%	-9.2%	-8.0%
Vic	2.7%	10.2%	11.9%
Qld	-2.1%	-20.0%	-12.3%
SA	-1.5%	-0.1%	-4.2%
Total	**-0.4%**	**-5.4%**	**-4.0%**

Winter 2014 - Retailer data

Winter 2015 - Retailer data

SPRING Consumption (kWh)

Spring 2014	Detectives	Gadgets	
NSW	1130	1700	1568
Vic	1456	769	1137
Qld	1807	1232	1587
SA	1252	845	956
Total	**1465**	**1340**	**1388**

SPRING Count

Spring 2014	Detectives	Gadgets	All
NSW	17	56	73
Vic	22	19	41
Qld	22	13	35
SA	6	16	22
Total	**67**	**104**	**171**

Spring 2015		Gadgets
NSW		1453
Vic		1079
Qld		922
SA		939
Total		**1228**

Gadgets
64
30
19
14
127

% Change		Gadgets
NSW		-14.6%
Vic		40.3%
Qld		-25.1%
SA		11.2%
Total		**-8.3%**

Spring 2014 - Retailer data

Spring 2015 - Monitor data

SUMMER Consumption (kWh)

Summer 2014-15	Detectives	Gadgets	All
NSW	1112	1643	1523
Vic	1346	858	1112
Qld	1733	1400	1598
SA	1203	844	942
Grand Total	**1399**	**1335**	**1359**

Summer Count

Summer 2014-15	Detectives	Gadgets	All
NSW	17	58	75
Vic	25	23	48
Qld	22	15	37
SA	6	16	22
Total	**70**	**112**	**182**

Summer 2015-16		Gadgets
NSW		1627
Vic		1215
Qld		1038
SA		1108
Total		**1390**

Gadgets
64
30
19
14
127

% Change	
NSW	-1.0%
Vic	41.7%
Qld	-25.9%
SA	31.3%
Total	**4.1%**

Summer 2014-15 - Retailer data

Summer 2015-16 - Retailer data

4.2.3 Value of reduction in consumption

The Project shows that the provision of real-time information on electricity consumption, as provided to the Gadget participants, brings about a reduction in consumption of 5.0%. This figure is remarkably consistent with other trials that have been undertaken in Australia on the use of smart meters and in-home displays (IHDs).

- A Western Power study in 2011 for the Perth Solar City program "provided analysis on the effect of the paired IHDs on electricity consumption over a six month trial to June 2011. An average 6.8% reduction in electricity use is evident. In short, there is some evidence to suggest that the IHDs lead to a reduction in energy consumption. This result is consistent with similar trials both in Australia and internationally."
- A further trial was conducted in 2013 by Essential Energy in the Bega region of NSW. The Bega trial sample, with IHDs, showed an average 8.1% reduction in electricity consumption over the 44 week operational period. The control group consumption varied by +/- 3% during the same period. If the 3% represents seasonal variations, then the Bega sample with IHDs had reduced consumption by approximately 5%.

The data collected from the electricity retailers shows an average quarterly electricity consumption per participating household (all participants across all quarters) of 1307 kWh. This equates to 5228 kWh per year, a figure around 10% lower than the best data on average annual household electricity consumption of 5817 kWh (Report to the Australian Energy Regulator, by ACO: Allen Consulting, 'Electricity Bill Benchmarks for Residential Customers', 2014, www.aer.gov.au).

Estimates of how much is saved with a 5.0% reduction in the annual electricity bill depend on both annual consumption and the average tariff over the year. The following table shows annual savings for a range of tariffs and consumption figures:

Annual Consumption, kWh Tarriff (cents./ kWh)	5000	5228 Average in Project	5500	5817 AER average, 2014	6000
15	$750	$784.20	$825	$872.55	$900
20	$1,000	$1,045.60	$1,100	$1,163.40	$1,200
25	$1,250	$1,307.00	$1,375	$1,454.25	$1,500
30	$1,500	$1,568.40	$1,650	$1,745.10	$1,800

Annual dsavings @ 5.0% Tarriff (cents./ kWh)	5000	5228 Average in Project	5500	5817 AER average, 2014	6000
15	$37.50	$39.21	$41.25	$43.63	$45
20	$50	$52.28	$55	$58	$60
25	$62.50	$65.35	$68.75	**$72.71**	$75
30	$75	$78.42	$82.50	$87.26	$90

On an annual consumption of 5817 kWh, at a tariff of 25 cents / kWh, the average annual household electricity bill in Australia is $1454.25 ($363.56 per quarter). A 5.0% savings on this amount represents an annual figure of $72.71, which is the figure used in this report and in the analyses in Chapter 7.

5817 kWh per year for the average Australian households means a total retail electricity bill of jover $1 billion ($1,118 million) across all 7.7 million households in the country. A reduction of 5.0% across all households would mean a savings of around $56 million. For stand-alone houses only (76.3% of housing stock), this equates to an annual Australia-wide savings of $42.6 million.

4.3 Retailer consumption

4.3.1 Introduction

This section contains data from electricity retailers, which is used as the baseline data for the analysis. This data could be measured only quarterly, as that is the frequency of electrical bills, but note that while retailers gather data and bill their customers every three months, the actual interval varies and does not fit neatly into standard calendar quarters.

The analysis in this report uses six quarters, based on start dates that ensure the majority of the electricity billed in that period fell within the designated quarter:

Quarterly analysis

Quarter	Actual Dates	Start date of retailer billing
Autumn 2014	1 March – 31 May 2014	16 January 2014
Winter 2014	1 June – 31 August 2014	16 April 2014
Spring 2014	1 September – 30 November 2014	16 July 2014
Summer 2014-15	1 December 2014–28 February 2015	16 October 2014
Autumn 2015	1 March – 31 May 2015	16 January 2015
Winter 2015	1 June – 31 August 2015	16 April 2015

There was great difficulty collecting the retailer data. All retailers were reluctant to provide the data, even though express permission was given by all participating households to collect this data on their behalf. To gather the data a range of strategies was used, including the provision of a letter from the Department indicating that the study was being conducted for the LIEEP, but many retailers still refused, citing privacy concerns (Australia's privacy laws became more stringent during the Project). This had the result of effectively excluding Western Australia from the study, because of the lack of cooperation from that state's leading retailer (Synergy).

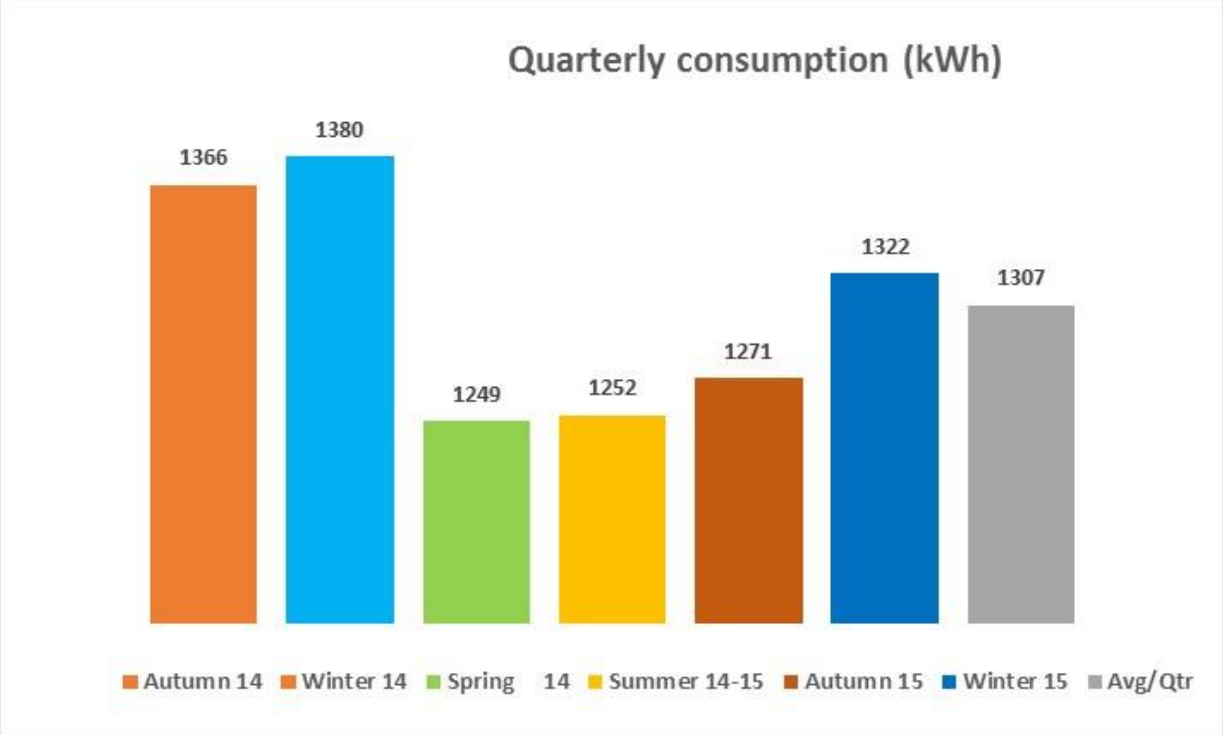
Ultimately retailer data was obtained for 338 out of the 600 households in the study (56.3%). But the data is incomplete – it covers a maximum of six quarters, not the eight quarters that would have allowed a complete year-on-year comparison covering all four quarters. Due to the lack of cooperation from the retailers it was not possible to go back to them at the end of the study and get the final two quarters' data before the reporting deadline.

As the charts in this chapter show, electricity consumption depends on many variables, and most especially the number of people in the household. It also varies by quarter, with consumption usually highest in the winter. An important feature of the analysis methodology used in the project was the ability to distinguish these variables and make comparisons between them.

The analysis below breaks down retailer data by group (Gadgets vs Detectives), location, tenure, household type, and dwelling type and age.

4.3.2 Overall quarterly consumption

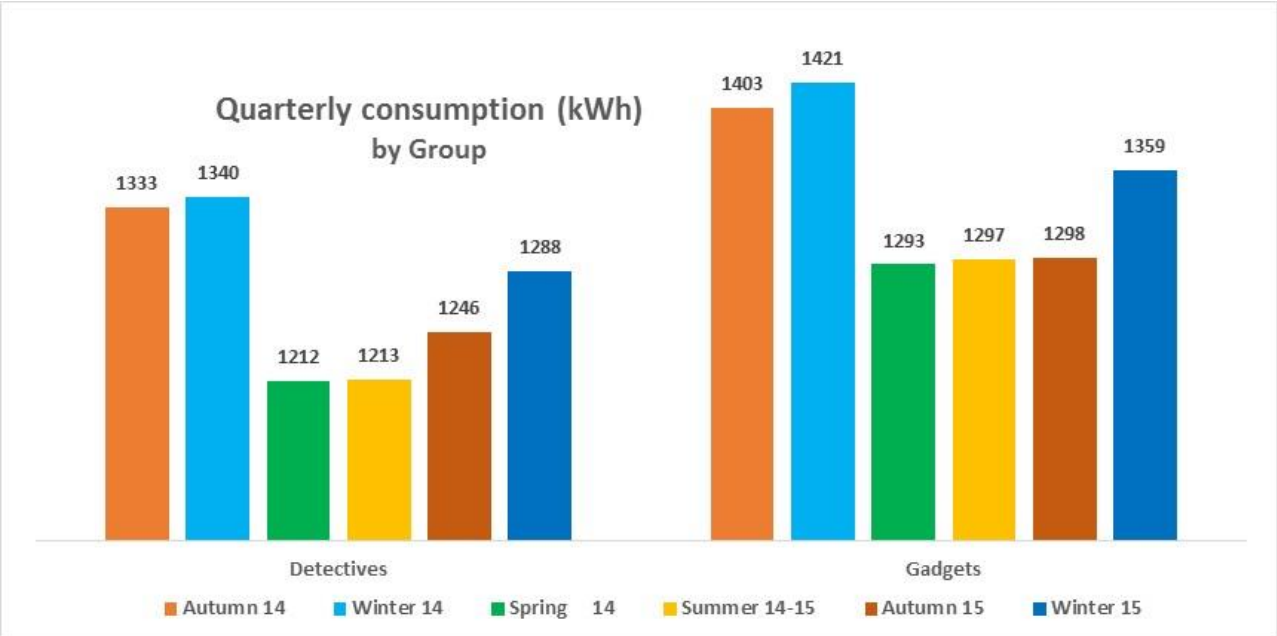
For all participants, the quarterly range was from a low of 1249 kWh in the spring quarter of 2014 to a high of 1380 kWh in the winter quarter of 2014. In the two quarters that could be compared year-on-year (Autumn and Winter), consumption was lower in 2015 than in 2014.



Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
1366	1380	1249	1252	1271	1322	1307	304

4.3.3 Retailer consumption by group

The Gadgets group (those with Our Green Home monitors installed during the project) had a higher baseline electricity consumption than the Detectives group (the control group). The Gadgets averaged 1345 kWh per quarter over the six quarters, largely because they were more likely to be stand-alone houses, which on average use more electricity than flats or semi-detached dwellings (see below).



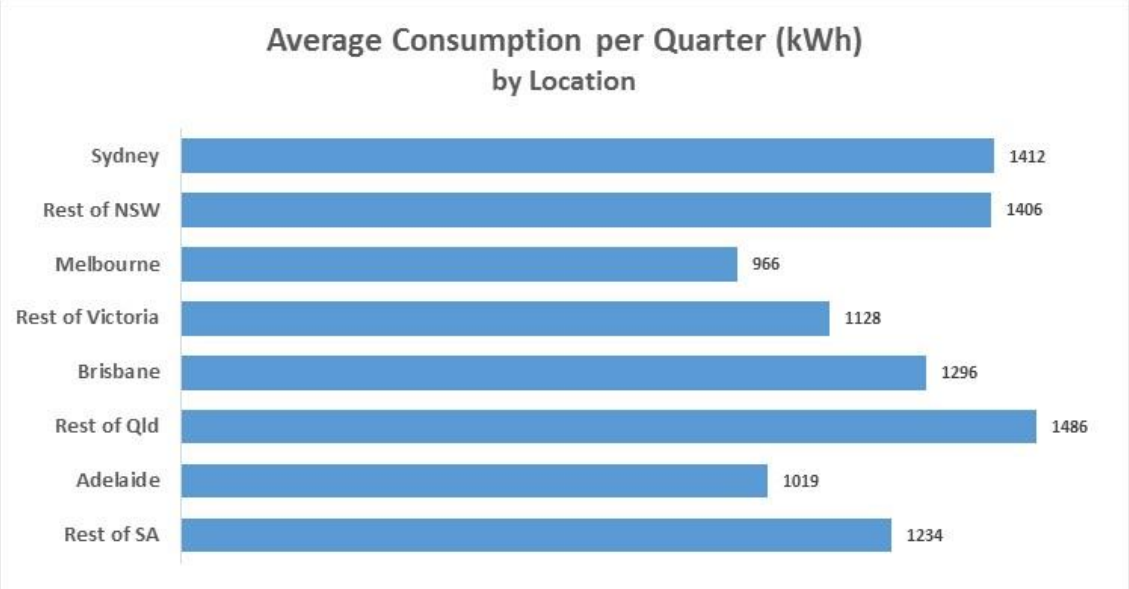
By Group	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Detectives	1333	1340	1212	1213	1246	1288	**1272**	**160**
Gadgets	1403	1421	1293	1297	1298	1359	**1345**	**144**
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**304**

Retailer (baseline) data from both Gadgets and Detectives showed a decline from 2014 to 2015 in the two quarters that could be directly compared year-on-year (Autumn and Winter). The comparison between the two rates of decline is the key metric used to determine the effectiveness of the installation of the Our Green Home monitoring device.

4.3.4 Retailer consumption by location

Average electricity consumption varied significantly by location, with Melbourne (average of 966 kWh per quarter) the lowest, and the rest of Victoria also comparatively low (1128 kWh). This is because of the relatively high use of gas heating in Victoria – note that consumption in winter is lower than that in autumn.

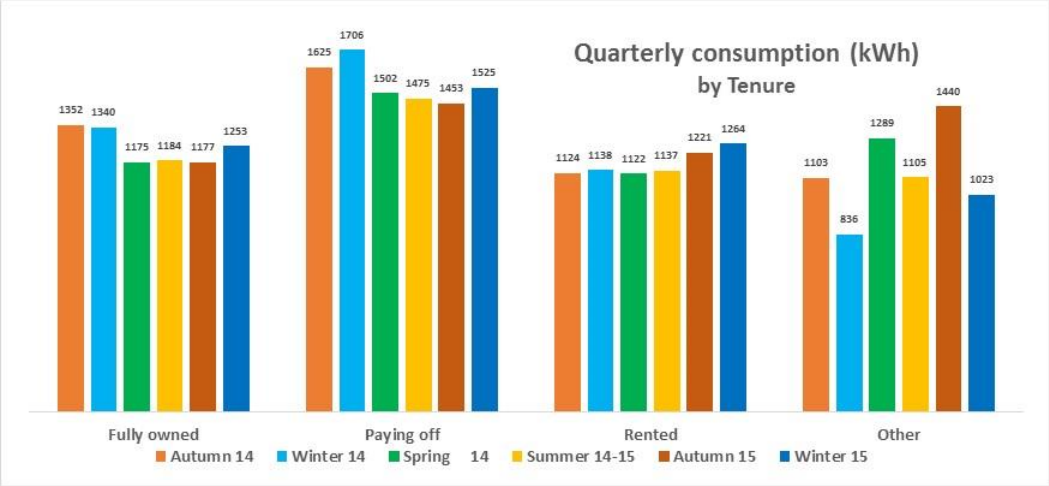
Adelaide also showed much lower average quarterly consumption (1019 kWh), because of the higher proportion of households in that city using solar PV systems. There is too little data from Western Australia, Tasmania, the ACT and the Northern Territory to make meaningful comparisons. Western Australia was low because of the inability to collect retail data from Synergy, which dominates electricity retailing in that state).



By Location	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Sydney	1394	1496	1376	1362	1370	1477	**1412**	58
Rest of NSW	1197	1496	1331	1393	1508	1514	**1406**	82
Melbourne	1145	960	818	926	965	984	**966**	25
Rest of Victoria	1478	1115	1003	972	1044	1154	**1128**	53
Brisbane	1355	1371	1388	1273	1136	1252	**1296**	19
Rest of Qld	1545	1492	1558	1558	1442	1320	**1486**	44
Adelaide	1061	1118	957	932	965	1079	**1019**	21
Rest of SA	1325	1682	997	1143	1040	1217	**1234**	16
Perth	Insufficient data							1
Rest of WA								2
Hobart								5
Rest of Tasmania								8
ACT								3
NT								0
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**304**

4.3.5 Retailer consumption by tenure

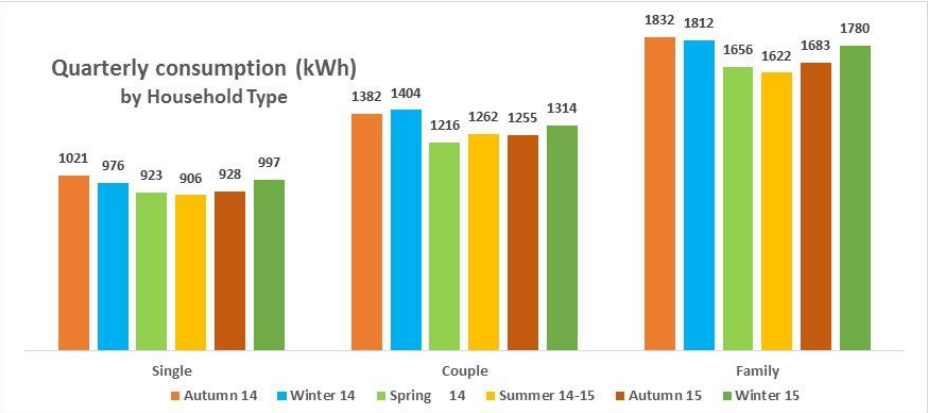
Households whose occupants are paying off their house are more likely to be occupied by families with children, and therefore had a higher quarterly consumption (maximum 1706 kWh in Winter 2014) than those that are fully owned (1340 kWh in the same quarter) or rented (1138 kWh).



By Tenure	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Fully owned	1352	1340	1175	1184	1177	1253	**1247**	135
Paying off	1625	1706	1502	1475	1453	1525	**1548**	84
Rented	1124	1138	1122	1137	1221	1264	**1168**	78
Other	1103	836	1289	1105	1440	1023	**1133**	7
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**304**

4.3.6 Retailer consumption by household type

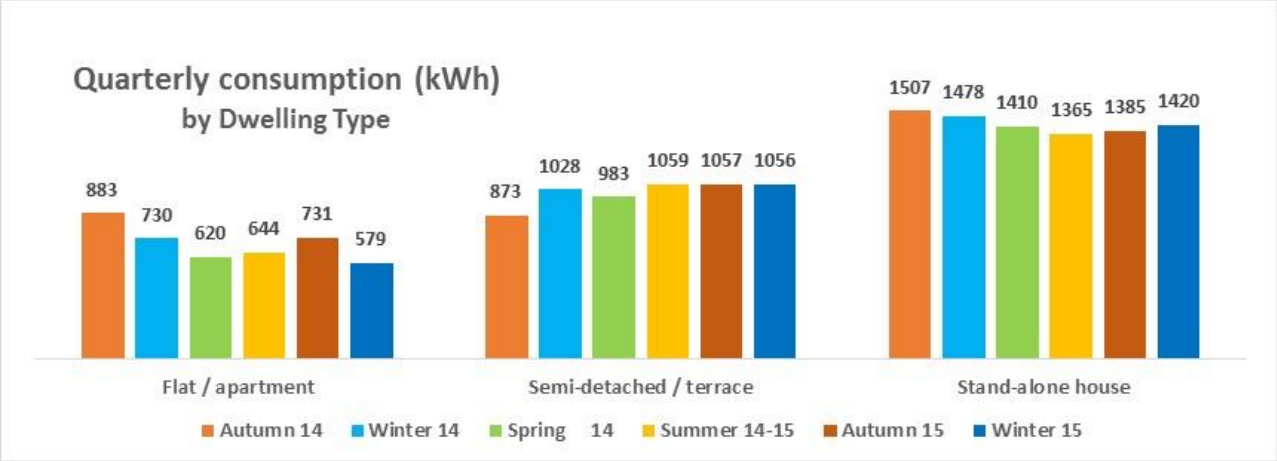
The more people in a household, the higher the electricity consumption. Families use around 70% more electricity per year on average (maximum of 1832 kWh per quarter) than single person households (maximum of 1021 kWh per quarter).



By Household Type	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Single	1021	976	923	906	928	997	**959**	110
Couple	1382	1404	1216	1262	1255	1314	**1306**	99
Family	1832	1812	1656	1622	1683	1780	**1731**	95
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**304**

4.3.7 Retailer consumption by dwelling type and age

Households in stand-alone houses consumed significantly more electricity (maximum of 1507 kWh) than those in semi-detached or terrace houses (maximum of 1059 kWh) or those in flats or apartments (maximum of 883 kWh). This is largely because stand-alone houses tend to be occupied by more people.



By Dwelling Type	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Flat / apartment	883	730	620	644	731	579	**698**	19
Semi-detached / terrace	873	1028	983	1059	1057	1056	**1009**	22
Stand-alone house	1507	1478	1410	1365	1385	1420	**1427**	181
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**222**

An analysis of consumption by age of dwelling shows little correlation by age:

By Age of Dwelling	Autumn 14	Winter 14	Spring 14	Summer 14-15	Autumn 15	Winter 15	Avg/Qtr	Count (Autumn 15)
Under 10 years	840	1409	1180	1231	1083	1324	**1178**	26
10-20 years	1624	1615	1385	1441	1456	1626	**1524**	39
20-30 years	1195	1267	1258	1244	1268	1382	**1269**	39
30-40 years	1570	1482	1331	1411	1489	1305	**1431**	35
40-50 years	950	1133	1059	1088	1088	1114	**1072**	21
Over 50 years	1386	1224	1219	1113	1163	1142	**1208**	42
Total	**1366**	**1380**	**1249**	**1252**	**1271**	**1322**	**1307**	**202**

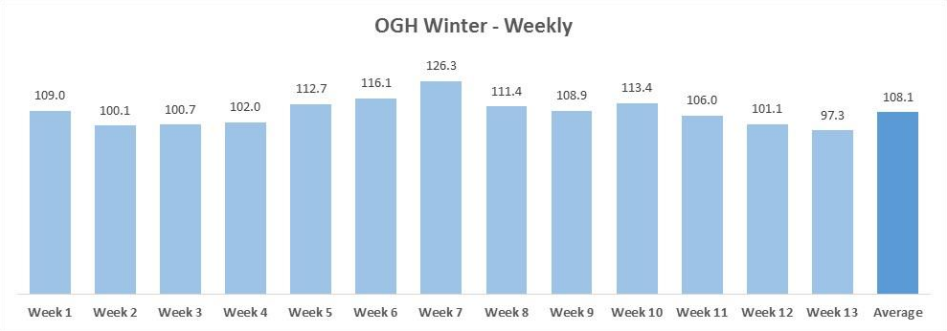
4.4 Online electricity monitor data

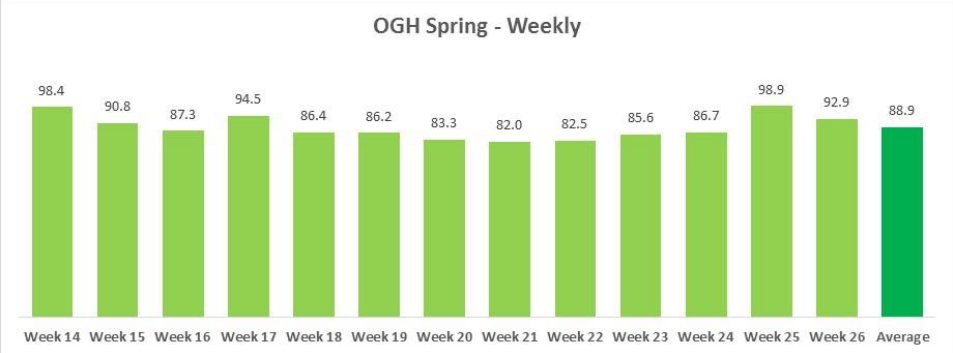
4.4.1 The online electricity monitors

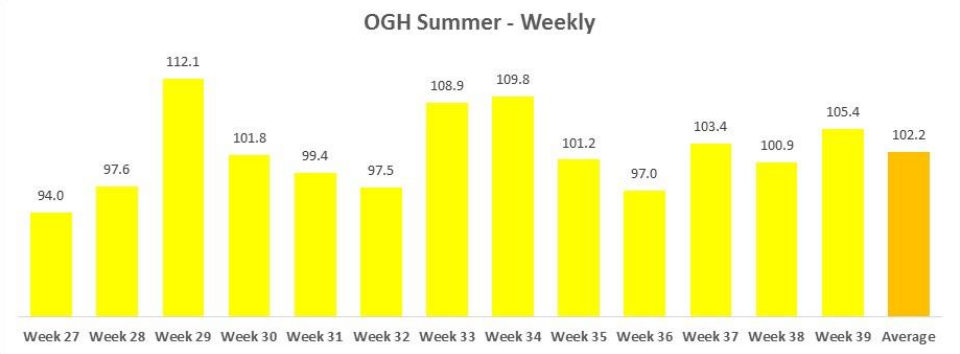
This rest of this chapter contains data from the electricity monitors, expressed as average weekly totals (kWh) for Winter (June, July, August 2015), Spring (September, October, November 2015) and Summer (December 2015 and January and February 2016). Data was not able to be collected for Autumn (March, April and May) because of the project deadline.

4.4.2 Online electricity monitor weekly consumption

Weekly consumption declines gradually over both the Winter and Spring periods, for an average of 108.1 kWh in Winter and 88.9 kWh in Spring. Note that Winter consumption increases as the weather gets colder in mid-Winter, but declines overall. Spring consumption was relatively even, but weekly Summer consumption varied significantly – temperatures tend to be more variable in Summer.







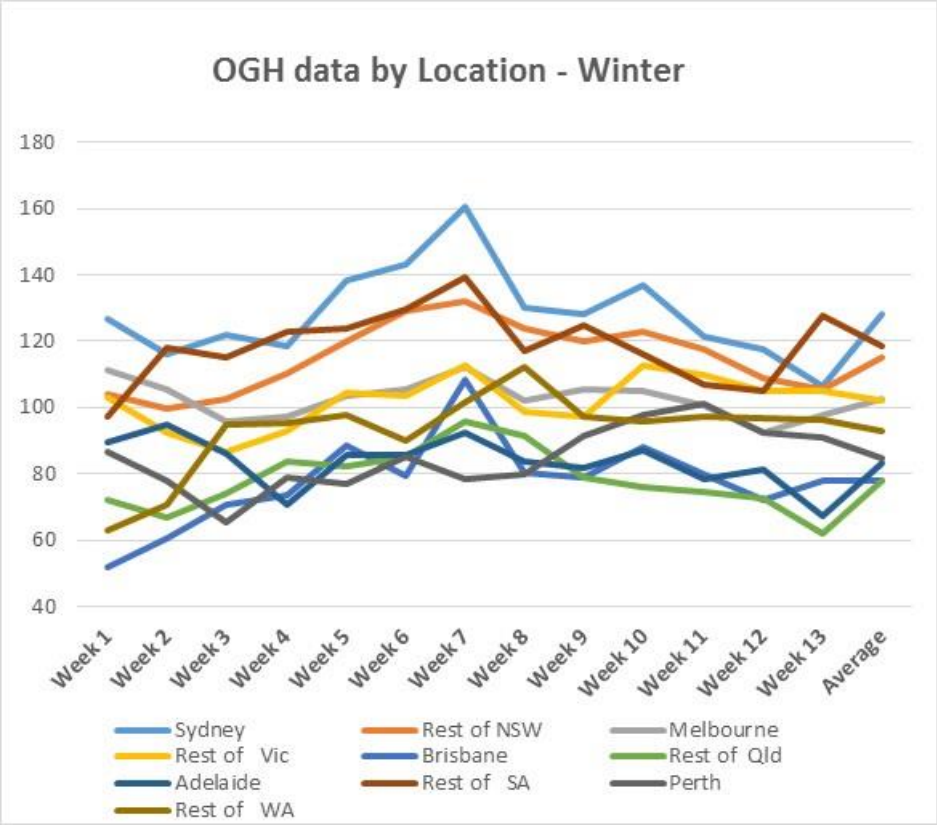
4.4.3 Online electricity monitor data by region

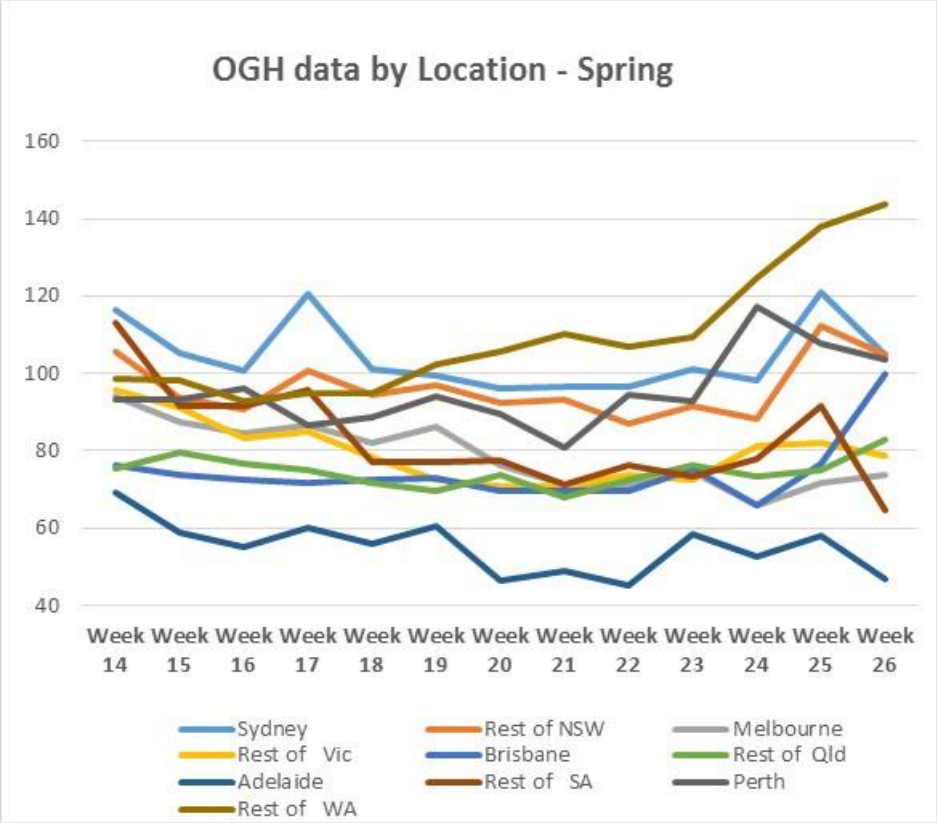
Note that not all regions are included, because of insufficient data (Hobart, Rest of Tasmania, ACT, Northern Territory).

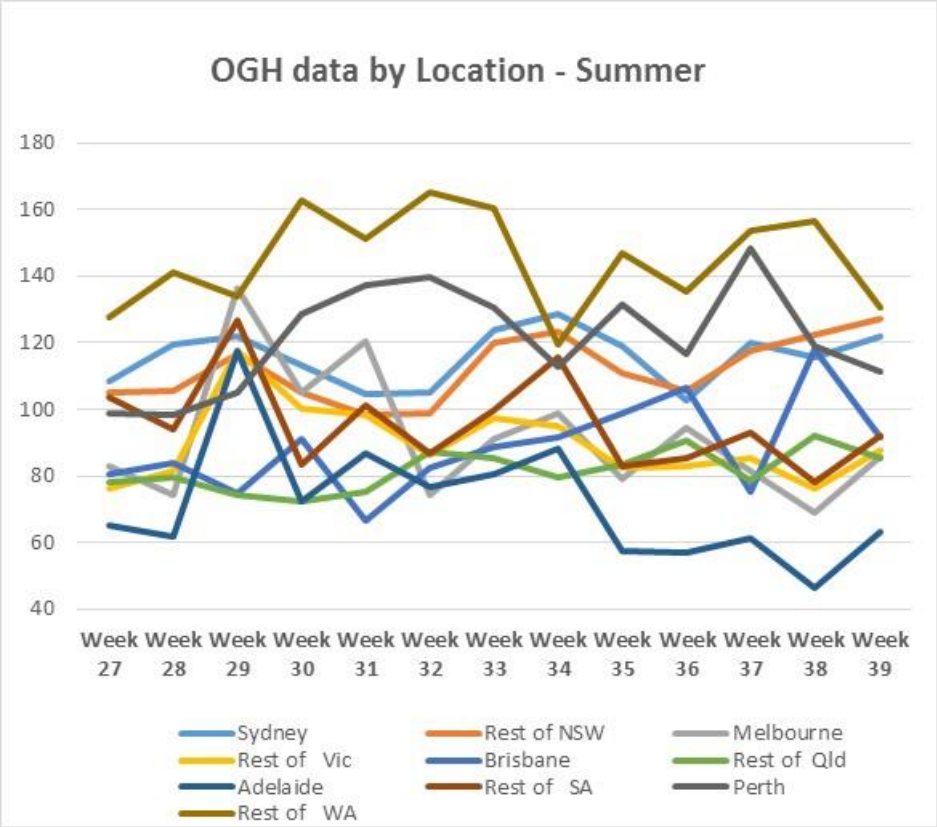
WINTER	Sydney	Rest of NSW	Melbourne	Rest of Vic	Brisbane	Rest of Qld	Adelaide	Rest of SA	Perth	Rest of WA	Overall
Week 1	126.8	103.9	111.2	103.0	52.0	72.1	89.6	97.2	86.7	62.8	**109.0**
Week 2	115.9	99.5	105.5	92.5	60.6	66.9	94.8	118.2	77.9	70.6	**100.1**
Week 3	121.9	102.7	96.0	86.8	70.8	74.2	86.1	115.0	65.2	94.9	**100.7**
Week 4	118.6	110.4	97.1	92.9	73.8	83.6	70.5	123.1	78.9	95.5	**102.0**
Week 5	138.3	120.2	103.7	104.5	88.5	82.1	85.6	123.7	77.2	97.6	**112.7**
Week 6	143.2	129.0	105.6	103.5	79.6	85.3	85.7	129.8	85.0	89.9	**116.1**
Week 7	160.4	132.1	112.0	112.7	108.2	95.8	92.6	139.4	78.6	101.7	**126.3**
Week 8	130.1	123.9	102.3	98.5	80.3	91.3	84.0	116.9	80.0	112.0	**111.4**
Week 9	128.2	119.8	105.5	97.2	79.1	79.1	82.0	124.8	91.2	97.4	**108.9**
Week 10	137.0	123.0	105.0	112.7	87.9	76.1	87.2	115.9	97.6	95.7	**113.4**
Week 11	121.6	117.4	100.6	109.6	79.9	74.4	78.2	106.9	101.4	97.3	**106.0**
Week 12	117.5	109.1	92.6	105.0	72.2	72.4	81.2	105.0	92.6	96.7	**101.1**
Week 13	106.7	105.4	97.8	105.2	78.2	62.2	67.3	127.6	91.0	96.1	**97.3**
Average	**128.2**	**115.1**	**102.7**	**101.9**	**77.8**	**78.1**	**83.4**	**118.7**	**84.9**	**92.9**	**108.1**
Total	**1666.3**	**1496.2**	**1334.8**	**1324.2**	**1011.3**	**1015.7**	**1084.7**	**1543.5**	**1103.3**	**1208.3**	**1405.1**

SPRING	Sydney	Rest of NSW	Melbourne	Rest of Vic	Brisbane	Rest of Qld	Adelaide	Rest of SA	Perth	Rest of WA	Overall
Week 14	116.6	105.6	94.0	95.6	76.0	75.5	69.1	113.1	93.4	98.6	**98.4**
Week 15	105.1	93.5	87.3	91.1	73.6	79.5	58.7	91.7	93.3	98.2	**90.8**
Week 16	100.5	90.8	84.3	83.1	72.6	76.7	55.2	91.6	96.2	92.7	**87.3**
Week 17	120.7	100.8	86.7	84.9	71.6	75.0	60.3	95.9	86.8	95.0	**94.5**
Week 18	101.0	94.3	82.2	78.4	72.5	71.8	56.0	77.2	88.6	94.9	**86.4**
Week 19	99.5	97.1	86.0	72.6	72.9	69.7	60.7	77.1	93.9	102.4	**86.2**
Week 20	96.2	92.3	76.4	71.0	69.8	74.0	46.4	77.5	89.5	105.5	**83.3**
Week 21	96.4	93.3	71.3	71.0	69.5	67.8	48.9	71.3	80.6	110.2	**82.0**
Week 22	96.4	87.0	71.3	73.7	69.5	72.7	45.4	76.1	94.4	106.9	**82.5**
Week 23	101.3	91.6	74.6	72.7	75.3	76.4	58.4	73.2	92.8	109.3	**85.6**
Week 24	98.3	88.2	66.1	81.4	65.8	73.2	52.7	77.8	117.0	124.7	**86.7**
Week 25	121.1	112.1	71.7	82.1	76.7	75.1	57.9	91.5	107.5	137.9	**98.9**
Week 26	104.7	105.0	73.9	78.8	99.9	82.7	46.8	64.7	103.6	143.6	**92.9**
Average	**104.4**	**96.3**	**78.9**	**79.7**	**74.3**	**74.6**	**55.1**	**83.0**	**95.2**	**109.2**	**88.9**
Total	**1357.7**	**1251.7**	**1025.8**	**1036.2**	**965.8**	**970.1**	**716.4**	**1078.5**	**1237.7**	**1420.0**	**1155.4**

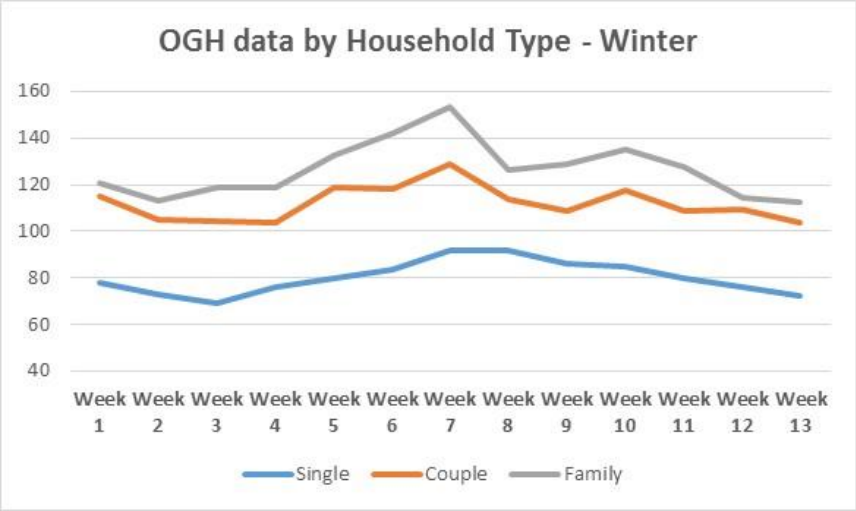
SUMMER	Sydney	Rest of NSW	Melbourne	Rest of Vic	Brisbane	Rest of Qld	Adelaide	Rest of SA	Perth	Rest of WA	Overall
Week 27	108.4	104.9	83.1	76.3	80.4	78.4	65.1	103.5	99.0	127.7	**94.0**
Week 28	119.5	105.8	74.1	81.3	84.0	79.4	61.7	94.2	98.2	140.9	**97.6**
Week 29	121.8	116.5	136.4	117.6	74.7	74.4	117.6	126.6	105.1	134.0	**112.1**
Week 30	113.1	105.2	105.2	100.4	91.0	72.3	72.3	83.3	128.7	162.9	**101.8**
Week 31	104.8	98.5	120.6	98.5	66.7	75.1	87.0	101.4	137.1	151.1	**99.4**
Week 32	105.0	98.7	74.1	86.1	82.3	87.2	76.6	86.7	139.6	165.1	**97.5**
Week 33	123.9	119.9	91.0	97.4	88.8	85.3	80.7	99.6	130.5	160.1	**108.9**
Week 34	128.9	123.3	98.9	95.0	91.7	79.7	88.0	115.7	113.0	119.6	**109.8**
Week 35	118.9	110.8	79.0	82.7	98.8	83.4	57.3	82.8	131.6	146.8	**101.2**
Week 36	102.5	105.5	94.6	83.1	106.5	90.6	57.1	85.4	116.7	135.3	**97.0**
Week 37	120.1	117.5	81.3	85.3	75.3	78.5	61.5	93.0	148.3	153.8	**103.4**
Week 38	115.5	122.2	68.9	76.0	118.0	92.3	46.2	78.3	119.0	156.3	**100.9**
Week 39	122.0	127.2	85.7	87.8	91.5	85.3	63.3	92.1	111.6	130.6	**105.4**
Average	**115.7**	**112.0**	**91.8**	**89.8**	**88.4**	**81.7**	**71.9**	**95.6**	**121.4**	**144.9**	**102.2**
Total	**1504.4**	**1456.1**	**1192.9**	**1167.5**	**1149.8**	**1061.8**	**934.3**	**1242.6**	**1578.4**	**1884.2**	**1329.0**

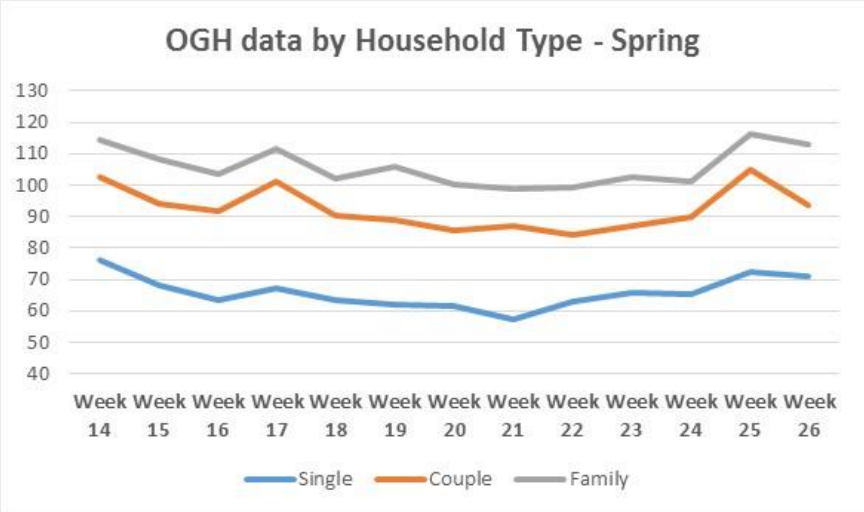

OGH data by Location - Winter
180
160
140
120
100
80
60
40
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Average
Sydney
Rest of NSW
Melbourne
Rest of Vic
Brisbane
Rest of Qld
Adelaide
Rest of SA
Perth
Rest of WA

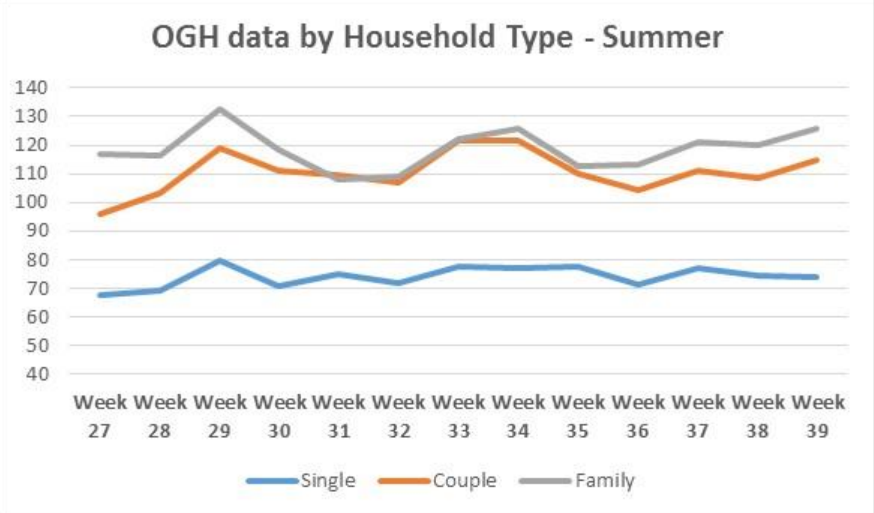

OGH data by Location - Spring
160
140
120
100
80
60
40
Week 14
Week 15
Week 16
Week 17
Week 18
Week 19
Week 20
Week 21
Week 22
Week 23
Week 24
Week 25
Week 26
Sydney
Rest of NSW
Melbourne
Rest of Vic
Brisbane
Rest of Qld
Adelaide
Rest of SA
Perth
Rest of WA


OGH data by Location - Summer
180
160
140
120
100
80
60
40
Week 27
Week 28
Week 29
Week 30
Week 31
Week 32
Week 33
Week 34
Week 35
Week 36
Week 37
Week 38
Week 39
Sydney
Rest of NSW
Melbourne
Rest of Vic
Brisbane
Rest of Qld
Adelaide
Rest of SA
Perth
Rest of WA

4.4.4 Online electricity monitor data by household type







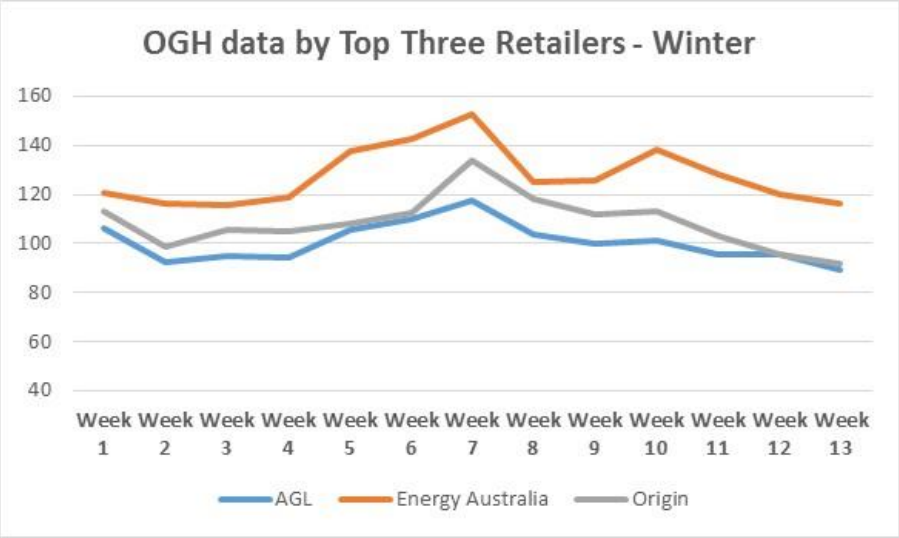
By Household Type

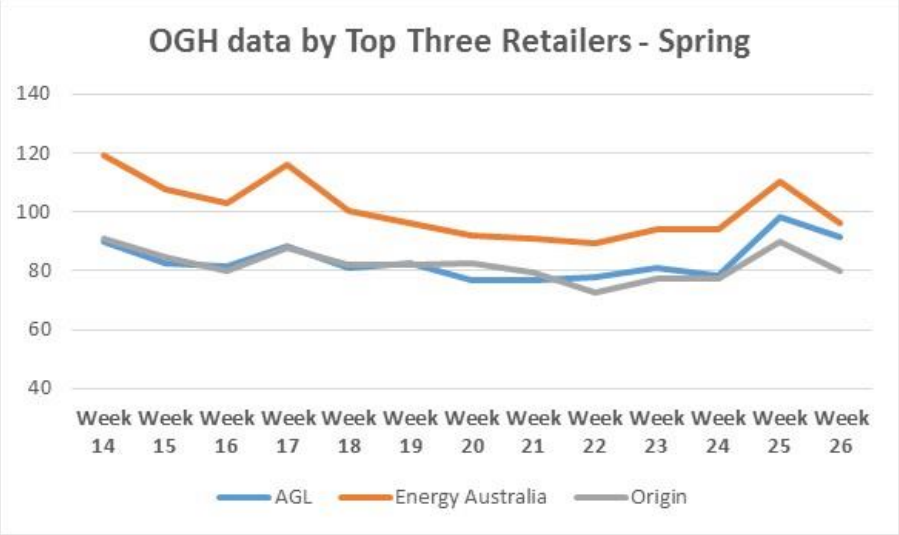
WINTER	Single	Couple	Family	Overall
Week 1	78.0	115.0	120.4	109.0
Week 2	72.7	105.0	113.0	100.1
Week 3	69.3	104.6	118.6	100.7
Week 4	76.1	103.8	118.5	102.0
Week 5	80.0	118.7	132.6	112.7
Week 6	83.4	118.1	142.2	116.1
Week 7	91.8	128.8	153.1	126.3
Week 8	91.6	113.4	126.2	111.4
Week 9	86.3	109.0	128.5	108.9
Week 10	84.9	117.8	135.3	113.4
Week 11	79.8	108.9	127.5	106.0
Week 12	76.3	109.2	114.6	101.1
Week 13	72.6	103.9	112.2	97.3
Average	80.2	112.0	126.4	108.1
Total	1042.7	1456.2	1642.6	1405.1

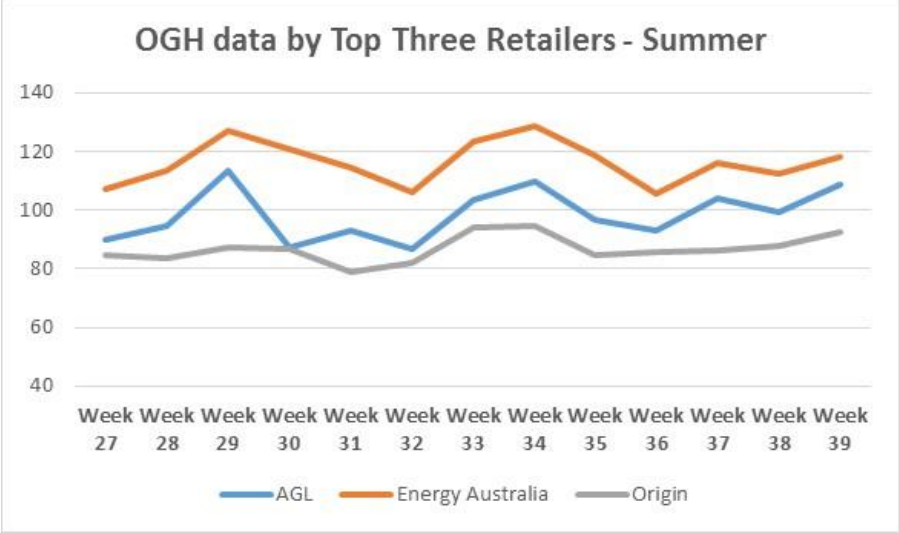
SPRING	Single	Couple	Family	Overall
Week 14	76.1	102.6	114.2	98.4
Week 15	68.4	93.9	108.3	90.8
Week 16	63.4	91.7	103.7	87.3
Week 17	67.3	101.1	111.5	94.5
Week 18	63.4	90.4	102.3	86.4
Week 19	62.2	88.8	105.8	86.2
Week 20	61.4	85.8	100.4	83.3
Week 21	57.3	87.2	99.0	82.0
Week 22	63.0	84.4	99.5	82.5
Week 23	65.9	87.0	102.6	85.6
Week 24	65.3	90.0	101.3	86.7
Week 25	72.2	104.9	116.3	98.9
Week 26	71.0	93.5	112.8	92.9
Average	65.9	92.4	106.0	88.9
Total	857.1	1201.4	1377.6	1155.4

SUMMER	Single	Couple	Family	Overall
Week 27	67.9	95.9	116.8	94.0
Week 28	69.3	103.2	116.3	97.6
Week 29	79.5	118.9	132.6	112.1
Week 30	71.0	111.1	118.3	101.8
Week 31	74.8	109.8	108.2	99.4
Week 32	71.9	107.0	109.1	97.5
Week 33	77.5	121.7	121.9	108.9
Week 34	76.9	121.5	125.6	109.8
Week 35	77.5	110.2	112.9	101.2
Week 36	71.5	104.5	113.3	97.0
Week 37	77.1	111.3	121.0	103.4
Week 38	74.2	108.3	119.9	100.9
Week 39	74.1	114.9	125.6	105.4
Average	74.1	110.6	118.6	102.2
Total	963.3	1438.2	1541.6	1329.0

4.4.5 Online electricity monitor data by top three retailers







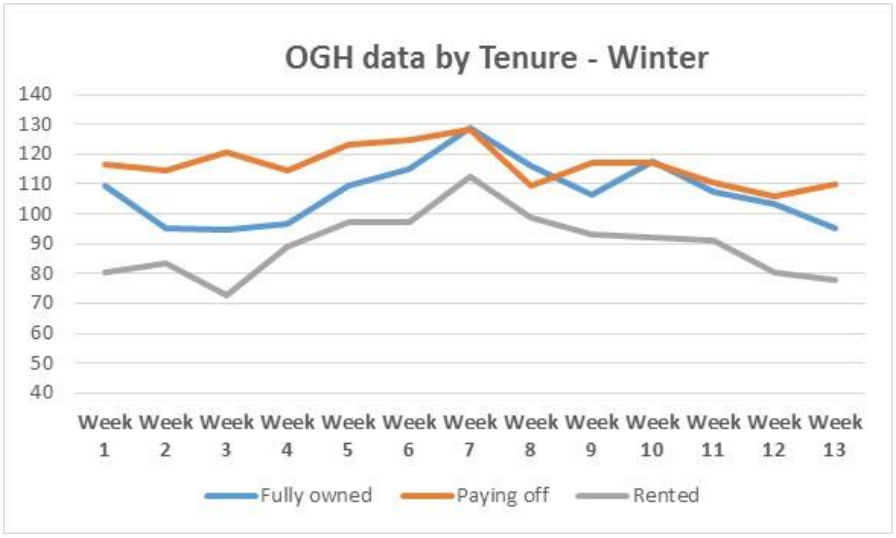
By Top Three Retailers

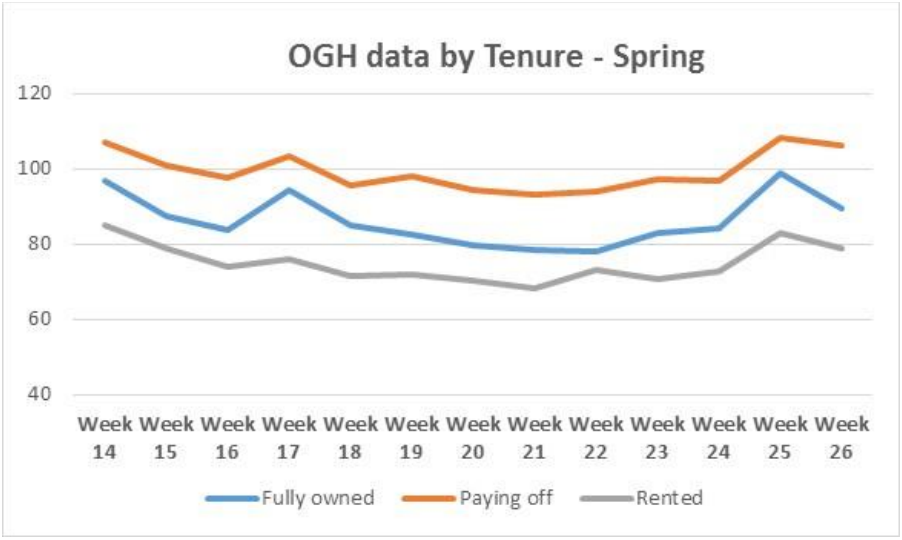
WINTER	AGL	Energy Australia	Origin	Overall
Week 1	106.0	120.7	113.2	**109.0**
Week 2	92.4	116.5	98.6	**100.1**
Week 3	94.8	115.7	105.4	**100.7**
Week 4	94.3	118.6	105.1	**102.0**
Week 5	105.3	137.5	108.2	**112.7**
Week 6	109.8	142.6	112.3	**116.1**
Week 7	117.8	152.4	133.5	**126.3**
Week 8	103.9	124.8	118.0	**111.4**
Week 9	100.1	125.6	111.9	**108.9**
Week 10	101.0	138.5	113.4	**113.4**
Week 11	95.5	128.2	103.2	**106.0**
Week 12	95.5	119.9	95.3	**101.1**
Week 13	89.1	116.3	91.7	**97.3**
Average	**100.4**	**127.5**	**108.4**	**108.1**
Total	**1305.4**	**1657.2**	**1409.8**	**1405.1**

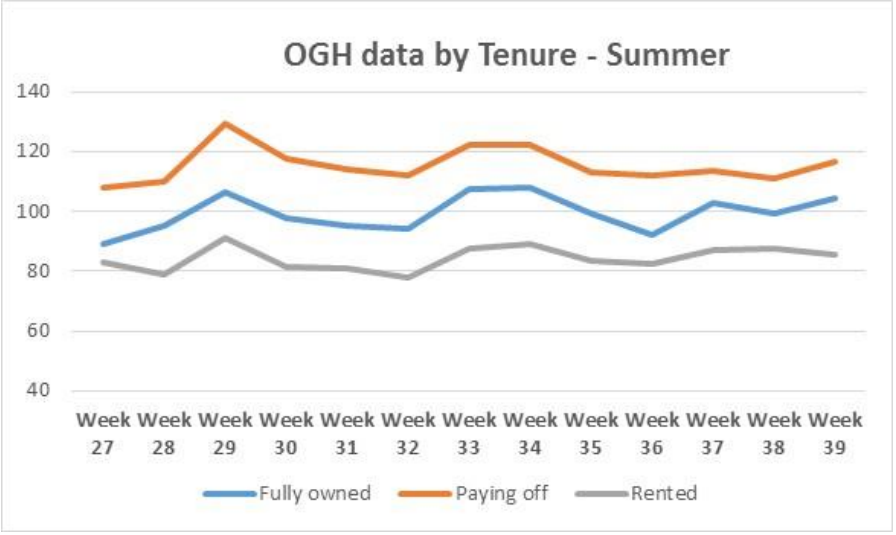
SPRING	AGL	Energy Australia	Origin	Overall
Week 14	89.7	119.2	91.0	**98.4**
Week 15	82.4	107.7	84.9	**90.8**
Week 16	81.7	102.9	79.9	**87.3**
Week 17	88.2	116.2	87.9	**94.5**
Week 18	80.8	100.5	81.8	**86.4**
Week 19	82.7	96.4	82.0	**86.2**
Week 20	76.8	92.0	82.4	**83.3**
Week 21	77.1	90.9	79.4	**82.0**
Week 22	77.7	89.6	72.8	**82.5**
Week 23	81.1	93.9	77.6	**85.6**
Week 24	78.6	93.9	77.2	**86.7**
Week 25	98.5	110.6	89.9	**98.9**
Week 26	91.6	96.1	80.1	**92.9**
Average	**83.6**	**100.8**	**82.1**	**88.9**
Total	**1086.9**	**1309.8**	**1066.7**	**1155.4**

SUMMER	AGL	Energy Australia	Origin	Overall
Week 27	90.1	107.4	84.7	**94.0**
Week 28	94.8	113.5	83.9	**97.6**
Week 29	113.5	127.0	87.1	**112.1**
Week 30	87.6	121.0	86.7	**101.8**
Week 31	93.3	114.6	79.2	**99.4**
Week 32	86.7	106.3	81.9	**97.5**
Week 33	103.7	123.2	94.2	**108.9**
Week 34	109.7	128.7	94.7	**109.8**
Week 35	96.7	118.8	84.5	**101.2**
Week 36	93.3	105.8	85.6	**97.0**
Week 37	104.0	116.1	86.4	**103.4**
Week 38	99.5	112.7	88.0	**100.9**
Week 39	108.7	118.0	92.3	**105.4**
Average	**98.6**	**116.4**	**86.9**	**102.2**
Total	**1281.6**	**1513.2**	**1129.1**	**1329.0**

4.4.6 Online electricity monitor data by tenure







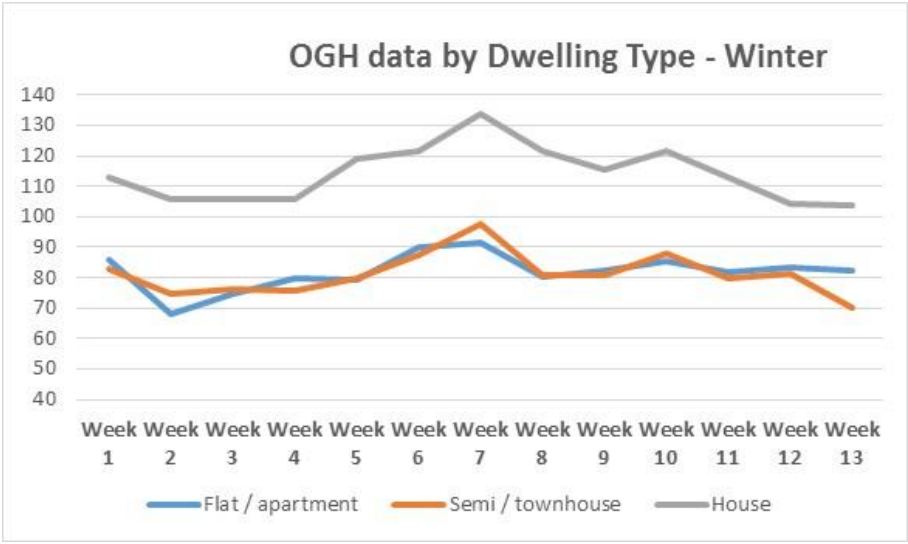
By Tenure

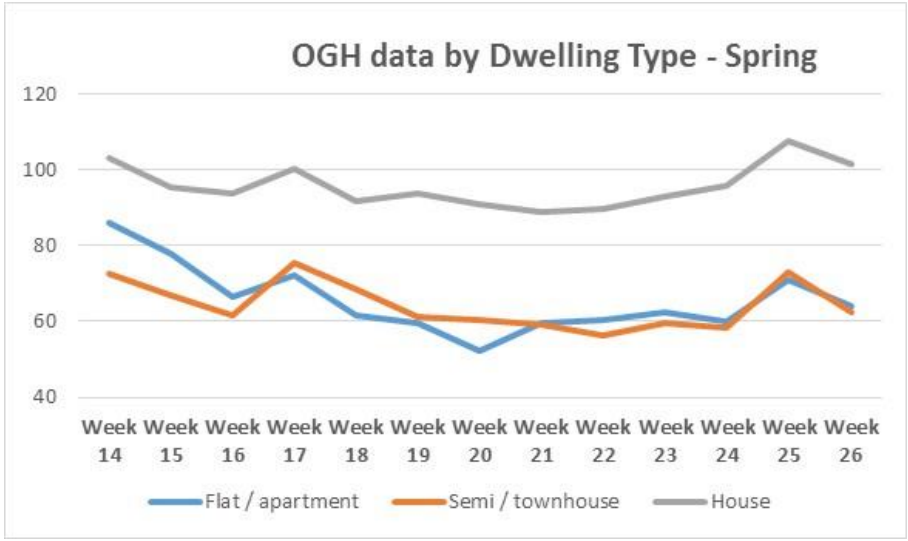
WINTER	Fully owned	Paying off	Rented	Overall
Week 1	109.3	116.4	80.5	**109.0**
Week 2	95.1	114.5	83.4	**100.1**
Week 3	94.8	120.5	72.8	**100.7**
Week 4	96.7	114.5	88.9	**102.0**
Week 5	109.3	123.1	97.2	**112.7**
Week 6	115.1	124.9	97.0	**116.1**
Week 7	129.0	128.1	112.5	**126.3**
Week 8	116.2	109.6	98.5	**111.4**
Week 9	106.5	116.9	93.2	**108.9**
Week 10	117.8	117.1	92.2	**113.4**
Week 11	107.6	110.2	91.2	**106.0**
Week 12	103.3	105.9	80.3	**101.1**
Week 13	95.0	110.0	77.9	**97.3**
Average	**107.4**	**116.3**	**89.7**	**108.1**
Total	**1395.7**	**1511.8**	**1165.8**	**1405.1**

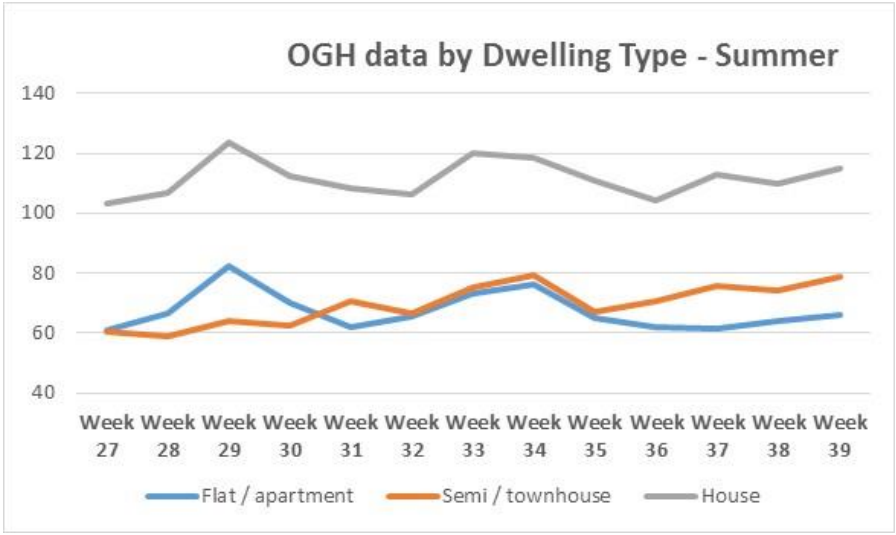
SPRING	Fully owned	Paying off	Rented	Overall
Week 14	96.8	106.8	84.9	**98.4**
Week 15	87.4	100.9	78.8	**90.8**
Week 16	83.8	97.5	74.1	**87.3**
Week 17	94.2	103.2	75.8	**94.5**
Week 18	84.9	95.4	71.4	**86.4**
Week 19	82.7	98.0	72.0	**86.2**
Week 20	79.8	94.4	70.4	**83.3**
Week 21	78.5	93.1	68.2	**82.0**
Week 22	78.2	93.9	73.2	**82.5**
Week 23	82.9	97.4	70.5	**85.6**
Week 24	84.1	97.0	72.7	**86.7**
Week 25	98.7	108.3	82.7	**98.9**
Week 26	89.2	106.1	79.0	**92.9**
Average	**86.2**	**99.4**	**74.9**	**88.9**
Total	**1121.2**	**1292.0**	**973.7**	**1155.4**

SUMMER	Fully owned	Paying off	Rented	Overall
Week 27	89.0	107.7	83.1	**94.0**
Week 28	95.0	109.8	79.0	**97.6**
Week 29	106.6	129.2	91.1	**112.1**
Week 30	97.9	117.6	81.5	**101.8**
Week 31	95.4	114.2	81.0	**99.4**
Week 32	94.0	112.1	78.0	**97.5**
Week 33	107.3	122.3	87.6	**108.9**
Week 34	107.9	122.0	89.1	**109.8**
Week 35	99.0	113.2	83.6	**101.2**
Week 36	92.4	111.8	82.4	**97.0**
Week 37	103.0	113.5	87.2	**103.4**
Week 38	99.4	110.9	87.8	**100.9**
Week 39	104.4	116.7	85.5	**105.4**
Average	**99.3**	**115.5**	**84.4**	**102.2**
Total	**1291.2**	**1501.0**	**1096.7**	**1329.0**

4.4.7 Online electricity monitor data by dwelling type







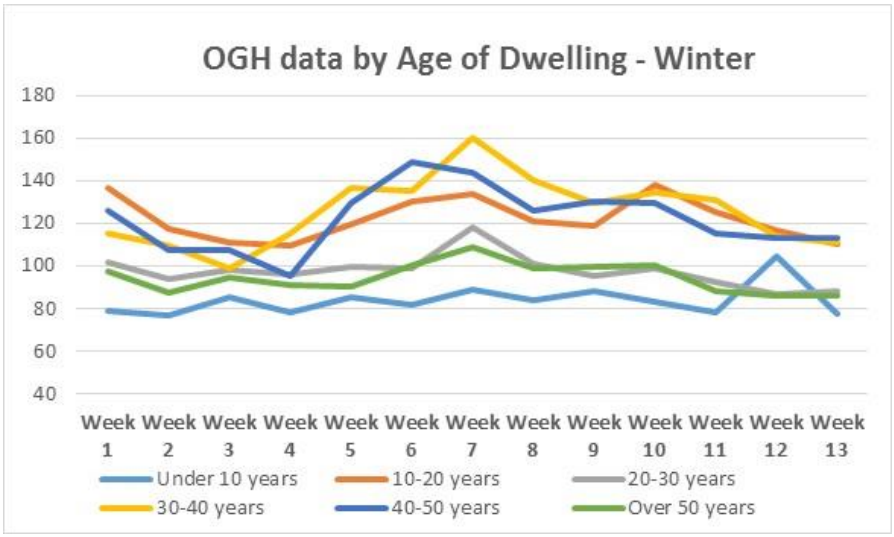
By Dwelling Type

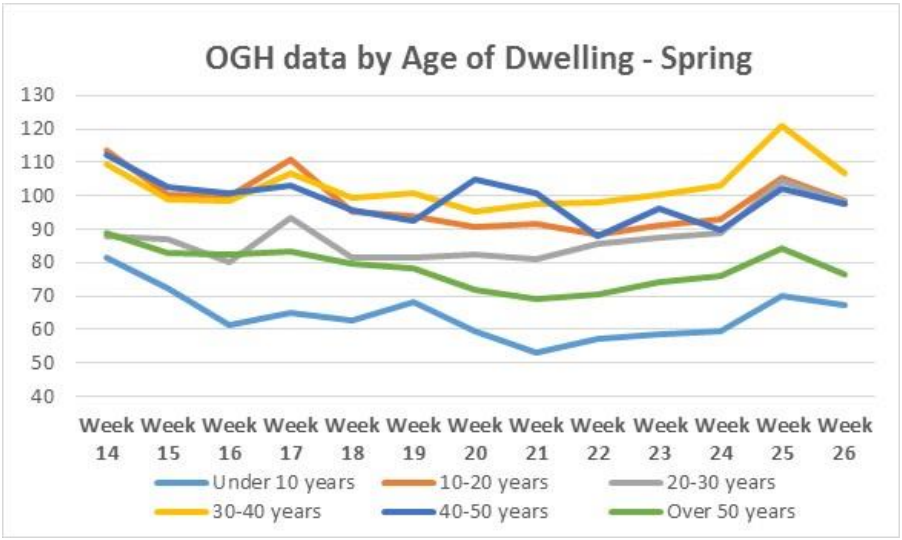
WINTER	Flat / apartment	Semi / townhouse	House	Overall
Week 1	85.7	83.0	112.8	**109.0**
Week 2	68.0	74.5	106.0	**100.1**
Week 3	74.5	76.4	105.5	**100.7**
Week 4	79.8	75.9	105.9	**102.0**
Week 5	79.1	79.5	118.8	**112.7**
Week 6	89.7	87.3	121.8	**116.1**
Week 7	91.7	97.8	133.7	**126.3**
Week 8	80.2	80.5	121.5	**111.4**
Week 9	82.4	80.8	115.7	**108.9**
Week 10	85.5	87.8	121.4	**113.4**
Week 11	82.0	79.9	112.7	**106.0**
Week 12	83.5	81.2	104.4	**101.1**
Week 13	82.4	70.3	103.6	**97.3**
Average	**81.9**	**81.2**	**114.1**	**108.1**
Total	**1064.4**	**1055.0**	**1483.7**	**1405.1**

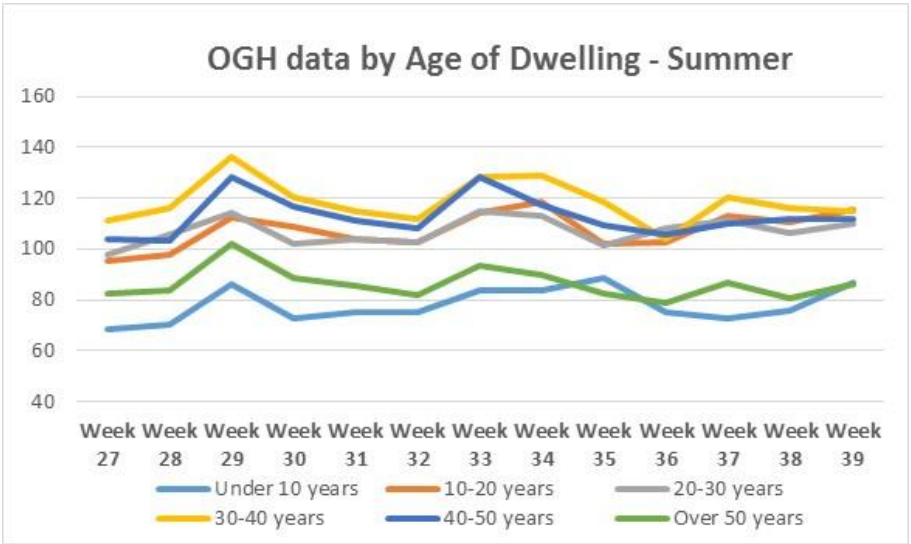
SPRING	Flat / apartment	Semi / townhouse	House	Overall
Week 14	86.1	72.6	103.2	**98.4**
Week 15	77.9	67.1	95.3	**90.8**
Week 16	66.7	61.7	93.8	**87.3**
Week 17	72.3	75.5	100.4	**94.5**
Week 18	61.7	68.7	91.6	**86.4**
Week 19	59.4	61.1	93.7	**86.2**
Week 20	52.3	60.3	90.9	**83.3**
Week 21	59.5	59.0	88.8	**82.0**
Week 22	60.4	56.4	89.7	**82.5**
Week 23	62.3	59.7	93.0	**85.6**
Week 24	60.0	58.3	95.7	**86.7**
Week 25	71.0	73.2	107.5	**98.9**
Week 26	63.9	62.6	101.6	**92.9**
Average	**65.7**	**64.3**	**95.8**	**88.9**
Total	**853.6**	**836.2**	**1245.4**	**1155.4**

SUMMER	Flat / apartment	Semi / townhouse	House	Overall
Week 27	61.1	60.2	103.4	**94.0**
Week 28	66.7	59.1	106.5	**97.6**
Week 29	82.4	64.0	123.7	**112.1**
Week 30	70.0	62.4	112.3	**101.8**
Week 31	62.2	70.5	108.2	**99.4**
Week 32	65.4	66.4	106.3	**97.5**
Week 33	73.3	75.3	119.9	**108.9**
Week 34	76.2	79.2	118.6	**109.8**
Week 35	64.8	66.9	110.9	**101.2**
Week 36	62.1	70.7	104.3	**97.0**
Week 37	61.5	75.6	112.7	**103.4**
Week 38	63.8	74.1	110.1	**100.9**
Week 39	66.0	78.6	115.0	**105.4**
Average	**67.3**	**69.5**	**111.7**	**102.2**
Total	**875.3**	**903.1**	**1452.1**	**1329.0**

4.4.8 Online electricity monitor data by age of dwelling







By Age of Dwelling

WINTER	Under 10 years	10-20 years	20-30 years	30-40 years	40-50 years	Over 50 years	Overall
Week 1	78.6	136.5	102.0	115.1	126.0	97.2	**109.0**
Week 2	77.1	117.2	93.9	109.7	107.6	87.2	**100.1**
Week 3	85.5	111.2	98.3	98.8	107.4	94.4	**100.7**
Week 4	78.2	109.6	95.8	115.4	95.1	90.7	**102.0**
Week 5	85.7	119.4	99.9	136.9	129.8	90.3	**112.7**
Week 6	81.7	129.9	99.0	135.6	148.9	100.4	**116.1**
Week 7	88.9	134.1	118.2	160.2	144.0	108.9	**126.3**
Week 8	84.1	120.8	101.1	140.4	126.1	99.0	**111.4**
Week 9	87.8	119.1	95.5	129.5	130.0	99.6	**108.9**
Week 10	83.1	138.0	98.9	134.7	129.9	100.5	**113.4**
Week 11	78.3	125.6	92.4	131.2	115.6	88.1	**106.0**
Week 12	104.4	116.6	86.5	113.9	113.0	85.8	**101.1**
Week 13	77.4	110.3	87.9	110.7	112.8	86.0	**97.3**
Average	**83.9**	**122.2**	**97.6**	**125.5**	**122.0**	**94.5**	**108.1**
Total	**1090.8**	**1588.3**	**1269.4**	**1631.9**	**1586.2**	**1228.1**	**1405.1**

SPRING	Under 10 years	10-20 years	20-30 years	30-40 years	40-50 years	Over 50 years	Overall
Week 14	81.4	113.4	87.8	109.6	112.0	88.8	**98.4**
Week 15	72.4	100.2	86.9	99.0	102.6	83.0	**90.8**
Week 16	61.2	99.8	80.3	98.5	101.0	82.2	**87.3**
Week 17	64.9	110.8	93.3	106.5	103.0	83.4	**94.5**
Week 18	62.7	95.2	81.4	99.6	95.9	79.6	**86.4**
Week 19	68.1	93.7	81.3	100.6	92.5	78.1	**86.2**
Week 20	59.7	90.7	82.4	95.2	105.0	72.1	**83.3**
Week 21	53.0	91.6	81.1	97.5	101.0	69.0	**82.0**
Week 22	57.2	88.4	85.6	98.0	87.8	70.7	**82.5**
Week 23	58.6	91.1	87.4	100.3	96.3	74.4	**85.6**
Week 24	59.7	93.1	89.0	102.9	89.7	76.0	**86.7**
Week 25	70.0	105.2	104.4	120.8	102.1	84.3	**98.9**
Week 26	67.4	98.5	97.9	106.6	97.4	76.5	**92.9**
Average	**64.3**	**97.8**	**87.6**	**102.7**	**99.0**	**78.3**	**88.9**
Total	**836.3**	**1271.5**	**1138.8**	**1335.2**	**1286.4**	**1018.1**	**1155.4**

SUMMER	Under 10 years	10-20 years	20-30 years	30-40 years	40-50 years	Over 50 years	Overall
Week 27	68.4	95.1	98.0	111.2	103.8	82.4	**94.0**
Week 28	70.1	97.5	105.9	116.2	103.4	83.9	**97.6**
Week 29	86.3	112.7	114.2	136.3	128.6	101.8	**112.1**
Week 30	72.7	109.1	102.2	120.5	117.0	88.8	**101.8**
Week 31	75.5	104.2	104.1	114.7	111.5	85.8	**99.4**
Week 32	75.3	102.8	102.5	112.1	108.1	82.1	**97.5**
Week 33	83.7	114.4	114.9	128.3	128.2	93.5	**108.9**
Week 34	83.8	118.5	112.8	128.8	117.6	89.9	**109.8**
Week 35	88.7	102.4	101.8	118.8	109.6	82.8	**101.2**
Week 36	75.2	102.4	107.9	104.0	105.9	79.1	**97.0**
Week 37	72.9	113.2	111.1	120.7	109.8	86.8	**103.4**
Week 38	75.6	110.8	106.4	115.9	111.9	80.4	**100.9**
Week 39	86.7	115.4	109.8	114.8	112.1	86.4	**105.4**
Average	**78.1**	**107.6**	**107.0**	**118.6**	**112.9**	**86.4**	**102.2**
Total	**1014.7**	**1398.3**	**1391.6**	**1542.3**	**1467.5**	**1123.7**	**1329.0**

Chapter Five
Attitudes and Behaviour

5.1 Introduction

Participants in the project were asked a number of questions about their attitudes and behaviour regarding a number of energy efficiency issues. The results are expressed as percentage of those who completed the attitudinal survey (350-450 participants out of the total of 600, depending on the question), in most cases comparing the responses of Detectives and Gadgets.

It was the original intention to ask these questions twice – once at the beginning of the Project and once again at the end. Unfortunately, the shortened timeframe of the Project precluded this, and only one round of surveying could be done. Thus the results measure overall attitudes and behaviours, with no attempt to measure how they may have changed during the course of the Project.

This is not inconsistent with the Project objective, which was simply to measure the hypothesis that the real-time information from the monitor would reduce household electricity consumption. No attempt was made to measure whether attitudes towards energy efficiency, or any changes in these attitudes, would lead to behavioural change. The Project treated at these attitudes as effects, not causes.

Many of these questions also asked the participants to make open-ended textual comments. The full text of all comments are contained in Appendix V.

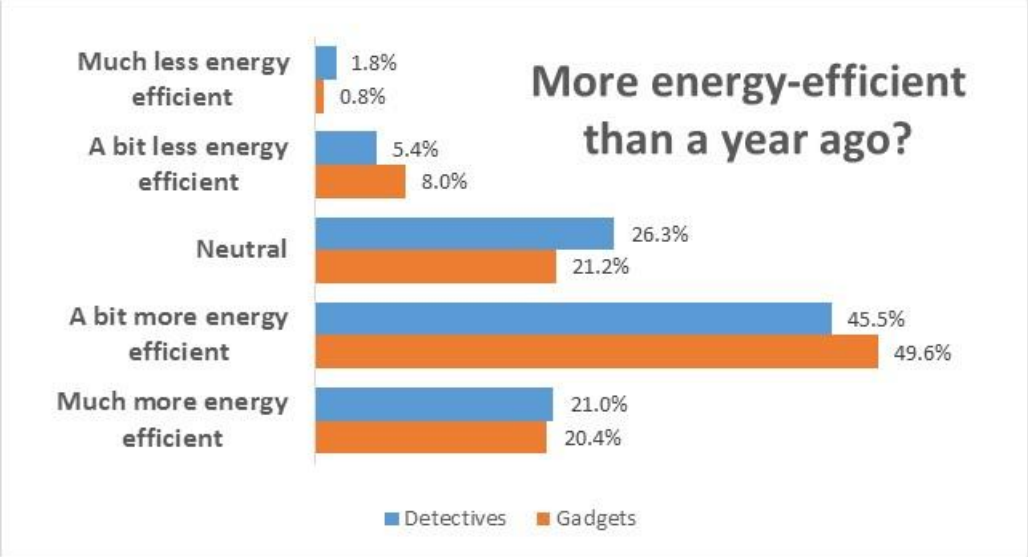
The Gadget group (those with monitors installed) were also asked questions about their experiences with the monitor hardware and the Our Green Home online platform. Answers to quantitative questions are contained in this chapter, and answers to qualitative questions are contained in Appendices VI and VII.

5.2 Feelings about energy efficiency

Participants were asked if they felt that their household was more energy efficient than it was a year ago. Most said that they were – 20.6% of participants said they were much more energy efficient and nearly half (48.0%) said they were a bit more energy efficient than a year earlier. There was no significant difference between Detectives and Gadgets.

There were many comments (see Appendix V), mostly to do with the difficulty of reducing energy consumption, or detailing various measures that had been undertaken.

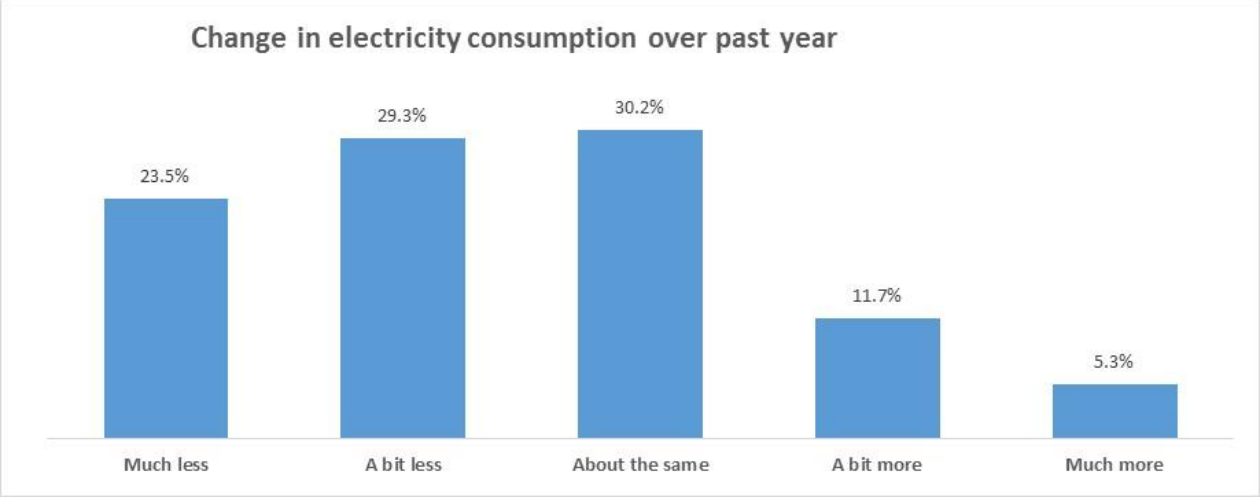
More energy efficient than a year ago?	Detective %	Gadget %	Total %	Detective Number	Gadget Number	Total Number
Much less energy efficient	1.8%	0.8%	1.2%	3	2	5
A bit less energy efficient	5.4%	8.0%	7.0%	9	20	29
Neutral	26.3%	21.2%	23.3%	44	53	97
A bit more energy efficient	45.5%	49.6%	48.0%	76	124	200
Much more energy efficient	21.0%	20.4%	20.6%	35	51	86
Total	**100%**	**100%**	**100%**	**167**	**250**	**417**



5.3 Change in electricity consumption over past year

Participants were asked if they had changed their electricity consumption over the past year. Most said they were using less electricity (much less – 23.5%, a bit less – 29.3%). Some said they were using more (much more – 5.3%, a bit more -11.7%).

Change in electricity consumption over past year	%	Number
Much less	23.5%	84
A bit less	29.3%	105
About the same	30.2%	108
A bit more	11.7%	42
Much more	5.3%	19
Total	**100%**	**358**

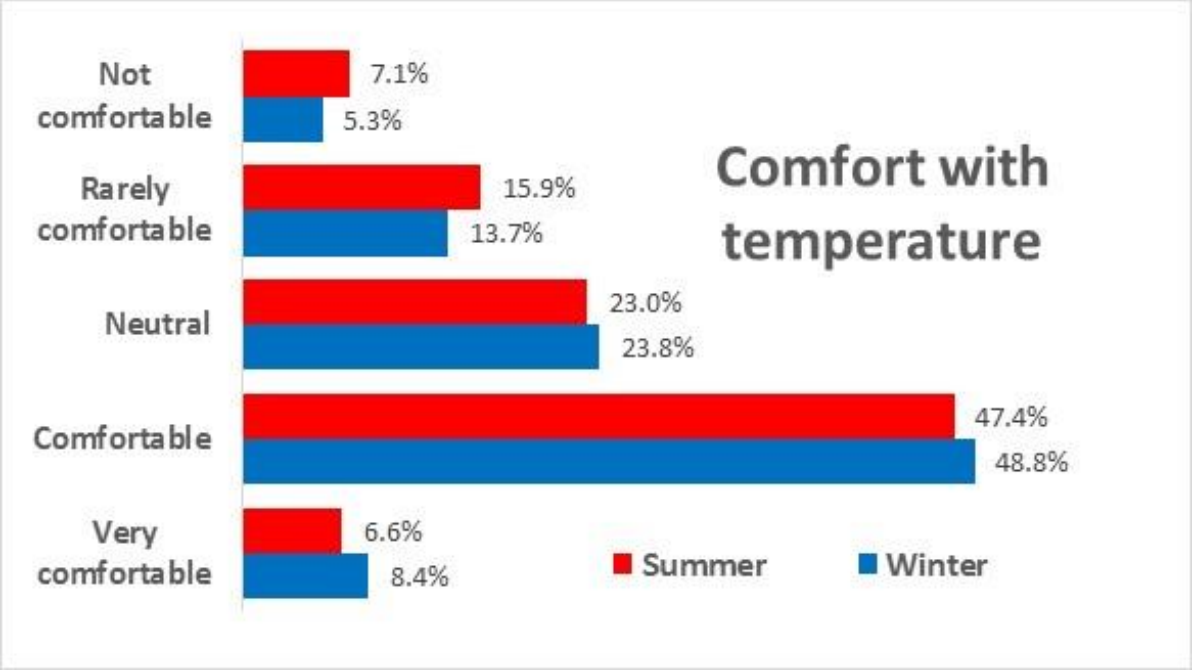


5.4 Comfort with temperature

Participants were asked if they generally felt comfortable with the temperature in their home, in summer and in winter. Most said they were comfortable or very comfortable in both summer and winter, but around 20% said they were not comfortable or rarely comfortable. They were a little less comfortable in summer than in winter.

There were many comments (see Appendix V), mostly to do with various measures people have undertaken to be cooler in summer and warmer in winter.

Comfort with temperature	Summer	Winter	Summer	Winter
Not comfortable	7.1%	5.3%	29	22
Rarely comfortable	15.9%	13.7%	65	57
Neutral	23.0%	23.8%	94	99
Comfortable	47.4%	48.8%	194	203
Very comfortable	6.6%	8.4%	27	35
Total	**100%**	**100%**	**409**	**416**

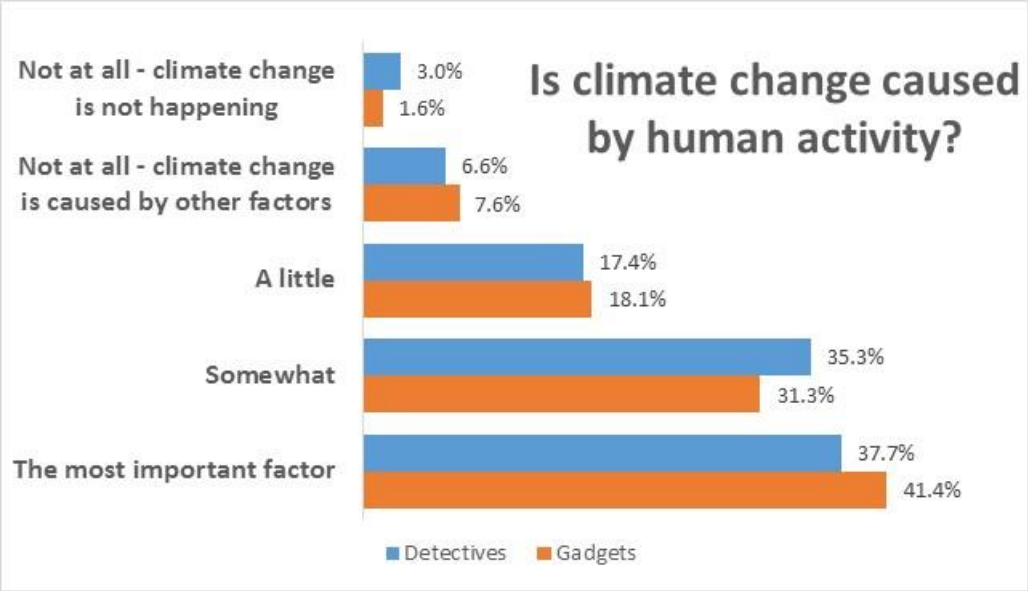


5.5 Is climate change caused by human activity?

Participants were asked if they thought climate change was caused by human activity. This question was intended as a proxy for determining their level of commitment to action on climate change. The biggest group (39.9%) said human activity is the main cause of climate change, with just 2.2% denying the existence of climate change and 7.2% believing it is caused by factors other than human activity. Gadgets were more likely than Detectives to believe that climate change is caused by human activity.

There were many comments, reflecting the strength of the respondents' views and their reasoning. Many commented on how the issue has become clouded by politics or ideology.

Is climate change caused by human activity?	Detective %	Gadget %	Total %	Detective Number	Gadget Number	Total Number
Not at all - climate change is not happening	3.0%	1.6%	2.2%	5	4	9
Not at all - climate change is caused by other factors	6.6%	7.6%	7.2%	11	19	30
A little	17.4%	18.1%	17.8%	29	45	74
Somewhat	35.3%	31.3%	32.9%	59	78	137
The most important factor	37.7%	41.4%	39.9%	63	103	166
Total	**100%**	**100%**	**100%**	**167**	**249**	**416**

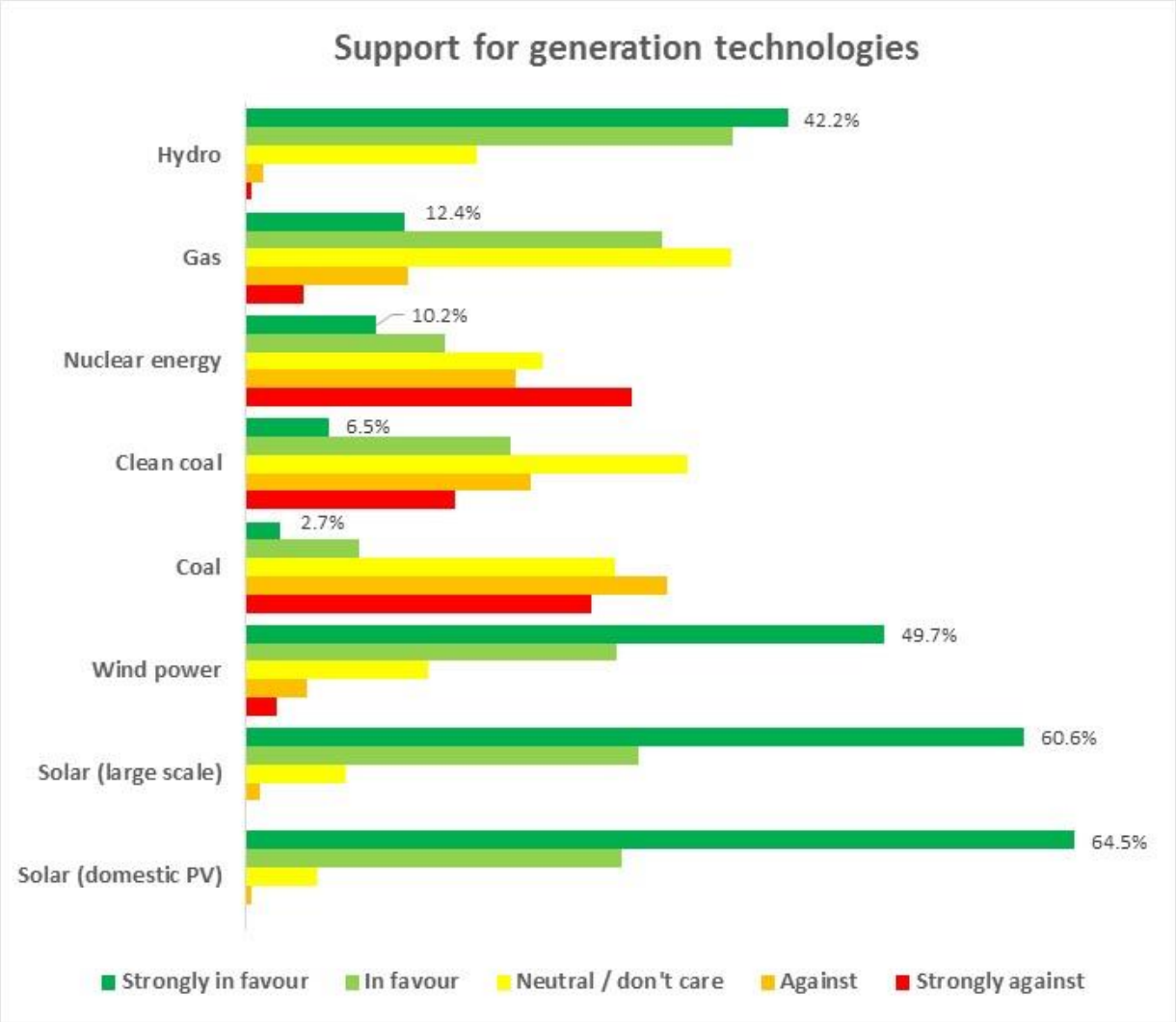


5.6 Support for generation technologies

Participants were asked about their level of support for various electricity generation technologies. Highest support ('strongly in favour') was for solar, both domestic (64.6%) and large scale (59.9%), and for wind (49.0%). Least popular were nuclear energy, coal, and 'clean coal'.

Support for generation technologies	Solar (domestic PV)	Solar (large scale)	Wind power	Coal	Clean coal	Nuclear energy	Gas	Hydro
Strongly against	0.0%	0.0%	2.4%	26.9%	16.3%	30.1%	4.6%	0.5%
Against	0.5%	1.1%	4.8%	32.8%	22.2%	21.0%	12.7%	1.3%
Neutral / don't care	5.6%	7.8%	14.2%	28.8%	34.4%	23.1%	37.8%	18.0%
In favour	29.3%	30.6%	28.9%	8.9%	20.6%	15.6%	32.4%	37.9%
Strongly in favour	64.5%	60.6%	49.7%	2.7%	6.5%	10.2%	12.4%	42.2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Support for generation technologies	Solar (domestic PV)	Solar (large scale)	Wind power	Coal	Clean coal	Nuclear energy	Gas	Hydro
Strongly against			9	100	60	112	17	2
Against	2	4	18	122	82	78	47	5
Neutral / don't care	21	29	53	107	127	86	140	67
In favour	110	114	108	33	76	58	120	141
Strongly in favour	242	226	186	10	24	38	46	157
Total	**375**	**373**	**374**	**372**	**369**	**372**	**370**	**372**



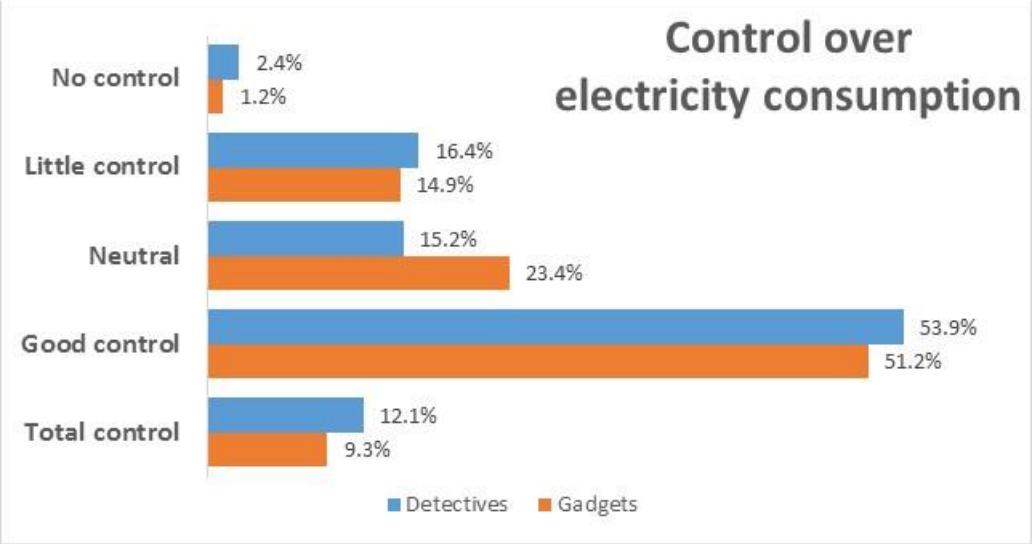
5.7 Control over electricity consumption and finances

5.7.1 Control over electricity consumption

Participants were asked if they believed they had control over their electricity consumption. Most said they had 'good' (52.3%) or 'total' (10.4%) control, with about one in six saying they had 'little' (15.5%) or 'no' (1.7%) control. Detectives were slightly more likely than Gadgets to believe they had control over their electricity consumption.

Comments (see Appendix V) were based mostly around measures people were taking to try to reduce their consumption, with many saying they had no real control because there was a minimum usage level which they could not fall below while maintain a reasonable lifestyle.

Control over electricity consumption	Detective %	Gadget %	Total %	Detective Number	Gadget Number	Total Number
No control	2.4%	1.2%	1.7%	4	3	7
Little control	16.4%	14.9%	15.5%	27	37	64
Neutral	15.2%	23.4%	20.1%	25	58	83
Good control	53.9%	51.2%	52.3%	89	127	216
Total control	12.1%	9.3%	10.4%	20	23	43
Total	**100%**	**100%**	**100%**	**165**	**248**	**413**



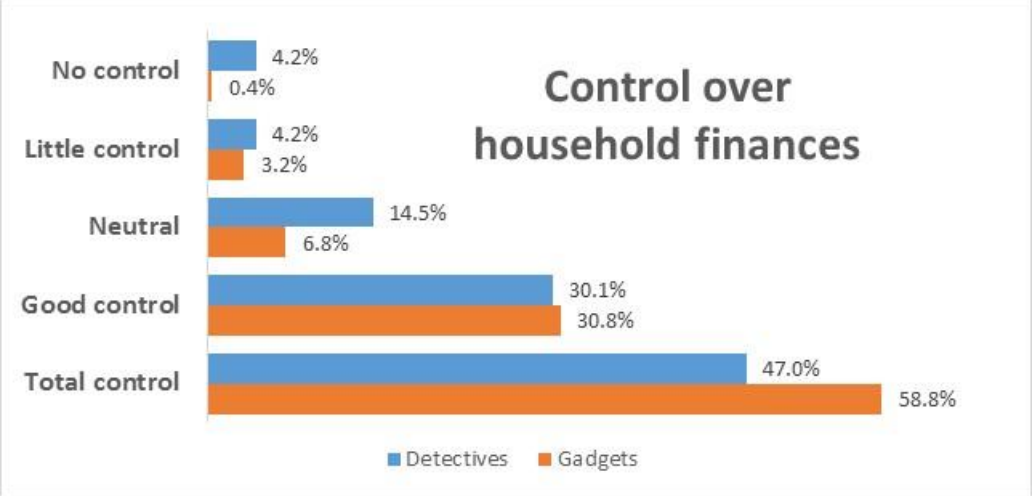
5.7.2 Control over household finances

Participants were asked if they believed they had control over their household finances. More than half (54.1%) said they were in total control, with a nearly one third (30.5%) saying they had good control. About than 1 in 20 said they have little or no control. Gadgets were more likely than Detectives to believe they had control over their electricity consumption.

Comments (see Appendix V) were based mostly around how people manage limited household budgets.

Generally speaking, there is a correlation between the two measures (control over electricity and control over household finances).

Control over household finances	Detective %	Gadget %	Total %	Detective Number	Gadget Number	Total Number
No control	4.2%	0.4%	1.9%	7	1	8
Little control	4.2%	3.2%	3.6%	7	8	15
Neutral	14.5%	6.8%	9.9%	24	17	41
Good control	30.1%	30.8%	30.5%	50	77	127
Total control	47.0%	58.8%	54.1%	78	147	225
Total	**100%**	**100%**	**100%**	**166**	**250**	**416**

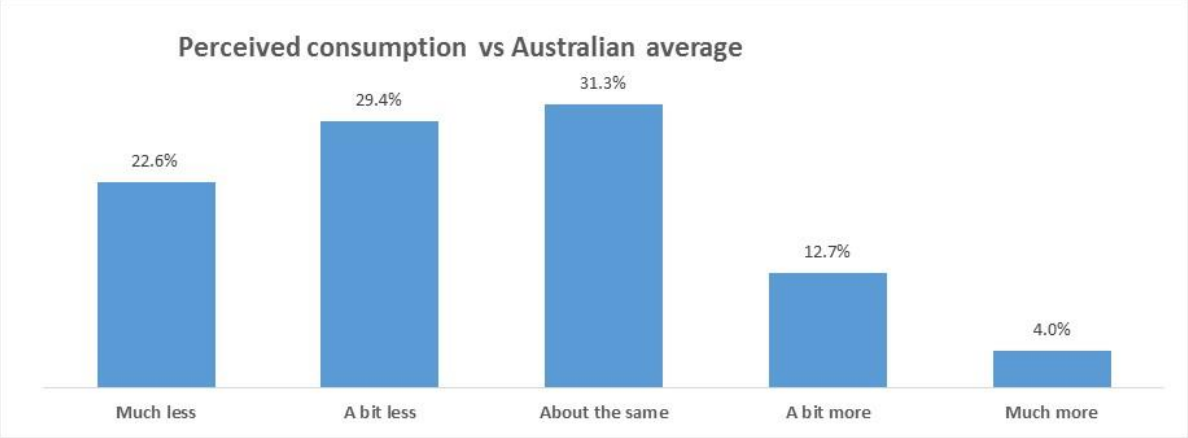


5.8 Perceived consumption vs Australian average

Participants were asked if they believed their household's electricity consumption per person was higher or lower than the Australian average. Many more believed it was lower (much less – 22.6%, a bit less – 29.4%) than higher (much more -4.0%, a bit more – 12.7%).

Comments (see Appendix V) were mostly intended to show reasons why the respondents were using less electricity than average, or justifications as to why they were not.

Perceived consumption vs Australian average	%	Number
Much less	22.6%	84
A bit less	29.4%	109
About the same	31.3%	116
A bit more	12.7%	47
Much more	4.0%	15
Total	**100%**	**371**



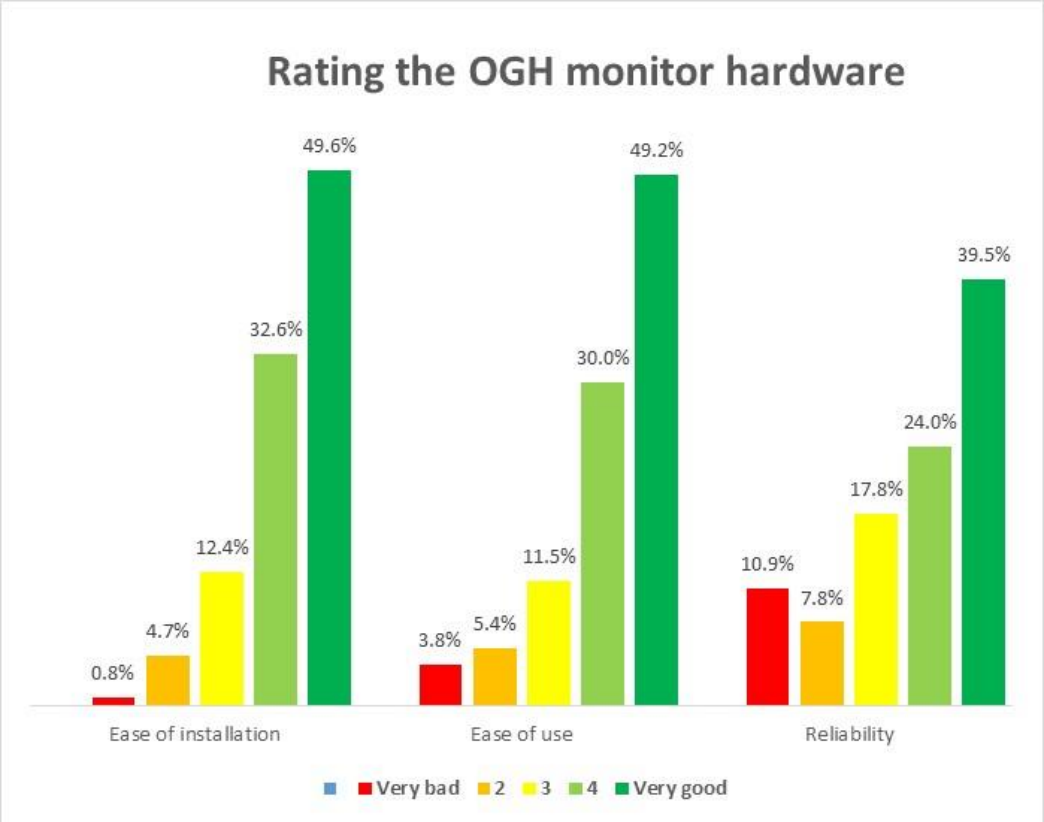
5.9 Attitudes to online electricity monitoring

5.9.1 Attitudes to the electricity monitoring hardware

Participants were asked to rate the electricity monitor hardware on three attributes. Generally speaking ratings were high, with half rating it very high for ease of installation (49.6%) and ease of use (49.2%). Reliability was rated a little lower (39.5%), but still scored well overall.

Rating the Our Green Home monitor hardware	Ease of installation	Ease of use	Reliability
Very bad	1	5	14
2	6	7	10
3	16	15	23
4	42	39	31
Very good	64	64	51
Total	**129**	**130**	**129**

Rating the Our Green Home monitor hardware	Ease of installation	Ease of use	Reliability
Very bad	0.8%	3.8%	10.9%
2	4.7%	5.4%	7.8%
3	12.4%	11.5%	17.8%
4	32.6%	30.0%	24.0%
Very good	49.6%	49.2%	39.5%
Total	**100.0%**	**100.0%**	**100.0%**

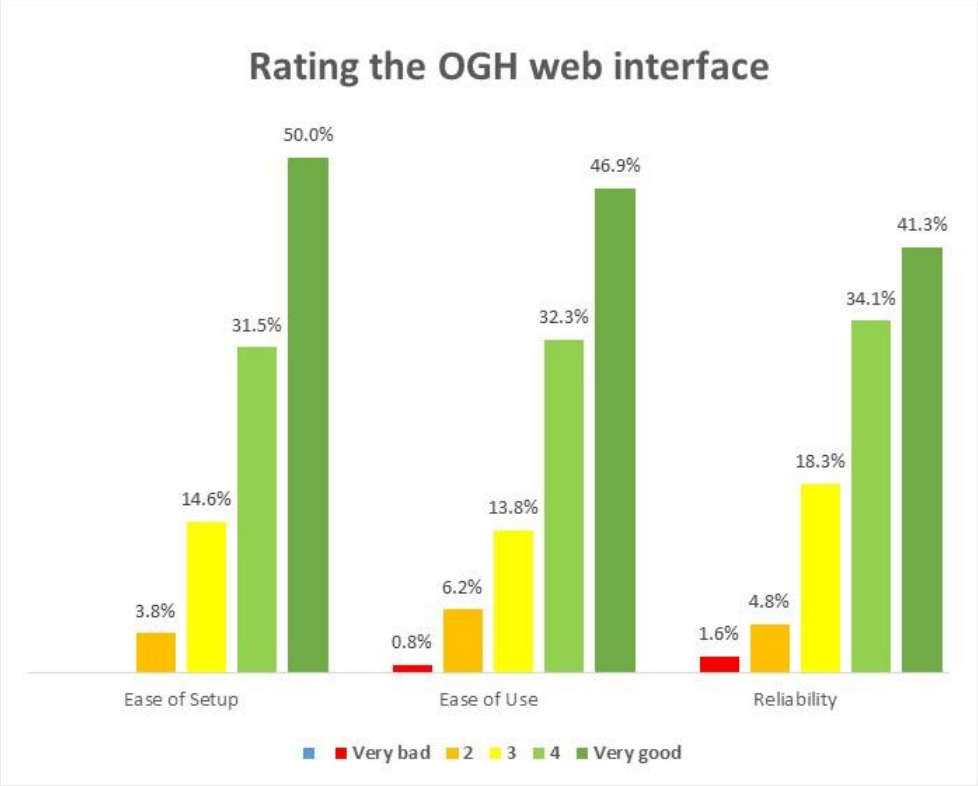


5.9.2 Attitudes to the Our Green Home online platform

Participants were also asked to rate the Our Green Home website and web interface on three attributes. Generally speaking, positive ratings were similar to those for the electricity monitoring hardware (see above), and with lower negative ratings.

Rating the Our Green Home web interface	Ease of Setup	Ease of Use	Reliability
Very bad		1	2
2	5	8	6
3	19	18	23
4	41	42	43
Very good	65	61	52
Total	**130**	**130**	**126**

Rating the Our Green Home web interface	Ease of Setup	Ease of Use	Reliability
Very bad		0.8%	1.6%
2	3.8%	6.2%	4.8%
3	14.6%	13.8%	18.3%
4	31.5%	32.3%	34.1%
Very good	50.0%	46.9%	41.3%
Total	**100.0%**	**100.0%**	**100.0%**

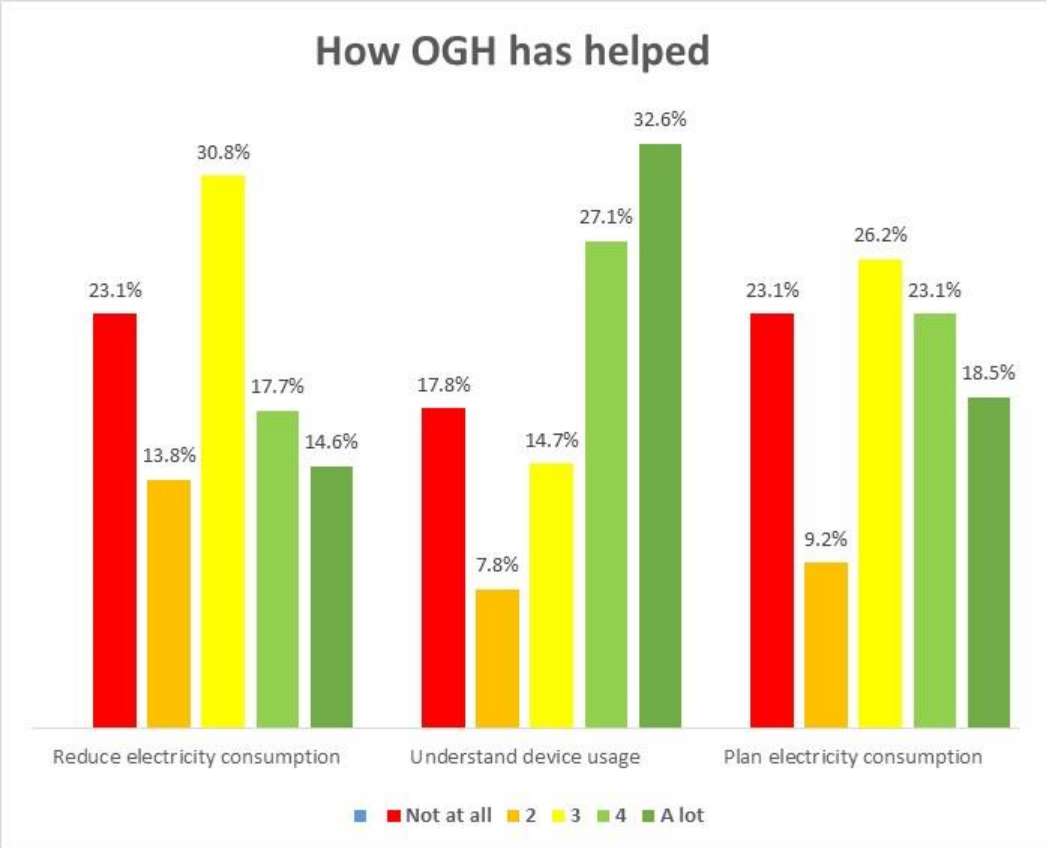


5.9.3 How Our Green Home has helped

Participants were asked to rate the Our Green Home monitor and web interface on three factors pertaining to electricity consumption. Around one third rated it 5 out of 5 (14.6%) or 4 out of 5 (17.7%) in helping to reduce electricity consumption, but one quarter (23.1%) said it did not help at all. Ratings for understanding the electricity consumption of devices and appliances in their homes, and for planning electricity consumption, were higher.

How OGH has helped	Reduce electricity consumption	Understand device usage	Plan electricity consumption
Not at all	30	23	30
2	18	10	12
3	40	19	34
4	23	35	30
A lot	19	42	24
Total	**130**	**129**	**130**

How OGH has helped	Reduce electricity consumption	Understand device usage	Plan electricity consumption
Not at all	23.1%	17.8%	23.1%
2	13.8%	7.8%	9.2%
3	30.8%	14.7%	26.2%
4	17.7%	27.1%	23.1%
A lot	14.6%	32.6%	18.5%
Total	**100.0%**	**100.0%**	**100.0%**

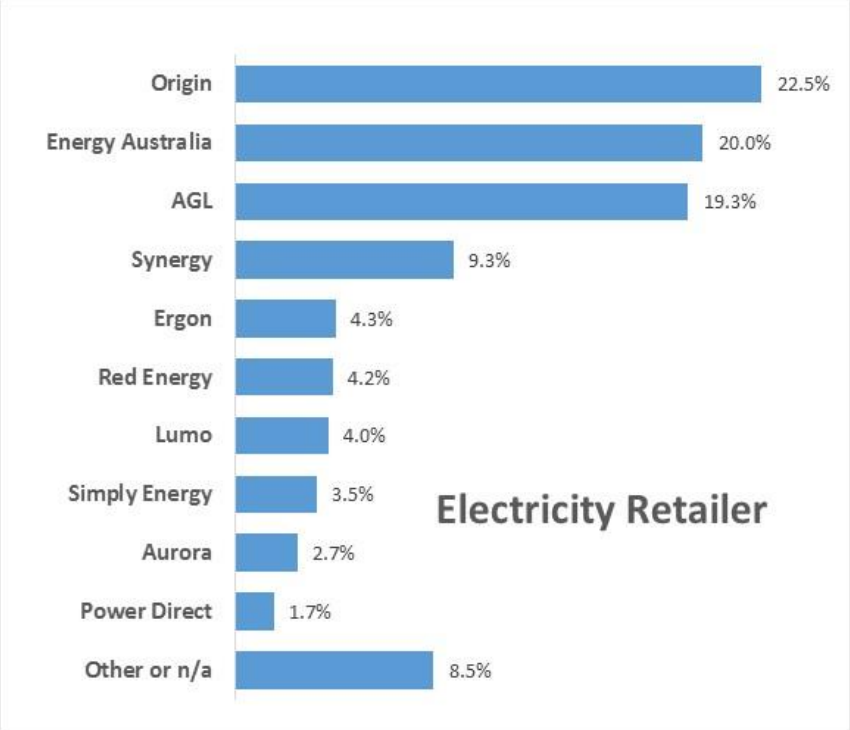


Chapter Six
Attitudes to Retailers

6.1 Electricity retailer demographics

Participants used a wide range of retailers, with Origin (22.5%), Energy Australia (20.0%), and AGL (19.3%) between them accounting for more than half of the total. The analysis methodology allowed all consumption data to be compared by retailer.

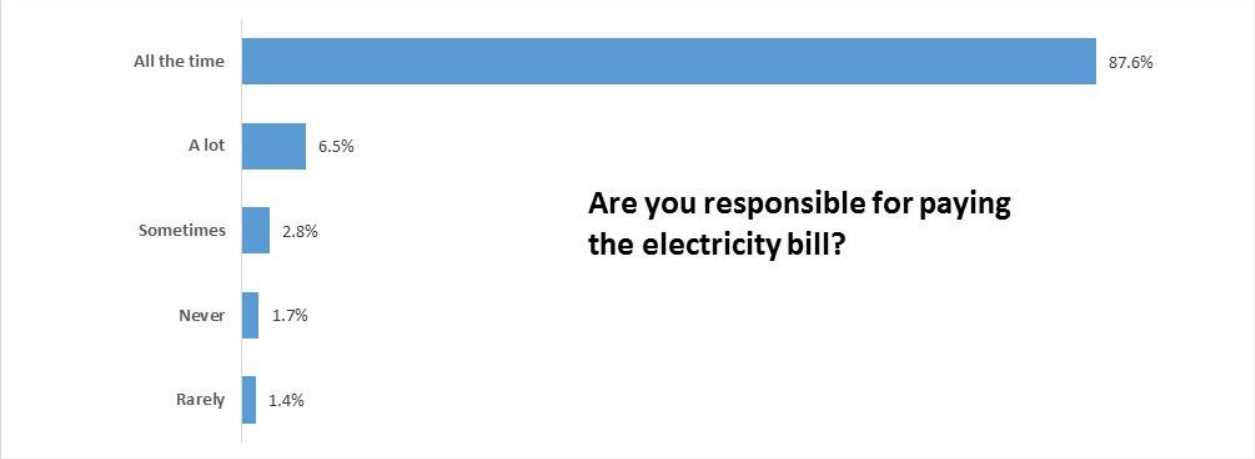
Electricty Retailer	%	Number
Origin	22.5%	135
Energy Australia	20.0%	120
AGL	19.3%	116
Synergy	9.3%	56
Ergon	4.3%	26
Red Energy	4.2%	25
Lumo	4.0%	24
Simply Energy	3.5%	21
Aurora	2.7%	16
Power Direct	1.7%	10
Other or n/a	8.5%	51
Total	**100%**	**600**



6.2 Responsibility for paying electricity bill

The primary respondent was asked whether they had responsibility for paying the electricity bill. The great majority (87.6%) were responsible the whole time.

Are you responsible for paying elec bill?	%	Number
All the time	87.6%	326
A lot	6.5%	25
Sometimes	2.8%	12
Never	1.7%	6
Rarely	1.4%	5
Total	**100%**	**374**



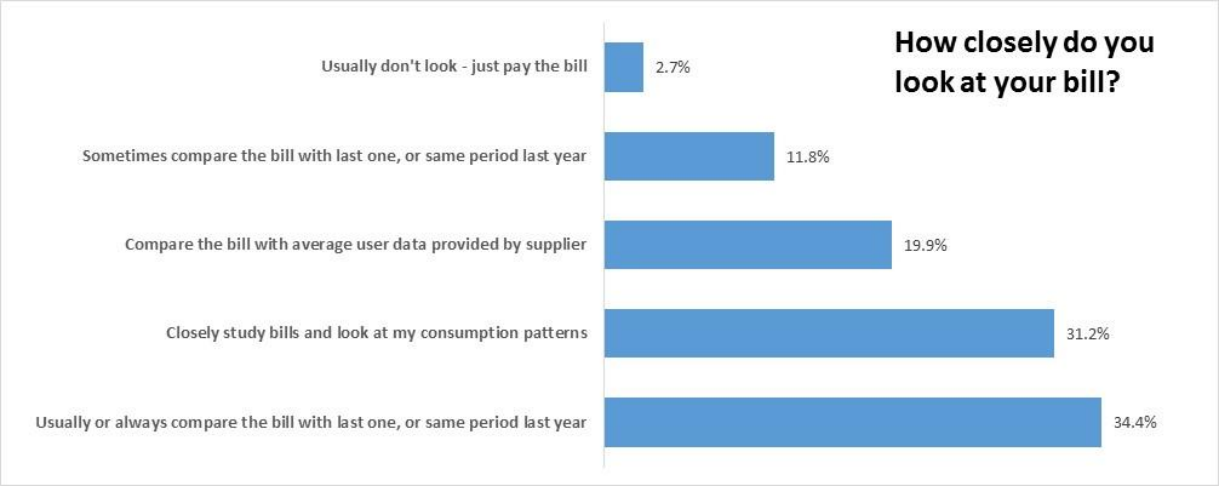
6.3 How closely do you look at your bill?

Participants were asked how closely they looked at their electricity bill. Very few (2.7%) did not look at it at all and just paid the bill. Around one third closely studied their bills and looked at their consumption patterns (31.2%), or compared it with previous bills (34.4%).

Comments (See Appendix V) were mostly complaints about how hard it was to read the bill, or how little useful information was on it.

Note: Respondents could provide multiple answers to this question.

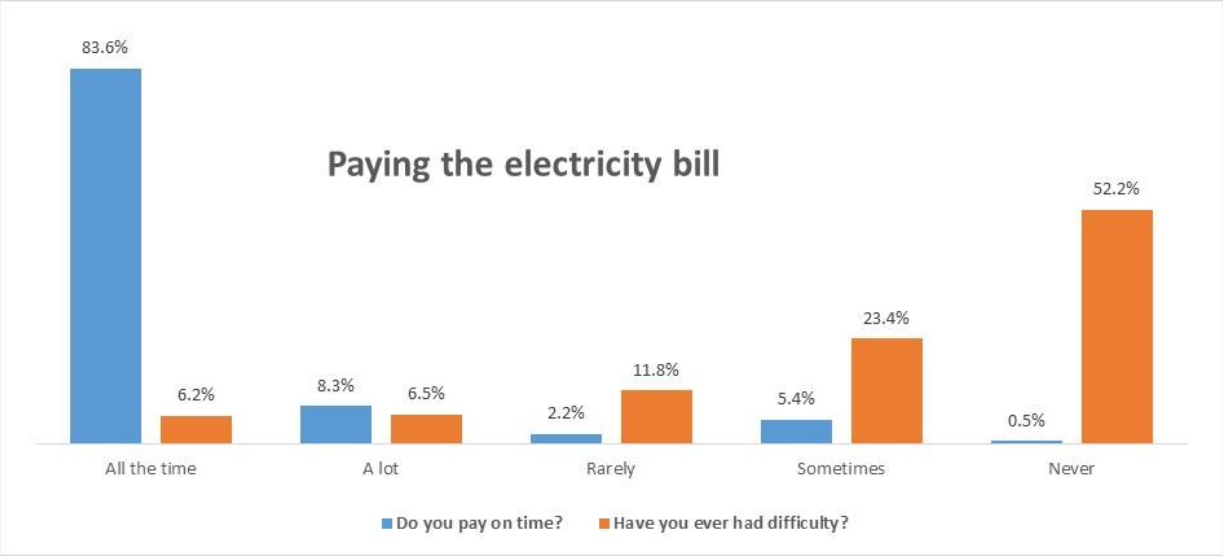
How closely do you look at your bill?	%	Number
Usually don't look - just pay the bill	2.7%	15
Sometimes compare the bill with last one, or same period last year	11.8%	65
Compare the bill with average user data provided by supplier	19.9%	110
Closely study bills and look at my consumption patterns	31.2%	172
Usually or always compare the bill with last one, or same period last year	34.4%	190
Total	**100%**	**552**



6.4 Paying the electricity bill

Participants were asked if they paid their electricity bill on time, and if they had had difficulty paying in the last two years. Almost all always paid on time ((84.4%) or did so a lot (8.2%), but only half (53.8%) never had difficulty paying.

Paying the electricity bill	Do you pay on time?	Have you ever had difficulty?	Do you pay on time?	Have you ever had difficulty?
All the time	83.6%	6.2%	311	23
A lot	8.3%	6.5%	31	24
Rarely	2.2%	11.8%	8	44
Sometimes	5.4%	23.4%	20	87
Never	0.5%	52.2%	2	194
Total	**100%**	**100%**	**372**	**372**



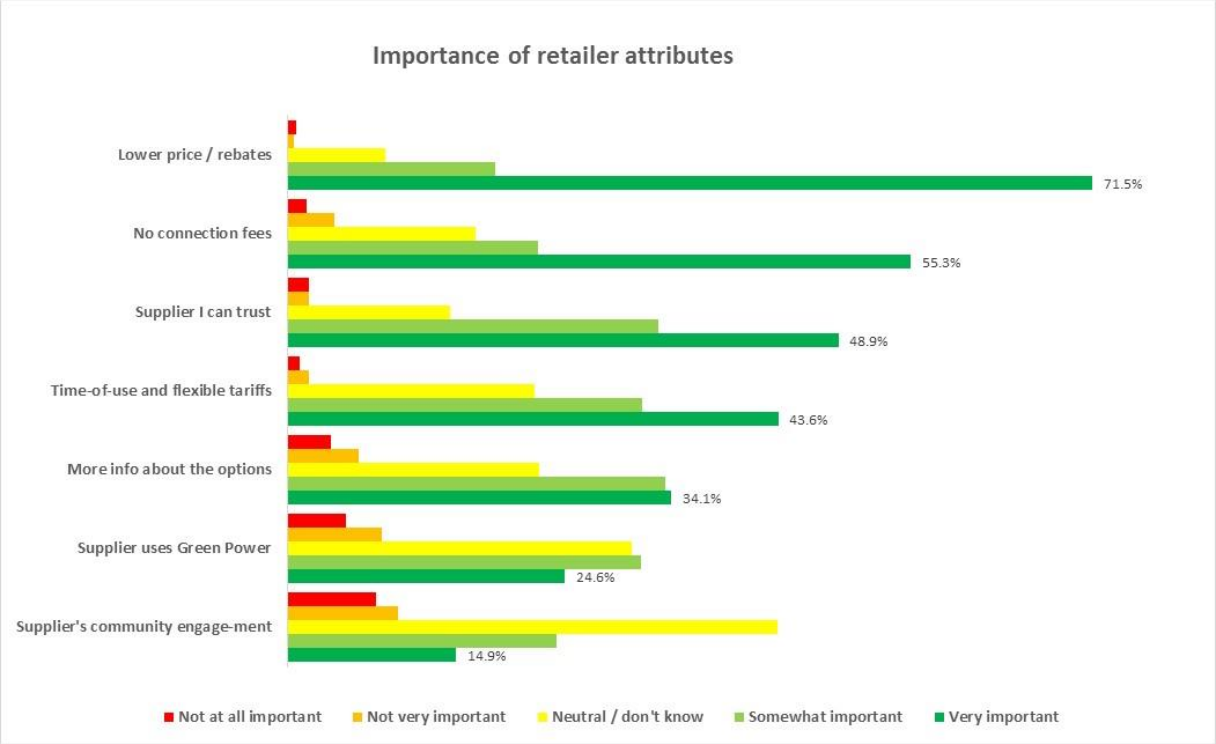
6.5 Importance of retailer attributes

Participants were asked to rate various attributes in a retailer. By far the most important was lowest price, rated very important by 71.5% of respondents, followed by no connection fees (55.3%) and trustworthiness (48.9%). The provision of Green Power (24.6%) and the extent of the supplier's community engagement (14.9%) were relatively unimportant.

There were not many comments (see Appendix V). Many had to do with a lack of choice, especially in Western Australia and Tasmania.

Importance of retailer attributes	Lower price / rebates	No connection fees	Supplier I can trust	Time-of-use and flexible tariffs	More info about the options	Supplier uses Green Power	Supplier's community engage-ment
Not at all important	0.8%	1.6%	1.9%	1.1%	3.8%	5.1%	7.9%
Not very important	0.5%	4.1%	1.9%	1.9%	6.3%	8.4%	9.8%
Neutral / don't know	8.7%	16.7%	14.4%	21.9%	22.3%	30.5%	43.5%
Somewhat important	18.5%	22.2%	32.9%	31.5%	33.5%	31.4%	23.9%
Very important	71.5%	55.3%	48.9%	43.6%	34.1%	24.6%	14.9%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Importance of retailer attributes	Lower price / rebates	No connection fees	Supplier I can trust	Time-of-use and flexible tariffs	More info about the options	Supplier uses Green Power	Supplier's community engage-ment
Not at all important	3	6	7	4	14	19	29
Not very important	2	15	7	7	23	31	36
Neutral / don't know	32	61	53	80	82	113	160
Somewhat important	68	81	121	115	123	116	88
Very important	263	202	180	159	125	91	55
Total	**368**	**365**	**368**	**365**	**367**	**370**	**368**



6.6 Taken part in concession programs

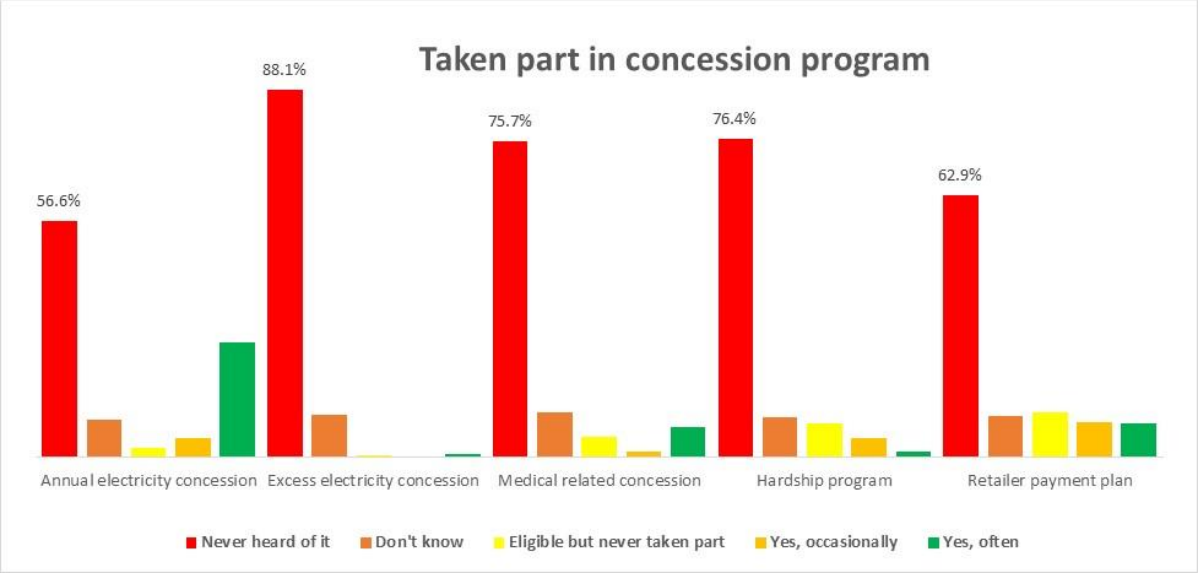
Participants were asked if they had ever taken part in any electricity concession program. There are number of such concessions, but in every case the majority of participants had never heard of them. There is no coordination between concessions offered by different bodies (e.g. state and federal governments, Centrelink, retailers), and none appear to have any responsibility for informing householders of their availability.

The most commonly used concession was the Commonwealth Government's Annual Electricity Concession, which provides concession card holders (Pensioner Concession Card, Health Care Card, DVA Gold Card) with a discount of 17.5% off household electricity bills. But most (56.3%) participants were unaware of it – though 28.0% had used it. Awareness and usage of all other concession programs was very low.

Most comments (see Appendix V) were about how hard it was to find out about concessions, or how stringent the criteria for inclusion were.

Taken part in concession program	Annual electricity concession	Excess electricity concession	Medical related concession	Hardship program	Retailer payment plan
Never heard of it	56.6%	88.1%	75.7%	76.4%	62.9%
Don't know	8.9%	10.2%	10.7%	9.5%	10.0%
Eligible but never taken part	2.2%	0.6%	4.9%	8.1%	10.9%
Yes, occasionally	4.6%	0.3%	1.4%	4.6%	8.3%
Yes, often	27.6%	0.8%	7.2%	1.4%	8.0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Taken part in concession program	Annual electricity concession	Excess electricity concession	Medical related concession	Hardship program	Retailer payment plan
Never heard of it	209	311	262	265	220
Don't know	33	36	37	33	35
Eligible but never taken part	8	2	17	28	38
Yes, occasionally	17	1	5	16	29
Yes, often	102	3	25	5	28
Total	**369**	**353**	**346**	**347**	**350**



Chapter Seven
Objectives and Outcomes

7.1 Project Objectives

In aligning with the Program objectives outlined in section 1.1, the Project set out to achieve four key objectives:

1 Collect the detailed households' energy consumption data from participating households over the trial period of 12 months and baselining that data against the previous 12 months of energy consumption prior to the trial.

2 A trial of an innovative real-time energy monitoring technology (the Our Green Home platform and the accompanying energy monitors) with real-time online access by participants to energy usage and costs to assess its potential in bringing in a sustained behavioural change. Central to this, the Project set out to test a hypothesis that providing users with regular reminders of their energy consumption by way of weekly email reports as well as ability to view their energy usage and costs online would bring about a reduction in energy usage. The real-time data and the weekly reports were the only educational component of the trial – providing other educational elements would have made it difficult to determine the cause and effect of any observed changes.

3 Assessment of behaviours and attitudes before, during and after the trial for participant households, to identify key factors that would enhance or inhibit their ability to reduce their energy consumption.

4 Identify the main barriers in adopting energy efficiency in low-income households.

7.2 Evaluation of Objectives

7.2.1 Evaluation of Objective 1

Collection of electricity consumption data

The Project intended to collect two sets of electricity consumption data:

- Electricity consumption as measured by the household's electricity retailer. This was in the form of quarterly bills, with consumption for the quarter measured in kWh. To be collected over two years (eight consecutive quarters).
- Electricity consumption as measured by the Our Green Home online electricity monitors – kWh in 30 minute intervals. To be collected over the second year of the Project (four consecutive quarters).

Because of the shortened timeframe of the Project, and the reluctance of retailers to supply data, only 18 months (six quarters, Autumn 2014 – Winter 2015) of retailer data was collected, and that was incomplete, and only nine months (three quarters, Winter 2015 – Summer 2015-16) of monitor data was collected. Detailed analysis was thus severely limited – see section 4.1.

7.2.2 Evaluation of Objective 2

Trial of real-time energy monitoring technology

The Our Green Home monitors allowed participants online access to their real-time energy usage (in five second increments), historical energy usage data, the cost of their energy consumption and comparisons with other households.

Access was provided to Gadget participants both through an online portal with individual login details and via smartphone and tablet apps. This enabled them to monitor and experiment with their electricity consumption at the device level. Analysis and aggregated reporting of energy usage across the variety of low-income households provided detailed information about which type of participants were able to implement behavioural changes, and the extent to which these changes reduced their energy usage.

In addition, each Gadget group participant installed received a weekly summary email of their energy usage and estimated costs over the past week, compared with the previous week. It was a simple email report showing if their consumption overall was going up or down.

Providing timely data on their energy consumption to households seems to have a desired effect of engaging with the participants and keeping them conscious of their weekly electricity consumption. Almost 15% of all support requests received during the period between July 2015 and February 2016 were in some way related to interpretation of the data and weekly reports.

On a number of occasions when the energy devices went offline or were accidentally disconnected from the Internet, and the affected household received a weekly summary showing no data recorded or much less than usual, most of those users immediately contacted the email support querying their weekly report.

In some other instances, users queried why their weekly consumption seemed to be above or below the average, seeking to understand what they could do to reduce it. In other cases, those users who had become accustomed to knowing that their usage was always below average may have not reduced their energy consumption overall.

7.2.3 Evaluation of Objective 3

Assessment of behaviours and attitudes

It was the initial intention to survey attitudes and behaviour before and after the trial. Due to the shortened timeframe this was not possible.

The Project included a single assessment of participants' behaviour and attitudes during the trial, to help identify key factors that might enhance or inhibit the ability of households to reduce their energy consumption. This qualitative information (in conjunction with the technical data) was intended to provide the Department with comprehensive and high-quality data to inform future policies and program.

Around two thirds of the participants completed the attitudinal and behavioural surveys, with a higher response rate from the Gadget group, due the Gadget's higher level of engagement with the project. There was sufficient response to get statistically valid data on behaviours and attitudes.

This analysis is contained in Chapter 5. Chapter 6 contains further analysis on participant's attitudes to retailers and electricity billing, which were not included as part of the original scope but which were added after informal discussions with the Department.

7.2.4 Evaluation of Objective 4

Identifying barriers to adoption

A number of barriers were identified as important. These barriers are referred to and backed by the insights throughout the rest of this report.

The barriers are examined in detail in section7.3

7.3 Barriers to Adoption

As mentioned above, the trial collected sufficient evidence of the following barriers to adopting energy efficiency in low-income households:

Landlord objection

Some would-be Gadget Group participants were renters. During the recruitment each participant was advised that for legal reasons it was not possible to install the monitoring device without landlord's permission, but they could still take part in the project as part of the Control Group. Although some Gadget Group participants did receive their landlord's permissions, many either advised that they could not obtain one or were automatically migrated to the Detectives group.

Low digital and computer literacy

For many Gadget group users the monitoring technology was a challenge to get familiar with, or to understand how it worked. Although the problem was exacerbated by the technical difficulties at some sites and, in some instances, inexperienced installers who did not complete the configuration of the equipment leaving it to the households to chase with the project team, in many other cases users had troubles understanding what an online cloud-based platform actually does.

In extreme cases, several users sought support from the project team in relation to installing Our Green Home after a computer malfunction or an upgrade to their Windows operating system, and did not understand that they still had access to their online account by using a web browser. In other cases, users affected by the NBN rollout contacted support seeking an electrician to come and "fix their energy monitors," not understanding that all they need to do is plug the energy base station into the newly installed NBN modem instead of the old modem. On the other hand, a handful of proactive curious users who are more technically savvy were able to self-troubleshoot the problems if those occurred.

Digital divide

For others, the technical limiting factor simply was the type of Internet available. In many cases, installations had to be abandoned after the modem that was installed on premises did not have an available port to connect the base station to, or the premises only had a 3G Internet available. In a couple of extreme cases, householders disconnected the equipment post installation, believing it interferes with their Internet speeds and connection stability despite our and the manufacturer's assurances this not being the case (the energy monitors use approx. 150 MB of data upload per month if permanently online). This requirement may eliminate large number of low income households to participate in similar programs.

Information barriers

For many of the Gadget group participants, understanding their electricity tariffs proved to be a real challenge, so that not many actually managed to enter their tariff information from their bill to their Our Green Home online account. As a result, their cost estimate may have been different to their actual billing data as in the absence of tariff information Our Green Home platform would apply a default flat rate tariff. The difficulty of converting the tariff information from the bill into the tariff configuration online may have also been exacerbated by the computer literacy barrier mentioned above.

7.4 Benefits

The project concentrated only on the measurement of energy reduction – no other benefits were measured.

The main benefit as highlighted by many Gadget group users was their ability to know how much energy they used week on week, removing the information barrier. Consequently, the trial noted a statistically significant reduction in energy usage amongst these participants by 5.0% on average. This corresponds to average annualised savings of 261 kWh per household, holding other things constant. Using an average flat rate tariff of 25 cents / kWh, this represents a household savings of $72.71 a year.

It should be noted, however, that using this average figure could be misleading as some households in the Gadgets group reduced their energy usage by very little (if at all) while others – who were considerably more engaged – reduced their usage by a larger amount. This suggests that for some users who see benefit in such technology it could deliver a larger than average benefit – and thus a much shorter payback period – while for other households such technology holds very little benefit at all.

The first objective of the trial – to collect the detailed energy consumption data over the period of 12 months and compare it with a baseline over the same period – was not achieved in full. Data from only three out of four quarters was collected, but this was due primarily to the late start of the project and the delays in recruiting eligible and technically suitable households, and not due to the limitations of the underlying technology.

Furthermore, the statistical analysis of the data collected from the energy monitors which is presented in this report shows that the patterns of energy usage in low income households are not dissimilar to those of the other households in Australia. The data collected was very consistent with previous studies of residential electricity consumption in Australia.

Collection of the other crucial data element of the study set – consumption data from the energy retailers – was substantially achieved through determination of the Project team despite difficulties in getting energy data from retailers. Data for five quarters was collected, for more than half of all participants.

Despite this, the final retail data set collected, although not as granular and detailed as the data from Our Green Home, was substantial enough for it to be statistically significant. It has also highlighted the issue of ownership of NEM consumption data in Australia.

Because the second goal of the trial – to identify key factors that enhanced or inhibit households' ability to reduce their energy consumption – was achieved in full, the study has collected empirical evidence to identify these factors (both catalysts and inhibitors).

Access to information

some households were able to successfully reduce their overall energy usage after getting access to online energy monitoring and receiving weekly reports about their energy consumption. One participant even asked to be removed from the Gadget group as she believed she had reduced her total energy usage to a minimum and saw no further need for keeping track of her energy usage.

Behavioural constraints

For many households, especially those living in flats or apartments, financial and living arrangement constraints were a limiting factor to their ability to reduce energy usage. Given that there is little scope to reduce energy usage by changing behaviour, further reductions may not be possible without investments into more energy efficient appliances and other energy efficiency measures which may not be affordable for these households.

Attitudes to renewable energy and climate change

Those households who have positive attitudes towards alternative energy sources (and who are generally less sceptical about climate change) appear to be more engaged, and more likely to change their behaviour. Households with solar panels installed were more cooperative during the installation of the monitoring devices, even if technical issues occurred. This could be explained by their genuine interest in technology and in reducing energy consumption.

The key goal of the Project was to determine if the installation of real-time energy monitor coupled with access to the usage data online made a significant change to electricity consumption and consumer behaviour.

Although it can be conclusively shown that the households with access to their usage data have reduced their consumption on average by about 5.0% compared to the control group during the study, we are unable to conclusively say that this outcome can be sustained, simply because the Project terms did not allow for continuous monitoring of these households over a longer period.

But another closely related key outcome is that this was the first trial of this kind for this type of energy monitoring equipment, deployed and stress-tested in a wide variety of residential settings. It highlighted a need for further design enhancements to ensure better usability as well as the stability of the product. This was understood by the manufacturer and incorporated in the newer models of the product.

For example, in many households more than one meter had to be installed to monitor multiple incoming phases or supply from additional sources such as solar PV generation. After the trial began the manufacturer developed a newer model with a capacity to monitor three individual circuits in one device. Having such device in the trial would have simplified the installation process and significantly reduced the costs of both hardware and installation labour.

Therefore, for future similar programs, a 3-phase monitor is recommended as a more cost-effective and a better scalable option. Similarly, the usability aspects of the online platform were tested by end-users with varying degrees of computer literacy.

7.5 Cost Effectiveness Analysis

7.5.1 Cost breakdown

This section breaks down the project cost using Activity-Based Costing method and allocates them into four levels in accordance to the following guidelines:

Cost Level	Cost data
Direct trial approach (Level 1)	The delivery of an outcome for the: **a. cost of delivering the trial approach to a participant.** These included costs of delivering: - the hardware and install cost per participant - the software support and coaching cost per participant - the software license cost per person
Trial Component (Level 2)	The delivery of an outcome for the: a. the cost of delivering the trial approach to a participant, **and** **b. costs associated with:** **i. recruiting a participant, and** **ii. maintaining a participant.** These included public relations, media and advertising costs, staff time, interviews, screening applicants, maintaining resources to support ongoing participation etc.
Total Business (Level 3)	The delivery of an outcome for: a. the cost of delivering the trial approach to a participant, and b. direct costs associated with: i. recruiting a participant, and ii. maintaining a participant. **c. cost of running an organisation to do the above** These included project management and other IT costs not related to collection of data, indirect deployment costs and overehads related to data collection and management).
Total Trial (Level 4)	The delivery of an outcome for: a. the cost of delivering the trial approach to a participant, and b. direct costs associated with: i. recruiting a participant, and ii. maintaining a participant. c. cost of running an organisation to do the above **d. cost of participating in a government funded trial** This included the total cost of the trial, including funding, co-contributions (in-kind and cash) and administrative and compliance costs associated with participating in a government funded trial – for example, costs associated with preparing milestone and financial reports and time spent working with the department.

The breakdown of costs associated with the delivery of the outcomes of the study is given below:

	Activity	Funded	In-Kind	Total	Per participant*
Direct trial approach (Level 1)	Hardware and Support	$ 93,054	$ -	$ 93,054	$ 310.18
	Deployment direct cost	$ 111,185	$ -	$ 111,185	$ 370.62
	Information Technology	$ 11,990	$ -	$ 11,990	$ 39.97
Total Direct Trial Approach (Level 1)		**$ 216,229**	**$ -**	**$ 216,229**	**$ 721**
Trial Component (Level 2)	Recruitment activities	$ 53,968	$ 46,800	$ 100,768	$ 335.89
	Engagement	$ 34,175	$ 16,700	$ 50,875	$ 169.58
	Analytics	$ 57,004	$ 11,700	$ 68,704	$ 229.01
	Hardware and Support	$ 276,943	$ 43,500	$ 320,443	$ 1,068.14
	Information Technology	$ -	$ 22,560	$ 22,560	$ 75.20
	Deployment indirect cost	$ 22,641	$ 67,922	$ 90,563	$ 301.88
	Trial Component (Level 2)	**$ 660,960**	**$ 209,182**	**$ 870,142**	**$ 2,900**
Total Business (Level 3)	Analytics	$ 38,003	$ 7,800	$ 45,803	$ 152.68
	Information Technology	$ 95,920	$ 180,480	$ 276,400	$ 921.33
	Deployment indirect cost	$ 22,641	$ 67,922	$ 90,563	$ 301.88
	Total Business (Level 3)	**$ 817,523**	**$ 465,384**	**$ 1,282,907**	**$ 4,276**
Total Trial (Level 4)	Governance	$ 111,437	$ 385,610	$ 497,047	$ 1,656.82
	Total Trial (Level 4)	**$ 928,960**	**$ 850,994**	**$ 1,779,954**	**$ 5,933**

* For the purpose of consistency, the cost per participant was calculated on the basis of 300-households sample which was the final size of the Gadgets Group. Given that the costs for some activities reflected overheads of dealing with a 600-sample group while others only with a 300-sample group, calculating the cost per participant depending on the type of activity would have resulted in a marginal cost that is not a good proxy. Since the existence of the control group in the study was to test the hypothesis using the testing group (the Gadgers Group) as the study subjects, the size of that group is the most relevant in this case.

7.5.2 Sample group

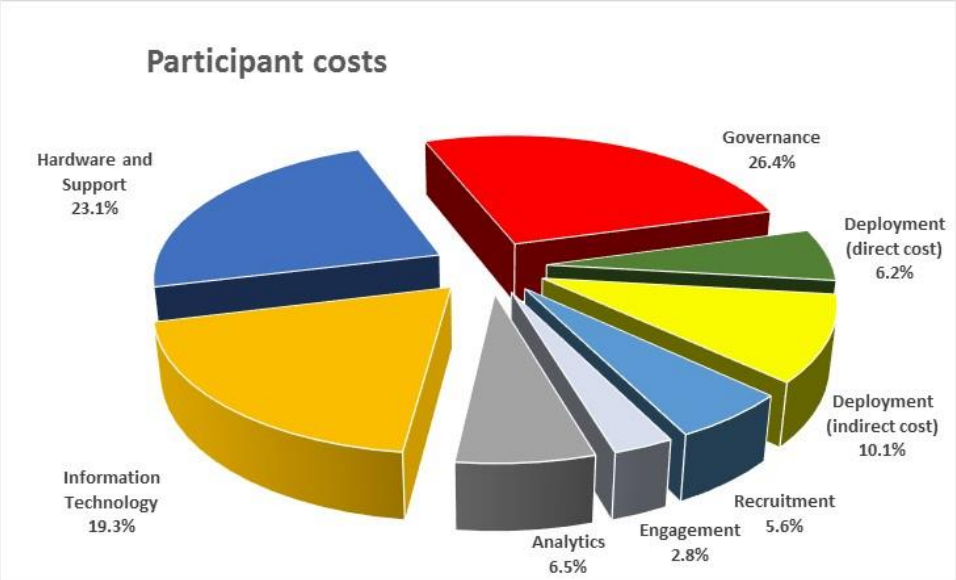
The economic benefits of a project of this nature can be analysed on the basis of the total cost per household, marginal cost per household, or cost per kWh saved. As the basis for the calculations, we used the sample size of the 300 households comprising the Gadgets group, rather than the total number of participants (600 households). Note that the final number in the Gadget group was 289, but more than 300 were initially in that group and were moved to the Detectives group because the monitor could not be installed.

Most of the cost drivers in the Project were specific to the Gadgets group, and the nature of the analysis required for the Gadgets group of households to have comparably sized control group. The marginal cost of

recruiting control (Detective) group participants was relatively low and was achieved using sign up incentives such as $50-$100 grocery vouchers. The key cost issue is the cost of recruiting and maintaining the Gadgets group, which enables a determination of the average variable cost at scale.

The average total cost per household exceeded the budget for every single activity of the Project, for a number of reasons. Unless specifically stated otherwise, the costs in this analysis include both the funding and the in-kind contribution.

	Funded	In-kind	Total	%	Per participant	
Recruitment activities	$ 53,968	$ 46,800	$ 100,768	6%	$ 336	6%
Engagement	$ 34,175	$ 16,700	$ 50,875	3%	$ 170	3%
Analytics	$ 95,007	$ 19,500	$ 114,507	6%	$ 382	6%
Information Technology	$ 119,900	$ 225,601	$ 345,501	19%	$ 1,152	19%
Hardware and Support	$ 369,997	$ 43,500	$ 413,497	23%	$ 1,378	23%
Governance	$ 111,437	$ 385,610	$ 497,047	27%	$ 1,657	27%
Deployment direct cost	$ 111,185	$ -	$ 111,185	6%	$ 371	6%
Deployment indirect cost	$ 45,281	$ 135,844	$ 181,125	10%	$ 604	10%
Total	**$ 940,950**	**$ 873,554**	**$ 1,814,504**	**100%**	**$ 6,048**	**100%**



7.5.3 Cost of recruitment

The total cost of recruitment increased from the budgeted $50 per household to over $330 per household. This was partly because of the reduction in the overall sample size, but also because of increases in the overall recruitment expenditure associated with:

- Engaging a public relations agency to promote the project in local media – at a cost of approximately $100 per household recruited through this method.
- Using a pay-to-complete email list to reach out to the target demographic – at a cost of approximately $30 per household recruited through this method. (The cost of obtaining each expression of interest was only approximately $10 per household, but the conversion rate from expressions of interest into actual participants was only 20%-30%).

Note that a second campaign by outsourcing distribution of the project information to a third-party email list provider yielded no additional participants, but the cost of that campaign was very high at $5,000. Therefore, a method of using a hired email distribution list from a commercial list provider is not recommended.

- Using an online channel for promoting the project (including development of the project website and the social media campaign) – this was not included in the original budget but is estimated to be approximately $250 in additional cost per household recruited via this method.
- Consequently, the weighted average cost of recruitment per household was $336.

Notably, the recruitment activities comprised only 5.6% of the overall project costs. In that, for every $1 received in funding for recruitment, the consortium contributed almost $1 of its own funds.

The ongoing costs of participant engagement and support increased from the budgeted $122 per household to approximately $170 average total cost per household, due to:

- The reduction in the overall sample size.
- Ongoing email support of the participants in the Gadget group amounted to approximately 1 man hour per household. Over the course of the trial, the support team responded to over 400 email support requests of varying complexity (many support requests were from the same users experiencing different problems or requiring assistance with understanding of their data).
- The phone support to complete householders' registration was around $100 per household.
- Cost of liaising with households to obtain consents for data collection from their energy retailers was around $20,000 for the 300 households, or $67 per household.

For every $2 received for participant engagement, the consortium contributed $1 of its own funds. The overall engagement cost comprised only 2.8% of the overall project cost – a very modest proportion.

7.5.4 Cost of analytics

The cost of analytics increased from the budgeted $90 per household (on the original basis of 800 households) to almost $390 per household, primarily due to the reduction in the overall sample size, but also due to increase in the overall analytics expenditure associated with:

- Difficulties in obtaining the energy retailers data
- Additional effort required to normalise the data sets for households that experienced periods of data outage (data was collected but had to be manually normalised).

In absolute terms, the total cost of the analytics component increased from the budgeted $71,500 to $116,000 (a 62% increase). Some of the funds budgeted for participant engagement due to the reduction of the sample size were reallocated to the analytics component, with additional $20,000 provided by the consortium in-kind.

Notably, the analytics component represents only 6.5% of the total project cost – a very modest proportion, which for a detailed study of this kind could have been expected to be 10%-20% of the overall project budget.

7.5.5 Cost of Information Technology (software)

Software costs increased from the budgeted $160 per household (on the original basis of 800 households) to almost $1,200 per household, primarily due to the reduction in the overall sample size, but also due to the additional software development and support effort. Information Technology represented 19.3% of the overall project cost, and the ratio remained the same in the actual costs when comparing to the budget. For every $1 provided in funding to fund the Information Technology component, the consortium has contributed almost $2 of its own funds. It is anticipated that despite the initial upfront fixed cost the information component can now be scaled cost effectively, with the marginal cost comprising of the software-related user support costs.

7.5.6 Cost of hardware and associated support

Hardware and hardware support costs increased from the budgeted $462 per household to almost $1,400 per household. In absolute terms, the cost of hardware and support increased by only 28%. The increase in the average cost per household was primarily driven by three factors:

- Reduction in the total sample size from 800 to 300.
- The need to install more than one meter in many instances, due to the multi-phase supplies and availability of on-site solar generation
- Substantial increase in the labour hours required to provide users with hardware-related support (412 man hours in support were recorded as hardware-related, or almost 1.5 per participant over the 12 month duration of the project).

Hardware and hardware-related support represented 23.1% of the total project cost, with 10% of the total hardware cost (support hours) provided as by the consortium in kind.

7.5.7 Cost of Installation

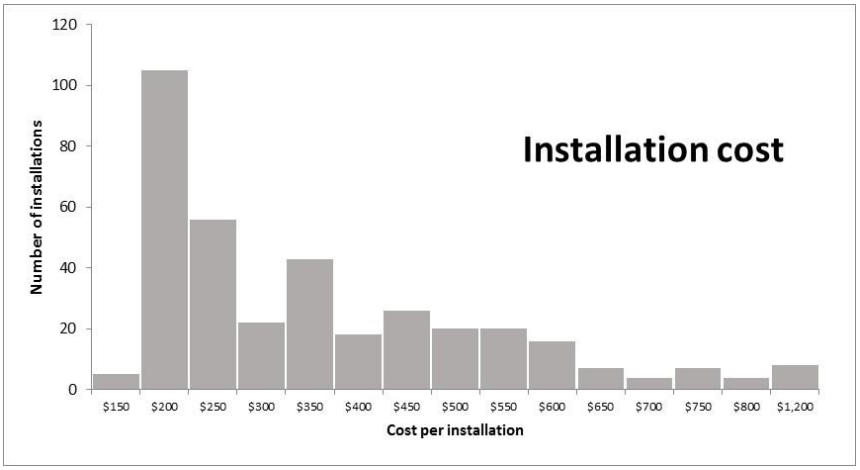
Installation costs increased from the budgeted $176 (including technical contingency) per household to $370 average total cost per household. This also meant that the median installation cost per household was $260, due to:

- The geographical spread of the final sample necessitated deployment of electricians outside of the well-serviced metropolitan areas of Sydney and Melbourne. In some cases, travel up to four hours' return was required to reach the site from the electrician's base due to difficulties of finding and training local electricians. In one extreme case, a Melbourne-based electrician took a three day regional trip to visit and install nine sites along the way, at a total cost of over $550 per installation.
- Complexities of the individual switchboards that necessitated minor upgrades and installation of more than one monitor to cover additional circuits also pushed the overall labour costs higher. In one extreme case, a site requiring three monitors to monitor a 3-phase incoming power supply also required an additional three monitors to install onto a 3-phase solar PV system, resulting in a labour cost in excess of $1,000, not counting the cost of hardware deployed (another $1,000).
- Higher than normal distances between switchboard and the modems that necessitated installation of additional costly signal boosters. Around 30% of all sites experienced various degrees of

intermittent signal, and 20% of all sites had to be fitted with signal boosters, at an additional average cost of $250 per site (hardware plus labour).

This does not include the overhead costs of managing the installation process, which also increased as a result of managing electricians in a variety of locations.

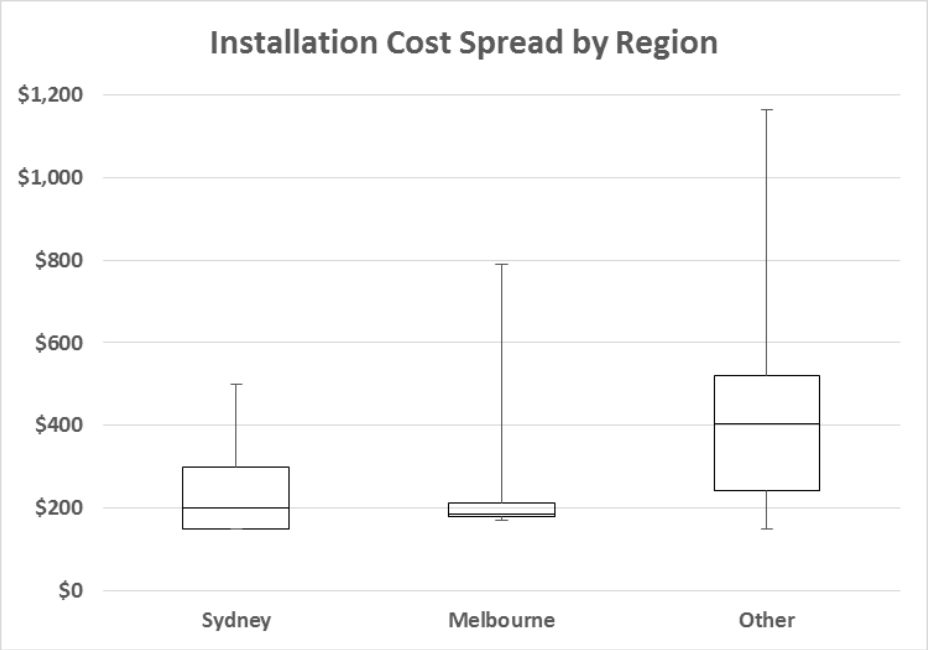
Mean	$326.88
Std dev.	188.6
Median	$259.60
Minimum	$101.10
Maximum	$1,166.00
Range	$1,064.90
Count*	361
1st Quartile	$175.40
3rd Quartile	$431.20
IQR	$255.81



The figure above illustrates the variety of installation overheads (both time and materials) encountered as a result of the issues mentioned. The cost does not follow a normal distribution, due to higher-cost outliers in remote areas as a result of increased travel cost combined with the extra effort required on site fitting multiple meters into the older switchboards. * Note that 'Count' shows all jobs including cancellations and additional visits.

While our estimate for budgetary purposes in the project's original budget was $149,000 to complete 800 installations, this estimate was made on the assumption of $30,000 in overhead costs and $150 average costs per site, as per our pre-project installation experience conducted in metro areas of Sydney and Canberra throughout 2012 and 2013.

We also assumed that low-income housing would not have many solar PV panels, would require only a single monitor to be installed, and that the project would not include difficult cases with old-wiring. The statistics above show that only 25% of all installations were completed at scale, at the rate originally budgeted. All of these installations were in metropolitan Sydney and Melbourne.



It is also important to note that there was a significant difference between the average installation costs in metropolitan and non-metropolitan areas. The chart above shows the spread of installation costs for metropolitan Sydney and Melbourne compared to other areas. The very small spread for Melbourne was due to using a single, efficient, subcontractor and a majority of simple sites.

The average installation costs for Sydney, Melbourne and the rest of the country were $216, $229 and $404 respectively. The median costs were $199, $185 and $404 respectively. The much higher average and median costs for installations outside of Sydney and Melbourne was due to agency costs of using a more expensive subcontractor with a geographical outreach into rural areas in which we had participants. In some cases, travel up to four hours were required to complete a single installation.

The effect was that having participants in remote areas included in the sample came with a significant deployment premium. Although the choice of locations was beneficial for the richness of the study in terms of its geographical coverage, it was less than optimal from a logistics point of view and resulted in deployment cost that were not the most cost effective.

In addition, the indirect installation costs related to the man-hours of management increased from the originally budgeted $30,000 to $180,000 (a 600% increase). This was driven by the difficulties of managing remote installations as well as the need to approve every installation on a case-by-case basis due to the diversity of costs quoted by installers. The effect was the average indirect variable labour overheads per completed install have risen from $38 to over $600. For every $1 of budgeted indirect installation cost the consortium contributed $3 of its own funds. We anticipate that at scale these overheads can largely be eliminated and reduced to the long-run variable cost between $30 and $50 per site.

7.5.8 Cost of project management and governance

Management and governance costs increased from the budgeted $276 per household (on the original basis of 800 households) to over $1,600 per household due to:

- the reduction in the overall sample size
- additional labour effort required to manage milestone variations.

The project management and governance component represented 27% of the overall project cost (an above average proportion). When considering the originally budgeted amount ($221,000 including in-kind contributions), this cost more than doubled to $497,000.

Reduction of the sample size further contributed to an increase on a per-household basis. For every dollar provided in funding for governance and project management, the consortium contributed $3.50 of its own funds.

7.6 Cost Benefit Analysis

7.6.1 Return on Investment analysis

From the cost benefit analysis perspective, the benefits to the participants should be viewed separately to the benefits of obtaining the data. As the benefits of the data are harder to quantify in monetary terms, this section values the intervention from the perspective of the household.

If viewed on a pure Return on Investment (ROI) basis, the annualised savings of 261 kWh represents a household savings of $72.71

The Project had an average installation cost of $370, plus the cost of hardware and software at $350, giving a total of $720 per household, on average. (For the purpose of this assessment, the fact that more than one monitoring unit was deployed in some cases is irrelevant as the hardware available currently on the market is capable of supporting monitoring of multiple circuits at cost not substantially more than the single-circuit meters used in the trial).

Therefore the cost recovery based on 2016 tariffs is approximately 10 years, using an simple payback period method.

Note that the average installation achieved at scale in metropolitan Sydney and Melbourne was closer to that budgeted originally, at $220 and $230 per install, on average. Assuming that at least this level of installation cost can be achieved at scale, it would bring the total technology and installation cost per household to around $570. The payback period would then be approximately 7.8 years.

The budgeted cost of installs was set at $170, so that each household had a theoretical technology plus installation cost of $520, suggesting a 7.3 year payback at current tariff levels. It is significant that seven years is the accepted return on investment for many sustainability projects. The individual ROIs per household and region will vary according to the various installation costs, and in some locations the returns may be realised in a shorter period.

7.6.2 Net Present Value analysis

A more sophisticated alternate assessment of the payback period can be made using the Net Present Value (NPV) method. Using the weighted average cost of installations of $220 in Sydney Metro and Melbourne Metro, it can be shown that such investment has an internal rate of return (IRR) of 4.4%, achieving the a NPV of $33.61 over ten years, holding other things constant. For simplicity, it was assumed that the initial investment was offset by the cost savings in the first year.

IRR	4.4%	Technology and installation cost = $570								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Benefit	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Hardware and software	-$350									
Installation	-$220									
Net cash flow	-$497.29	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Discount factor	1.00	0.96	0.92	0.88	0.84	0.81	0.77	0.74	0.71	0.68
Discounted cash flow	-$497.29	$69.65	$66.71	$63.90	$61.21	$58.63	$56.16	$53.79	$51.52	$49.35
NPV	$33.61									

By comparison, an investment with the same IRR but with a theoretical installation rate of $170 at scale would have a much larger NPV of $83.61 over the same ten year period (for simplicity, it was assumed that the initial investment was offset by the cost savings in the first year):

IRR	4.4%	Technology and installation cost = $520								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Benefit	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Hardware and software	-$350									
Installation	-$170									
Net cash flow	-$447.29	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71	$72.71
Discount factor	1.00	0.96	0.92	0.88	0.84	0.81	0.77	0.74	0.71	0.68
Discounted cash flow	-$447.29	$69.65	$66.71	$63.90	$61.21	$58.63	$56.16	$53.79	$51.52	$49.35
NPV	$83.61									

No consideration was given to any increases in the cost of electricity over these time periods, or for any changes in energy usage patterns due to variability of the climate. It is likely these will change significantly. As the average tariff increases the payback period declines, and vice versa.

7.6.1 Cost Benefit and Cost Effectiveness Ratios

Cost-benefit analysis involves translating all trial benefits and costs into monetary units. Cost-benefit analysis takes the process of cost-effectiveness one step further by comparing trial costs with the dollar value of trial outcomes and benefits.

Key benefits resulting from each of the trial approaches generally include:

- Direct benefits:
  - energy saving (kWh)
  - monetary savings ($)
  - reduction in carbon emissions resulting from the reduced energy usage (kg CO_2-e)
- Indirect benefits:
  - improvement to householders health, life style and social well-being
  - other societal benefits such as reduced medical bills, etc.

This trial due to its nature did not aim to produce indirect benefits such as those listed above, so the effectiveness is centered on the direct benefits only.

Cost Effectiveness Analysis (CEA) can be applied to energy efficiency investments to calculate the value of energy saved in $/kWh. The energy in such a calculation is virtual in the sense that it was never consumed but rather saved due to some energy efficiency investment being made. Such savings are sometimes called *negawatts*. The benefit of the CEA approach in energy systems is that it avoids the need to guess future

energy prices for the purposes of the calculation, thus removing the major source of uncertainty in the appraisal of energy efficiency investments[1].

In that sense, a Cost Effectiveness Ratio is given by:

$$Cost\ Effectiveness\ Ratio = \frac{Trial\ Cost}{Unit\ of\ Effectiveness}$$

Cost Benefit Ratio can be obtained from the formula:

$$Cost\ Benefit\ Ratio = \frac{Trial\ Cost}{Benefit\ in\ Dollars}$$

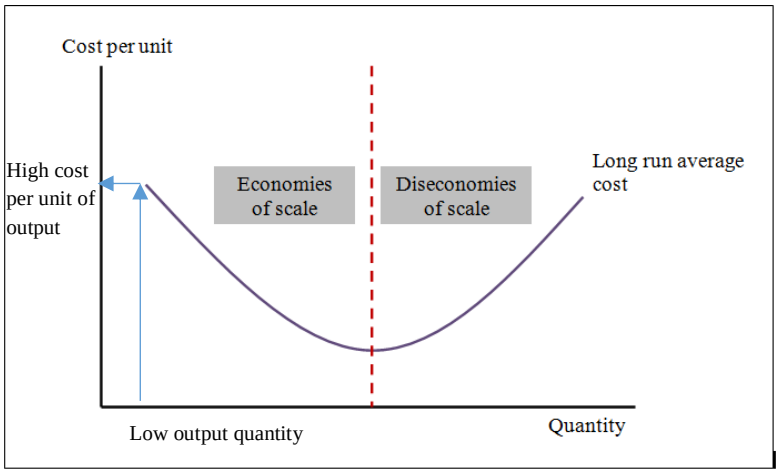
By assuming the kWh saved as the unit of effectiveness (261 kWh of annualised savings per household per year or 548MWh in total over 7 years), and using the annualised dollar saving of $72.71 per household over 7 years ($152,691 in total over 7 years), we can thus calculate the Cost Effectiveness Ratio as well as the Cost Benefit Ratio for each level of the costs identified in section 7.5.1:

Activity	Funded	In-Kind	Total	Cost Effectiveness Ratio	Cost Benefit Ratio
Total Direct Trial Approach (Level 1)	$216,229	$ -	$ 216,229	$ 0.39	1.4
Trial Component (Level 2)	$660,960	$209,182	$ 870,142	$ 1.59	5.7
Total Business (Level 3)	$817,523	$465,384	$1,282,907	$ 2.34	8.4
Total Trial (Level 4)	$928,960	$850,994	$1,779,954	$ 3.25	11.7

From this statistic it can be concluded that the costs exceeded the benefits of the trial at all cost levels, including the direct trial cost.

A number of micro-economic factors can explain this finding. Firtsly, the cost effectiveness ratio is a proxy for the economic variable *Average Total Cost*, if the reduction in electricity consumption expressed in kWh (the unit of effectivess) is viewed as the '*output of production*' for the trial. To that end, the trial given its limited scope was exhibiting reduced returns to scale. For example, adding additional participants to the scope of the trial would have affected the marginal production costs (i.e. the variable costs of delivering the installation and support of participants), but not the fixed costs such as the software licensing, data analytics and governance costs which represented a substantial proportion of the total costs. Consequently, the fixed cost spreading over larger volume of output (a larger total reduction in kWh) would likely result in lower Averate Total Cost and, therefore, a higher effectiveness.

[1] Pekka Tuominen, Francesco Reda, Waled Dawoud, Bahaa Elboshy, Ghada Elshafei, Abdelazim Negm: Economic Appraisal of Energy Efficiency in Buildings Using Cost-effectiveness Assessment. Procedia Economics and Finance, Volume 21, 2015, Pages 422–430.



Secondly, the learnings obtained during the trial by the project delivery team are likely to result in cost reductions and/or quality improvements due to accumulated experience over time.

And thirdly, improved technology itself (such improved models of the energy monitoring equipment) tend to reduce the variable and, consequently, the marginal costs over time.

Chapter Eight
Administration and Budget

8.1 Management

The composition of the parties to this Project was unique as it was a led by a Business NGO (Sustainable Business Australia) with the support of key members, Object Consulting, Connection Research, and in a unique partnership with a community organisation, Apex Australia.

Accordingly, the management of the Project was run on functional lines, with each participant in the Consortium, at least initially, seeking to deliver its defined and assigned role (see section 1.5).

The many variations in the project, and complications caused by the late start, led to a significant increase in governance efforts for all consortium members, and was the main reason for the high figure (over $600,000) of in-kind contributions from members.

8.2 Variations and relations with the Department

During the life of the Project, there were three variations to the original scope and funding agreement, two of which were necessitated by the Consortium and one of which was introduced by the Department. None of the variations resulted in an increase in funding, and in the case of the variation requested by the Department, resulted in a reduction in funding for the Project.

The Department recognised the difficulties in recruiting the suitable households, and in **Variation #1** 6 June 2014) the completion criteria were altered:

- **The Third Milestones** completion criteria changed from 'completion of recruitment activities' to 'satisfactory progress toward the completion of recruitment activities'.
- **The Fourth Milestone** completion criteria changed from 'completion of recruitment activities' to 'satisfactory progress toward the completion of recruitment activities'.
- **The Fifth Milestone** completion criteria changed from 'completion of recruitment activities' to 'satisfactory progress toward the completion of recruitment activities'.

Following the relatively successful second round of recruitment, but due to insufficient time left to continue recruitment activities to achieve the originally planned sample size, the Department agreed to amend the sample sizes of both the monitored group ('Gadgets') and the control group ('Detectives') as part of **Variation #2** (6 January 2015):

- The size of the Monitored Group was reduced from 800 to 600 participants.
- The size of the Control Group was increased from 200 to 300 participants.
- The completion date of the Fourth Milestone (satisfactory progress toward recruitment of both the Monitored Group and the Control Group) was moved to 8 January 2015.
- The completion date of the Fifth Milestone (completion of installations of energy monitors) was moved to 31 March 2015, which was later revised to 31 July 2015 as part of **Variation #3**.

In recognition of the technical difficulties during the deployment of the Gadgets Group, the Department agreed to finalise the sample sizes of both the Monitored Group and the Control Group at 300 participants each as part of the **Variation #3** (6 January 2015):

- The size of the monitored (Gadget) group was reduced to 300 participants (final number in Project 289).
- The size of the control (Detectives) group was kept at 300 participants (final number in Project 311).
- The completion date of **the Fifth Milestone** (completion of installations of energy monitors and delivery of the baseline data) was moved to 30 October 2015. The payment amount associated with this milestone was reduced to $50,000.
- The completion date of **the Sixth Milestone** (completion of installations of energy monitors and delivery of the baseline data) was moved to 30 October 2015. The payment amount associated with this milestone was reduced to $50,000.
- The requirement to submit a mid-term report (**the Seventh Milestone**) was removed due to a shortened period of monitoring. The Seventh Milestone has become the final submission of all raw data to CSIRO.
- The completion data of **the Eighth Milestone** changed to 31 March 2016. The payment amount was increased to $62,165.
- The variation reflected the overall reduction of the project budget by $55,000 (see section 8.4).

At all times the Department was facilitative and open to revised approaches to deliver the project's desired outcome.

8.3 Risk and compliance

The Project was overlaid with a comprehensive and continuously updated risk and compliance plan, the development of which was externally reviewed by accounting and consulting firm KPMG.

The only reportable risk issue that required remedial action was the Consortium's handling of Householder Information during the initial recruitment phase. Two incidents were reported to the Privacy Commissioner at the early recruitment stage (complaints by householders of a breach of privacy). In each case the Consortium put in place steps to review and remediate the recruitment steps and technology capture. In each case the Privacy Commissioner was satisfied with the steps either taken or proposed to be taken, and took no further action.

The project governance framework identified a number of key projects risks that had a potential impact on the project. The table below outlines the risks and their outcomes.

Risk	Consequences	Initial Rating	Outcome
Participation fatigue	Participants leaving the study Low response rates for attitudinal / behavioural survey. Incomplete data, results not statistically valid	Likely / Major consequence	Better than expected in terms of responding to the survey, but as expected or lower than expected in terms of the monitored group engagement Data was incomplete in some cases, but not so much to affect its statistical validity.
Insufficient participants meeting eligibility criteria	Sub-optimal data set. Timelines pushed back to achieve agreed participant base with potential budget overruns. Milestone dates not met.	Possible/ Major consequence	This risk became an issue and resulted in a redesign of the recruitment strategies, followed by a considerable extension to the recruitment phase, as well as re-allocation of recruitment budget towards activities not originally planned for (e.g. PR)
Insecure housing status, participants moving	Interruption in or termination of data flow. Additional de-installation and re-installation costs.	Possible / Moderate impact	Although a number of participants dropped out due to this reason, the overall impact was not significant.
Unavailability of the NEM data	Inability to source historical data for the participants as well as the data for the control group. Incomplete or inaccurate baseline data to compare to data set of households having installed technology. Historical electricity consumption data is not provided by retailers to generate a baseline to measure the effect of the project's intervention.	Possible / Major Impact	There were significant difficulties in obtaining data from the energy retailers information, requiring backing from the Department. This had a major impact on the project budget internally due to additional level of in-kind contributions provided to obtain this information. Eventually a reasonable amount of historical data was supplied, but due to the project being shortened and the continued reluctant of the retailers to provide data, insufficient data was obtained to compare against the monitor data in the last few quarters of the Project.

Risk	Consequences	Initial Rating	Outcome
Landlord approval takes too long for participants who are renting	Delays in identifying eligible participants within timeline. Timelines pushed back to achieve agreed participant base with potential budget overruns.	Possible/ Minor impact	The Project found a substantial difference between the number of participants renting and owning a house, which suggests that split incentive could have been at play.
Control group not incentivised and thus not engaged.	Low engagement from the control group in responding to surveys. Incomplete or inaccurate control group data to compare to data set of households with installed technology.	Unlikely / Major impact	There was some evidence that the participation from the control group was a little lower. They did not complete the attitudinal and behavioural surveys at the same rate as the monitored group, but did so at a sufficient rate to ensure statistical validity.
Change in consortium arrangements.	Interruption to activities due to discontinued responsibilities. Inability to undertake necessary activities within timelines.	Rare / Major impact	Although responsibilities between consortium members to undertake various activities changed throughout the project, the consortium structure and the governance arrangements remained in place.
Unsatisfactory safety and security policies for delivery staff and lack of compliance.	Safety and security of the delivery staff on the ground.	Rare / Major impact	All delivery sub-contractors were recruited on the basis of having appropriate insurance coverage. There were no incidents or problems.
Installations performed incorrectly. Negligence by sub-contractors	Potential for unreliable data collection, electrical faults at the premises, electrocution, fire risk or electrical damage to connected devices.	Unlikely / Major impact	All delivery sub-contractors were recruited on the basis of having appropriate insurance coverage. There have been several instances in which the equipment was not been configured properly. None of those instances posed any risk, but did result in a lack of data received. Those instances were rectified by arranging a repeat visit.

Risk	Consequences	Initial Rating	Outcome
Incorrect use of the equipment or connected electrical system post implementation.	Unauthorised or incorrect modifications to the switchboard or connected monitoring system may result in a malfunctioning unit and/or damage to connected property or persons. Potential for unreliable data collection, electrical faults at the premises, electrocution, fire risk or electrical damage to connected devices.	Rare / Major impact	There was one instance in which the equipment failed at the switchboard, and after replacement the second set of the equipment also failed. Upon inspection by the manufacturer of the failed equipment the site's switchboard was deemed to be producing unusual electrical currents. The site was removed from the project, and the participant was advised that no further installations would be provided.
Delays in delivery of the monitoring equipment.	Installation milestone not met and dependent activities pushed back.	Unlikely / Moderate	Not occurred.
Monitoring equipment goes missing while in transit or storage	Less data collected, cost overruns.	Unlikely / Moderate	Due to a reduced sample size there was a sufficient number of units to install.
Breach of contracts by sub-contractors.	Financial risk associated with breach of contracts by sub-contractors. Adverse impact on project budget (cost overruns) and timelines.	Unlikely / Moderate	Not occurred.
Data privacy breaches.	Possible leakage of personal data and / or electrical consumption data. Potential to alienate participant.	Unlikely / Moderate	There was one instance of a data privacy breach in which participants were inadvertently emailed in a group (the email addresses were not hidden). The team member apologised, but one of the participants complained to the Privacy Commissioner. The project provided further training to the team member, and the matter was closed.

Risk	Consequences	Initial Rating	Outcome
IT outage or other storage related system failures	Data loss for data collected during the project covering all systems where data is to be stored. Sub-optimal data set disrupting data analysis and timelines.	Unlikely / Major	Did not occur. The processes were established for data backups and using cloud storage.
Faulty energy monitoring equipment.	Equipment not operational. Cost of replacement equipment and installation. Loss of data or inaccurate data during down period.	Rare / Minor	There were instances of the monitoring equipment failing post-installation. Most were dealt with via a repeat visit and a replacement, but some of the faults that occurred at the end of the project could not be rectified. This had a marginal effect on the completeness of the data set.
Participants' concerns regarding privacy of data.	Not enough participants.	Unlikely / Minor	There have been instances when expressions of interests were concerned about how data from the trial would be used, but for the great majority it was not a major barrier for participation.
Complexity of legal language.	Households reluctant to participate due to lack of understanding of legal language in the participation agreement. Timelines pushed back to achieve agreed participant base with potential budget overruns.	Unlikely / Minor	This became an issue and resulted in redesign of the recruitment documentation, followed by a considerable extension to the recruitment phase.
Data not received from energy monitors (Internet outage, cancellation of the Internet service or signal issues).	Incomplete data. Potential for unreliable data collection.	Possible / Minor	This became an issue, with 25% of all users experiencing connectivity issues of varying degree. Some participants required installation of additional equipment (e.g. signal boosters) at extra cost to the project.

Risk	Consequences	Initial Rating	Outcome
Conversion rate of expressions of interest to project participants is lower than expected. Rate of return on recruitment / participation does not deliver sufficient sample.	Compromises the ability to undertake further recruitment campaigns (diminishing returns) and puts at risk delivery of other project deliverables if further expenditure is required.	Possible / Major	This risk became a major issue and resulted in a substantial redesign of the recruitment strategies, followed by a considerable extension to the recruitment phase. The sizes of both samples were modified to reflect the difficulties with converting the expressions of interest.
Ad hoc communications to external stakeholders, especially eligible householders, that do not follow quality assurance processes	Communication inadvertently states something that is inconsistent or plainly wrong. Damages the project's brand and compromises trust that the project is worthwhile and genuine.	Possible / Moderate impact	Not occurred.
Complaints to ACMA	Email recipients considers email campaign to be spam, or has previously unsubscribed and then re-emailed. Can cause damage to reputation and ACMA fines the project.	Possible / Moderate impact	Although unsubscribes were managed using digital tools for opt in and out, there were a few recipients who complained. These were handled individually to the recipients' satisfaction.

8.4 Budget

At all times the project has complied with all Department's requirements on financial disclosure. The original project budget was set to allocate the following amounts to each project activity:

Activity	Type	Budget			Details
		LIEEP	In-Kind	Sub-Total	
Project Management	Governance	$99,000	$121,275	$220,275	Project management and governance cost through KPMG as a sub-contractor.
Set up of the engagement networks	Recruitment	$13,200	$3,064	$16,264	Produce collateral and train recruitment volunteers.
Sign-up of the participants	Recruitment	$12,000	$7,661	$19,661	Set up community events, advertising in local media, etc.
Sign-up incentives	Recruitment	$6,000	$3,064	$9,064	An incentive for real-estate agents to sign-up participants.
Ongoing engagement with the participants	Support	$48,000	$18,386	$66,386	$4,000 for each of the 12 targeted locations.
Local help desk support	Support	$10,000	$9,959	$19,959	Cost of establishing and running a local phone support for participants to call.
Engagement of the control group	Support	$40,000	$3,064	$43,064	Incentive payments to the control group to participate.
Deployment. Installation cost of electricity monitors	Deployment	$149,000	-	$149,000	T&M cost of installations, at $149 per site.
Deployment contingency	Deployment	$22,350	-	$22,350	15% technical contingency budget to allow for difficulties during deployment (e.g. re-wiring of the switch box, additional DIN-rail, etc.) as well as for relocation of participants during the trial.
Technology. Electricity monitoring equipment and support	Technology	$370,000	-	$370,000	Cost of 800 energy monitoring units, including activation and initial account set up, and support.
Technology. Platform licensing fee	Technology	$129,900	$101,400	$231,300	Cost of Our Green Home platform configuration, hosting and support for the two years of the project duration.
Analysis - Benchmarking, develop survey and report card	Analysis	$13,000	$13,300	$26,300	Develop the initial survey, data structure and report card. Incl. market insight analysis as in-kind.
Analysis - Initial benchmarking	Analysis	$19,500	-	$19,500	Initial survey, data collection and preparation of the Baseline Report.
Analysis - Ongoing surveys and final analysis	Analysis	$39,000	-	$39,000	Regular surveys, data collection and preparation of the Mid-Term and Final Reports.
Insurance, legal & audit	Governance	$15,000	-	$15,000	Cost of audit of project finances over 2 years, insurance and other prof. services
Travel cost / Discretionary	Admin	$10,000	$9,000	$19,000	Disretionary spending inc. lead applicant overheads
TOTAL		**$995,950**	**$290,174**	**$1,286,124**	

As a result of the slower than expected rate of installations (and higher than budgeted cost per installation) during the deployment phase of the project in the second half of FY14-15, in June 2015 we evaluated two possible options for continuing the project:

- Complete installations currently scheduled with the households.
- Continue with the installations until the 31 July 2016 or until the entire deployment budget including deployment contingency run out (whichever comes first).

Based on the financial and other data, our recommendation was to wrap up the installations and only proceed with those that are already approved and booked with the households, resulting in the final size of

the monitored group ('Gadgets') of 311. As a result of the reduction in scope, the budgeted project costs were lowered by $55,000, an amount which was subsequently approved and included as part of Deed of Variation #3:

Activity	Budget		Variation		Variation Budget		Sub-Total
	LIEEP	In-Kind	LIEEP	In-Kind	LIEEP	In-Kind	
Project Management and Governance	$ 99,000.00	$ 121,275.00	-$ 10,000.00	-$ 12,250.00	**$ 89,000.00**	**$ 109,025.00**	$ 198,025.00
Participant Recruitment	$ 31,200.00	$ 30,199.00	$ -	-$ 16,409.00	$ 31,200.00	**$ 13,790.00**	$ 44,990.00
Participant Engagement	$ 98,000.00	$ 15,000.00	-$ 20,000.00	$ 16,410.00	**$ 78,000.00**	**$ 31,410.00**	$ 109,410.00
Analysis	$ 71,500.00	$ 13,300.00	$ -	$ -	$ 71,500.00	$ 13,300.00	$ 84,800.00
Deployment. Installation of electricity monitors	$ 149,000.00	$ -	$ -	$ -	$ 149,000.00	$ -	$ 149,000.00
Deployment contingency	$ 22,350.00	$ -	-$ 15,000.00	$ -	**$ 7,350.00**	$ -	$ 7,350.00
Technology. Electricity monitoring equipment and support	$ 370,000.00	$ -	$ -	$ -	$ 370,000.00	$ -	$ 370,000.00
Technology. Platform licensing fee	$ 129,900.00	$ 101,400.00	-$ 10,000.00	$ -	**$ 119,900.00**	$ 101,400.00	$ 221,300.00
Other costs (legal, audit, insurance)	$ 25,000.00	$ 9,000.00	$ -	$ -	$ 25,000.00	$ 9,000.00	$ 34,000.00
TOTAL	**$ 995,950.00**	**$ 290,174.00**	**-$ 55,000.00**	**-$ 12,249.00**	**$ 940,950.00**	**$ 277,925.00**	**$ 1,218,875.00**

The final project costs and their comparison with the project budget are shown in the table below:

Activity	Final Budget		Actual Cost		Variance	
	LIEEP	In-Kind	LIEEP	In-Kind	LIEEP	In-Kind
Project Management and Governance	$ 89,000.00	$ 109,025.00	$ 89,000.00	$ 363,110.00	$ -	-$ 254,085.00
Participant Recruitment	$ 31,200.00	$ 13,790.00	$ 49,890.91	$ 46,800.00	-$ 18,690.91	-$ 33,010.00
Participant Engagement	$ 78,000.00	$ 31,410.00	$ 33,675.00	$ 16,700.00	$ 44,325.00	$ 14,710.00
Analysis	$ 71,500.00	$ 13,300.00	$ 98,000.09	$ 19,500.00	-$ 26,500.09	-$ 6,200.00
Deployment. Installation of electricity monitors	$ 149,000.00	$ -	$ 156,466.27	$ 135,843.75	-$ 7,466.27	-$ 135,843.75
Deployment contingency	$ 7,350.00	$ -	$ -	$ -	$ 7,350.00	$ -
Technology. Electricity monitoring equipment and support	$ 370,000.00	$ -	$ 369,997.36	$ -	$ 2.64	$ -
Technology. Platform licensing fee	$ 119,900.00	$ 101,400.00	$ 119,900.00	$ 225,600.50	$ -	-$ 124,200.50
Other costs (legal, audit, insurance)	$ 25,000.00	$ 9,000.00	$ 24,020.37	$ 66,000.00	$ 979.63	-$ 57,000.00
TOTAL	**$ 940,950.00**	**$ 277,925.00**	**$ 940,950.00**	**$ 873,554.25**	**$ 0.00**	**-$ 595,629.25**

Chapter Nine
Findings and Recommendations

9.1 Findings and lessons learnt

Monitoring energy lowers consumption

The Project showed that the information on energy consumption enabled by the usage of an energy monitor, showing householders their real-time electricity consumption, reduces that consumption by 5.0%, for an annualised saving of an average of $68.75 per household. Depending on a number of variables around the cost of installing the monitors, this gives a payback period of seven to eight years.

The energy saving is consistent with the findings of a number of smart meter trials, and the payback period is typical of many sustainability technologies (e.g. solar PV panels). Full analysis of costs and benefits is contained in Chapter 7.

There are many barriers to the use of the technology

The Project was funded to test the hypothesis that the real-time information on electricity consumption provided by monitoring hardware and software would reduce consumption. It was not designed to overcome any specific barriers, but many became apparent during the course of the project.

Energy monitors are effective in many cases, but there are many barriers to their installation and effective use. The most important of these are:

- **Landlord objection** – Most of the Gadget participants were not renters. During recruitment each participant was advised that for legal reasons we were not able to install the energy device without landlord's permission, but they could still take part in the project as part of the control group.
- **Digital and computer literacy** – for many Gadget Group users the monitoring technology was a challenge to get familiar with, or to understand how it worked.
- **Digital divide** – for others, the technical limiting factor simply was the type of Internet connection available. In many cases, installations had to be abandoned after the modem that was installed on premises did not have an available port to connect the base station to, or the premises only had a 3G Internet available.
- **Information barrier** – for many of the Gadget Group participants, understanding their electricity tariffs proved to be a real challenge, so that not many actually managed to enter their tariff information from their bill online to their Our Green Home online account.

Energy retailers are reluctant to part with retailer data

Overcoming information barriers is the key to consumers understanding their energy consumption, but the information contained in retailer electricity bills is retrospective – by up to three months – and shows very little detail about usage. There is no incentive for retailers to provide more information.

The Project had great difficulty in obtaining retailer data, even with the express permission of the participants. The retailers are reluctant to part with the data they hold, even quarterly information that lacks granularity.

It is difficult to recruit participants

The Project was overly optimistic about the recruitment process, and under-budgeted significantly. The Project had great difficulties with recruitment. Perhaps a centralised approach by a government agency or subcontractor would be more effective, perhaps followed by random allocation of participants to projects. That would be much less expensive due to significant economies of scale.

Despite the fact that the monitors are free to participants, are installed free of charge, and are left with the participants once the project is completed, it was very difficult to find suitable candidates. There were many reasons. They include:

- Difficulty in identifying and approaching candidates in the first place.
- Difficulty in convincing them of the merits and legitimacy of the project.
- Difficulty in securing the relevant permissions and privacy requirements.
- Reluctance to make the effort – "It's all too hard."
- Dwelling is unsuitable (e.g. old meter, poor Wi-Fi or Internet connection, remoteness).
- Property is rented and landlord will not give permission to install monitor.

It is not easy to install the monitors

The project attempted to install 421 monitors in the households of participants who expressed interest in receiving one. Of these, 300 installations were completed in the six months between February and July 2015, a 71% completion rate). Although the original plan allowed six months for installations, this was done on the basis of 800 installations. The slower completion rate of installations can be attributed to:

- Identified risks and complexities during the installations
- Necessity of multiple visit to some homes.
- The predominance of older style switchboards in the non-metro areas
- The degree of travel required to remote sites in non-metro areas.
- Poor Internet connectivity
- Low householder availability
- Difficulties of finding suitable local electricians.

Low income households already have below average electricity consumption and already feel they are more energy efficient

The Project focussed on reducing electricity consumption (achieving the same results by using less energy), rather than on increasing energy efficiency (using the same amount of energy to achieve a better result).

The average annual electricity consumption of the households in the study is 5228 kWh per year. The Australian average is closer to 6000 kWh per year.

Participants were asked if they felt that their household was more energy efficient than it was a year ago. Most believe that they are – Around one in five say they are much more energy efficient and nearly half say they are a bit more energy efficient. Participants in the study, by nature of their willingness to participate, have already self-selected as households interested in energy efficiency.

People are generally comfortable with temperatures in their homes

Participants were asked if they generally felt comfortable with the temperature in their home, in summer and in winter. Most were comfortable in both summer and winter, but around 20% said they were not comfortable or rarely comfortable. They were a little less comfortable in summer than in winter.

Price is the main determinant in choosing a retailer

Participants were asked to rate various attributes in a retailer. By far the most important was lowest price, rated very important by 71.5% of respondents, followed by no connection fees (55.3%) and trustworthiness (48.9%). The provision of Green Power (24.6%) and the extent of the supplier's community engagement (14.9%) were relatively unimportant.

Low income households often live in older housing stock

We found that the demographic targeted in this study lives in housing stock which is older than average, with older wiring and asbestos-based switchboards which were deemed unsafe or too complex to rectify to prepare for an installation. As a result, the effort required to deploy the technology – especially in areas outside of capital cities – was grossly underestimated. More time was required to pre-qualify each site for deployment worthiness, slowing down the rollout progress.

Many households needed multiple monitors

The original design of the Project allowed for installation of a single electricity monitoring device in each dwelling, with budgeting and procurement on that basis. But due to the older than average housing stock there was a larger than expected penetration of sites with older 3-phase switchboards, requiring two monitors at each site.

Many sites also were found to operate have solar PV generation systems, requiring an additional monitoring device to collect data on energy generated from the panels as opposed to the energy imported from the grid. Given the scarcity of participants we were unable to discriminate on the complexity of the site, leading to installation of a whole-of-the-site monitoring with the implication that the hardware ratio requirement was over 1.5 units per site (originally assumed 1.1), meaning that approximately 150 monitors were needed to monitor 100 sites.

This resulted in over-allocation of all procured energy monitors sooner than expected, but also in higher installation costs. The supplier subsequently offered a more flexible product allowing connection of up to 3 points of monitoring in one single device, but this was not available at the time of the procurement activities.

Many households have poor Internet connections

Over 5% of eligible participants being not suitable due to poor or unstable Internet or very old Internet modems. More later dropped out due to their concerns over the impact the energy monitors might have on the quality of their already unstable Internet connectivity.

Many households have a low level of computer literacy

As our support overheads show, substantially more effort than anticipated was required to assist the participants in understanding how to use the online platform as well as to assist with re-connecting energy monitors if they went offline.

9.2 Recommendations

Establish strong metrics

The key to any exercise of this nature is effective metrics. Electricity consumption generates massive amounts of data, which causes its own problems. The data must be translated into meaningful metrics, which must then be applied in a relevant manner. Firm metrics must also be established for all costs involved in any project.

Keep the costs down

The name of the game is return on investment, often represented as the payback period. As electricity prices rise, payback periods will fall, but every effort needs to be made to ensure the cost of equipment, and its installation and maintenance, is minimised.

Educate consumers and create champions

Our experience during the project and in researching the case studies showed that in most households there was a ‘champion’ for the technology. While highly qualitative, this does highlight the fact that there are many consumers eager to understand more about, and act upon, energy efficiency. This should be further explored to understand and document the motivations to embrace this type of digital adoption.

Most users of electricity are not very sophisticated or knowledgeable about their consumption. The installation of a real-time monitor is intended to give them more knowledge, but they also need further information about how to use the system and what the information means.

Educating consumers – beyond supplying them with real-time information on their electricity consumption – was not one of the objectives of the Project. Indeed, such interventions were kept to a minimum so as to ensure only the effect of the monitor intervention was measured. To this end the Project provided participants on the monitored (Gadget) group with a user manual, and with a weekly email outline their usage for the previous week.

Test the technology on other demographics

The Program was, by definition, limited to low income households. Because their electricity consumption is already lower than that of households with a higher income, they are probably not the right demographic for this type of technology. But many low income households, especially those with low level of literacy, don't understand the connection between their energy consumption habits and levels.

Direct any technology rollout based on a phased and targeted program

There are many difficulties in installing the technology, particularly outside of metropolitan areas. This greatly increases the cost of installation and therefor the payback period or Return on Investment.

All low income households should be entitled to the benefits of technology, but access is hampered by time, cost and resources. One way around this may be to link the technology to the rollout of the NBN or associated programs around housing upgrades.

Future policy and projects will need to realistically target households in specific geographic areas, rather than try to cover too many locations with limited resources.

Work with energy retailers to ensure better access to energy usage data

Information about electricity consumption is the key to its reduction, yet energy retailers provide only quarterly data long after the event. They are also extremely reluctant to share that data. Any improvement in quality of and access to that data will empower all households, including income low income households, and help reduce consumption.

Case Studies

The Merritts

Mr and Mrs John Merritt live in Adelaide, South Australia. Their two children have both moved out of home but still frequently return to the nest for the free Wi-Fi and food.

John is a retired ABC radio technician with a good grasp of all things electrical. He and his wife are keen tennis and golf players and also enjoy travelling around Australia. It was the ability to check on their power and their temperamental fridge while they were away that drew them to the Our Green Home Project. They also have solar energy they can monitor while away.

John considers himself an energy conscious man, having switched to fluorescent lights and changed his showerhead before he applied for Our Green Home. Because of his background he is comfortable with all things electrical and found the OGH information useful in showing his wife how much each appliance used.

They conducted their own experiment; they noticed that boiling the kettle took 2.5 kW and that the washing machine used less electricity than expected. Their experiment has changed the way his wife uses their kitchen appliances, boiling the kettle only once or twice a day and not for every cup.

John thinks the system is a great idea. The installation went smoothly and he has recommended it to many of his friends. He says the easy to read graphs have changed the way his family understands electricity and how they use it.

“Our Green Home helped to better understand our electricity consumption and how better to use it.”

John Merritt

Merrilyn Kennedy

Merrilyn is a retired senior living alone in inner suburban Forest Lodge, Sydney. Shev boosts her pension by inviting Airbnb guests into her home. She is passionate about the environment and has found Our Green Home has helped to answer some of her lingering questions about energy consumption and how singular appliances impact her average consumption.

Her focused attention meant she was able to see her vacuum cleaner was in fact using more energy than Dyson had led Gadget information was so accessible and easy to read that Merrilyn could see when her guests woke up and put the kettle on.

“Our Green Home helped to fine tune the answers to my questions about the energy consumption within my home. The immediate information relay to my computer enabled me to see when my guests got up and made tea while I was away."

Merrilyn Kennedy

Derek Millar

Derek Millar is a retired scientist living in Davistown on the New South Wales Central Coast. He was drawn to Our Green Home to satisfy his 'penny saving' wife and to ensure they were making the most of their pension. Derek has a scientific background and found the tabulation of data particularly useful and an easy guide to show his wife how to better their energy consumption. They made a weekly ritual of going over the summary and have since been able to shave a couple of dollars of their monthly bill.

Derek found the process of registration long and drawn out but the steps were easy to follow and the installation went smoothly. The results were presented simply and has helped them to helps them to maintain a frugal lifestyle. Derek enjoyed the project and wishes that Our Green home would go for longer.

"Our Green home has been a great addition into my home. I am surprised it doesn't go for longer."

Derek Millar

Margaret Russell

Margaret and her husband are retired church ministers living in Anglesea, Victoria. They already have solar power but were looking for more ways to minimise their energy usage.

Our Green home was able to provide them with this. It taught them to use power more effectively. They looked at the graphs frequently and have changed their attitude towards energy greatly, only using their appliances during daylight hours when their solar power can be used.

Margaret thinks everyone should be on Our Green Home. The project has made them look at things differently and is helping to cut costs within their home.

"Our Green Home made us look at things differently, especially at what time we are using our appliances."

Margaret Russell

Appendix I
Definition of 'low income'

The project attempted to use an objective and standardised method for identifying low income householders. This could not be left to the subjective judgement on the part of consortium members, or any community or welfare organisation personnel involved in the selection process. Whether intentional or not, there was a chance that making a subjective judgement about who should (or should not) be referred could introduce systematic bias into the sample.

But unfortunately there is no standard definition of 'low income', even within Australian Government agencies and statistical bodies. The original LIEEP Round Two Guidelines (October 2012, section 1.4) said that "for the purposes of the program, low income households are those whose household income is in the bottom two quintiles of the Australian population."

The Australian Bureau of Statistics publishes detailed information on household incomes (ABS 6523.0 - Household Income and Income Distribution), which analyses weekly household income by income band ($) and by quintiles (bands of 20% of all households). Income is defined as receipts from all sources (including government benefits) for all members of the household, before any expenses, including tax. The top income in the second quintile – i.e. the income below which 40% of households fall – was $581 per week as at June 2012 (the most recent data). This equates to an annual gross income of $30,300.

There are other definitions, from other government agencies, which are based on the number of people in the household. For example, the National Rental Affordability Scheme (NRAS), administered by the then Department of Families, Housing, Community Services and Indigenous Affairs, set eligibility for rental assistance as high as $100,000 for a couple with three children.

The advantage of a graduation based on the number of people in a household is that household size is taken into account – one person on a given income is financially better off than a number of people sharing that same income.

A simple definition from the Department of Human Services (DoHS), intended to identify candidates for the Low Income Supplement to help eligible low-income households with any impact from the carbon price on everyday expenses, is:

> *Income for the 2012-13 financial year was below: $30,000 for singles, $45,000 combined for couples, or $60,000 combined for couples or singles with a dependent child.*

The figure for of $30,000 for a single person household is similar to the ABS cut-off figure for the bottom two quintiles. Because of the desirability of allowing for large households, the DoHS definition was the basis of the definition used in this project. It is very straightforward, at the single person level accords with the ABS bottom two quintiles desired by the Department, and makes allowance for family size.

Households in dwellings where they are not responsible for payment for their energy consumption were excluded. This included some public housing. But any household which paid for its own separately measured electricity consumption was eligible for inclusion.

Note the redefinitions used as the progress progressed (see Chapter Five).

Appendix II
Privacy

Each participant signed a simple and easy-to-understand agreement outlining the expectations from their participation, as well as granting the project ability to use desensitised data for analysis.

All data for the final analysis was stored and accessed in de-sensitised manner, with participant contact details removed. The Our Green Home platform, developed and hosted by Object Consulting, an Australian-based company, is guided by the current Privacy Policy, which complies with the Privacy Act 1988: http://www.objectconsulting.com.au/privacy-policy/

The research was conducted in accordance with the *National Statement on Ethical Conduct in Human Research* (2007, updated 2013). This document, published by the Australian Government's National Health and Medical Research Council (NHMRC) and the Australian Vice Chancellors' Committee (AVCC) is available at: http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72_national_statement_140130.pdf

The guidelines include consistently adhering to best practice procedures for obtaining informed and voluntary consent from participants, ensuring that data was collected and stored in a way that protects participant confidentiality and anonymity, providing feedback to participants on conclusion of the project, and appropriate record-keeping (e.g., storing raw data for an appropriate length of time subsequent to the completion of the project), among many other activities.

Non participants

The project kept extensive records of all interventions and sub-components of interventions that involved non-participant personnel – for example, the Apex volunteers, consultants, subcontractors or facilitators involved in delivering the project to participants. Information explicitly linking such personnel with specific participants in the target population has been recorded. This non-participant data is directly linked to the relevant participant in the sample where appropriate.

This enables ease of analysis if for any reason it is necessary to check the way in which the participant entered the program.

Participant recruitment and sampling

In order to accurately calculate predicted take-up and response rates, the project gathered records of the number and type of householders who were approached to participate in the project, including those who declined. For all prospective participants, information on their geographical location and other relevant demographics was retained where possible to provide broad level information about the types of people who were willing versus unwilling to participate.

Appendix III
Statistical Validity of Respondent Numbers

The Our Green Home (OGH) consortium has seen a reduction in the number of planned participants due to recruitment difficulties. There is a consensus that the project will be just as useful and just as valid with the smaller number of participants, and that there are many advantages in doing so.

The smaller project is more manageable and can be completed sooner, and there is less risk of financial exposure both to the consortium members and the Department of Industry, which is funding the project.

Some concern has been expressed about the statistical validity of the project with the lower number of participants. The purpose of this appendix is to outline the differences in statistical validity between different sample sizes.

Size of the universe

The statistical term for the total population from which a sample is drawn is the 'universe'. There are 8,344,462 households in the six Australian states included in the study – that is our universe.

Of these, 2,522,227 (about 2.5 million) households meet the original low income criteria, based on an upper limit of $30K per year for singles, $45K for couples, and $60K for a family with dependent children.

Thus, the size of the universe for the project is about 2.5 million. This has subsequently been increased (see Chapter Five), but without any significant effect on these calculation.

Margin of Error

There is a widely used statistical measure known as Margin of Error (MoE), which is a function of the sample size and the universe. The higher the sample size, the lower the MoE and the more statistically valid the survey. The MoE is a number which expresses the percentage by which the sample's results might differ from a sample of the whole universe.

It is of course impossible to sample the whole universe, so a key issue in any sampling exercise is to select a sample size that gives an acceptable MoE. Larger samples are always better, but are limited by practical considerations. That is very much the case in this project.

The concept of MoE is widely used in statistics. A good layman's explanation of it can be found in the Wikipedia article on the subject: http://en.wikipedia.org/wiki/Margin_of_error

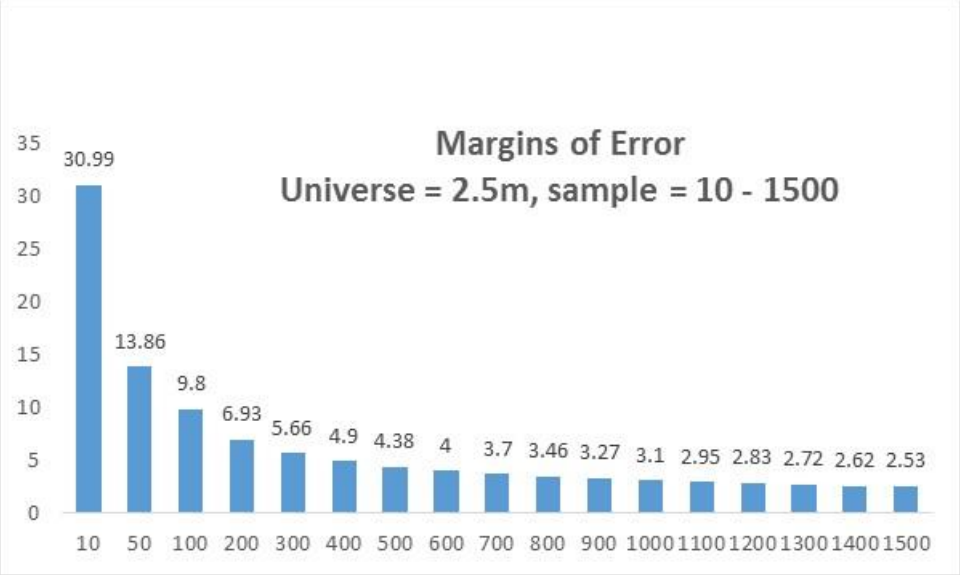
The graph below shows the MoE for different sample sizes for a universe of 2.5 million. A 'confidence level' of 95% is assumed – this is widely used in market research. The confidence level indicates the degree with which we can be certain that the results from our survey fall within the calculated MoE. The MoE for a different degrees of confidence can be calculated using a standard formula.

The maths are complex to the layman and are not explained here (go to Wikipedia if you need the details), but to make it easy there are any number of MoE calculators on the Internet. The calculations below use a simple calculator from European market research firm ComRes (calculator is here) using a confidence level of 95%. Other calculators have been tried and give identical results – they are all based on the same mathematical formula.

An examination of MoEs shows that most people not familiar with statistics and sampling methodology believe that a much larger sample size is needed to ensure an acceptable degree of statistical validity than is actually the case. We have often found this in our market research work.

Comparatively small samples can be acceptably accurate. As the sample becomes larger, it is a case of diminishing returns - larger samples are just not worth the effort. That is why opinion polls in Australia typically use a sample size of just 1000 voters, in a universe of 17 million registered voters.

The calculations show that for our universe, and with a confidence level of 95%, the MoE for a sample size of 1000 is 3.1. This increases to 4.0 with a sample size of 600.



This means that the overall findings of the larger sample of 1000 could be as much as 3.1% out, and the findings of the smaller sample size in the final project (600) could be as much as 4.0% out – a difference of .9%.

We believe the difference to be acceptable.

MoEs on subgroups of the sample

It is also possible to calculate MoEs on subgroups of the sample – e.g., Couple households in Sydney. We have not attempted this, but if necessary it could be done using the same comparative calculations. The difference in MoE for the two overall sample sizes would be similar, and we believe similarly acceptable.

Appendix IV
LIEEP Data Items

The data collected for the project complies with the field names, descriptions and values contained in Annexure B, Schedule 4 of the Funding Agreement executed between the Department and Sustainable Business Australia. They are reproduced below with an added final column for comments.

Trial Characteristics

#	Field name	Field description	Field values	COMMENTS
1.	Trial name	Identifies the project to which the data relates	Trial001 – Trial999	
2.	Unique LIH identifier	Unique identifier for each household serviced.	HH001-0001 – HH001-9999	A number are available – see 2.1.3
3.	Trial approach	Project approach /engagement method	Home visits Door knocking Previous contact Referral from other agency Other	
4.	Barriers being addressed by trial	List the types of energy efficiency barriers being addressed by the project	Information Education Split incentives Financial Other	
5.	Overview of Planned Trial	Type of measures or service undertaken:	Comparison of: Community based education Home Energy Assessment/Audit In-Home Display Education/Information/Workshop Other	
6.	Trial Commence-ment Date	The date on which this trial of work commenced	01/01/2013	Exact dates as per project plan
7.	Trial End Date	The date on which this trial of work was finalised	31/12/2016	Exact dates as per project plan

Energy Efficiency Measure Characteristics

`#	Field name	Field description	Field values	COMMENTS
8.	Energy Efficiency Measure or Service Program Name	Unique Name the Measure/Service is to be known by	Short Text	
9.	Short Description of Energy Efficiency Measure or Service	Short Description of the measures or service undertaken:	Short Text – for example: Home Energy Audit In-Home Display Education or Information Workshop Other	
10.	Long Description of Energy Efficiency Measure or Service	Long Description of the measures or service undertaken:	Long Text – detailed description of the measure or service	
11.	Particular Barrier being addressed	List the types of energy efficiency barriers being addressed by this Measure/Service	Information Education Split incentives Financial Other	
12.	Anticipated saving of Measure or Service (per year)	The anticipated savings per year of the implemented Measure or Service.	$0-$99,999 $ range may be required.	$ range
13.	Compliance indicator	Conducted in the approved format /process by qualified/trained personnel.	Yes No	
14.	Energy Efficiency Measure/Service Program Name	Unique Name the Measure/Service is to be known by	Short Text	
15.	Date Measure or Service was undertaken	Date on which the service was undertaken or completed.	01/01/2013 – 31/12/2016	
16.	Actual Cost of service	The cost of service per household.	$0-$99,999 Product $0-$99,999 Installation $0-$99,999 other costs	
17.	Item being replaced	Type of item being replaced.	Item Type Energy use	

Household Characteristics

#	Field name	Field description	Field values	COMMENTS
18.	Gender of people in household	Gender of participant	Female, Male	Demographic survey
19.	Number and age of people in household	Total number of individuals living in the household with the age of each individual	5 year bands	Demographic survey
20.	Education status of people in household	Level of education	Not of school age Primary school High school Y10 High school Y12 TAFE Tertiary Degree/Diploma	Demographic survey
21.	Indigenous indicator	Are any individuals Indigenous	Yes No	Demographic survey
22.	Birthplace Indicator	Were the individuals born in Australia or Overseas?	Born In Australia Born Overseas Overseas place of birth	Demographic survey
23.	Primary language spoken in the household?	Indicator of English or other language spoken at household	English only spoken at home Households where two or more languages are spoken. Other languages spoken	Demographic survey
29.	Household comfort status	How comfortable do the householders feel? (heating/cooling/lighting/etc.)	Very comfortable Comfortable Neutral Rarely comfortable Not comfortable	Behavioural Survey
30.	Empowerment status	How empowered do the householders feel in relation to their energy consumption?	Very empowered Empowered Neutral Rarely empowered Not empowered	Behavioural Survey
31.	Finance control status	How in control of their finances do the householders feel?	In control Sometimes in control Neutral Rarely in control Not in control	Behavioural Survey
32.	Behaviour change status	How much has the householder's behaviours changed over the last 2 years?	Very energy efficient Sometimes energy efficient Neutral Rarely energy efficient	Behavioural Survey

Dwelling Characteristics

#	Field name	Field description	Field values	COMMENTS
33.	State	The state or territory of dwelling	NSW / Vic / Qld / SA / WA / Tas / NT / ACT	Derived from postcode (can also derive metro v regional)
34.	Climate zone	The climate zone in which the dwelling is located, based on temperature and humidity (BOM 2003)		
35.	Postcode	Postcode of the dwelling.	0000-9999	
36.	Dwelling status	Tenancy	Owned outright Mortgaged Rental property	Demographic survey
37.	Dwelling Structure	Type/structure of dwelling.	Separate house Semi-detached, terrace house, townhouse etc. Flat, unit or apartment Other dwelling	Demographic survey
38.	Age of dwelling	The year the dwelling was built.	1900-2012	Demographic survey
39.	Wall construction	Major outside wall material	Fibro / Brick Double Brick / Timber / Weatherboard / Mixture	Demographic survey
40.	Roofing construction	Major roofing material	Metal / Tiles / Timber / Concrete / Mixed / Roof colour	Demographic survey
41.	Number of stories	Number of stories in dwelling	1-99	Demographic survey
42.	Number of bedrooms	Total number of bedrooms	1-19	Demographic survey
43.	Number of bathrooms	Total number of bathrooms	1-9	Demographic survey
44.	Number of living rooms	Total number of living rooms	1-9	Demographic survey
45.	Size m^2	Total area of the household in m^2	1-999m2	Demographic survey
46.	Nationwide House Energy Rating Scheme (NatHERS) star rating or equivalent	NatHERS star rating of the household	1-10 Not known	Demographic survey

Dwelling Characteristics (continued)

#	Field name	Field description	Field values	
47.	Insulation	Indicates if the house is the house insulated	None Ceiling/Wall/Floor Type and Rating Foil / Wool Glass / Other	Demographic survey
48.	Window type	Type of glass in most windows	Single glazed / Double glazed / Tinted / Other	Demographic survey
49.	Window coverings	Type of window coverings on most windows	Blinds /Curtains Type: Backing / Other	Demographic survey
50.	Smart Meter	Household has a Smart meter installed	Number of Smart Meters attached to Mains/Off Peak/Solar PV Brand/model NMI Number	All will have Our Green Home™ meters
51.	PV	Household has PV installed	Yes/No Size (Kw)	Demographic survey
52.	Modifications made to dwelling in last 12 months	Any changes or modifications made to dwelling in last 12 months.	Renovation or extension Install or upgrade of energy efficiency Install new hot water system (type) Install solar Install insulation Window treatment Replaced space heating or cooling equipment Replaced white-goods with new energy efficient models Draught proofing Double glazing Installed ceiling fans Added external shading Changes to lighting systems Major renovation to improve energy efficiency design Unable to (tenant)	Demographic survey

Energy Supply Characteristics

#	Field name	Field description	Field values	COMMENTS
53.	Types of energy sources used within the household	Select the types of energy sources used within the household	Electricity Gas – mains Gas – bottled Wood Solar Other (Diesel, etc.)	Demographic survey
54.	Energy Service Retailer	For each energy type list the retailers name	Example: AGL Energy Australia	Demographic survey
55.	Tariff Name	The name the retailer calls the tariff scheme	Example: Super Saver Energy Plus Green Energy	Demographic survey
56.	Tariff type		Flat rate Time of use Net of PV Direct Load control Other	Demographic survey
57.	Tariff Structure	Detail the periods and charge Rates of the periods within the tariff scheme	Example: Period #1: 0700h – 0900h $0.220 / kWh Period #2: 0900h – 1700h $0.187 /kwh Period #3: 1700h – 2000h $0.220 / kWh Period #4: 2000h – 2200h $0.187 /kwh Period #5: 2200h – 0700h $0.0125 /kWh [Source: ACTEW AGL – Smart Saver Plan]	Demographic survey

Energy Consumption Characteristics

#	Field name	Field description	Field values	COMMENTS
58.	Heating	Type of space heating and energy input requirements (Watts), if available	Ducted gas Reverse-cycle AC Wall-mounted gas Wall-mounted electric Portable electric Portable gas Star rating = 1-7 Other	Demographic survey
59.	Cooling	Type of space cooling and energy input requirements (Watts), if available	Reverse-cycle A/C Evaporative cooler Wall/Window mounted A/C Portable A/C Ceiling fan Portable fan Star rating = 1-7 Other	Demographic survey
60.	Water heating	Main method or fuel used for watering heating and energy input requirements (Watts), if available	Electric / Gas Solar – gas boosted Solar – electric boosted	Demographic survey
61.	Lighting	Number and type of light globe used in household and energy input requirements (Watts), if available	CFLs / Halogen / LED / Incandescent (GLS) Other globe (specify) Number in household	Demographic survey
62.	Refrigeration	Type of refrigeration and energy (Watts), if available	Combined or separate fridge/freezer Other (e.g. minibar, wine/beer cooler, wine cabinets) Star rating = 1-7 Number and age in household	Demographic survey
63.	Cooking - oven, stove, microwave	Type and method used for cooking e.g. oven, stove, microwave Energy (Watts), if available	Electric Gas Wood Time used (hrs) Number in	Demographic survey

Energy Consumption Characteristics (continued)

#	Field name	Field description	Field values	COMMENTS
64.	Computers	Number and type and energy input requirements (Watts), if available	Desktop / Laptop Tablet Star rating = 1-7 Time used (hrs) Number in household	Demographic survey
65.	Home entertainment appliances	Number and type of and energy input requirements (Watts), if available	TVs / DVD players/recorders Games consoles Set top boxes VCRs / Audio equipment Time used (hrs) Number in household	Demographic survey
66.	Laundry appliances	Number and type and star rating, and energy input requirements (Watts), if available	Front loader / Top loader / Dryer Washer/Dryer combo Time used (hrs) Number in household	Demographic survey
67.	Pool/Spa pumps	Number and type of pool or spa pumps and energy requirements (Watts), if available	Pool pump / Spa pump / Other pump Time used (hrs) Size and time in use.	Demographic survey
68.	Other appliances	Number and type of other appliances and energy input requirements (Watts), if available	Time used (hrs) Number in household	Demographic survey
69.	Prior EE measure energy usage	Period/Quarterly energy usage in kWh for the period prior to the EE measure	NEM 12 data - Interval energy usage in kWh NEM 13 data - Accumulation energy usage in kWh	Need to be collected from supplier
70.	Post EE measure energy usage	Period/Quarterly energy usage in kWh for the period post the EE measure		Need to be collected from supplier

Appendix V
Full text of responses to all open-ended questions

This Appendix contains the full text of all responses to the open ended questions asked of participants in the attitudinal and behavioural surveys. All questions were quantitative, asking respondents to rate a number pf factors on a scale from 1 to 5, and many questions also invited comments, the full unedited text of which is contained below.

Feelings about energy efficiency (5.2)

- 2 children in the house – I thinks it's harder to control
- A bit hard and costly to reduce costs on a farm
- A little
- Away from home a lot this year and adult son at home not so careful with turning things off
- Because it costs so much these days
- Changed all lighting and replaced TV
- Changed all the light bulbs to fluorescents
- Due to my disability my body can't adjust to temperature charge due to my spinal injury
- Had an assessment done by an energy efficiency assessor from Uniting Care late January last year and managed to cut my electricity bill down from $350 the previous year to $150 in the Jan-April quarter.
- Hasn't helped
- Have a 3 yr old and 2 yr old now!
- Have always been a frugal energy user.
- Have always looked to be energy efficient for a number of years now
- Have high bills in Winter from Heating and my son living with me. he has since moved out in to his own unit. The next set of bills should warrant a smiley face.
- Have implemented renewal to low wattage lighting throughout my home.
- Have installed ceiling fans and so are not using air conditioning so much.
- Have installed roof-top solar panels. As much as possible we run appliances at times when we are generating solar power.
- Have installed solar panels
- Have only lived in SA for just under 12 months
- Have solar hot water and special switches that turn the TVs off at the wall, plus all lights are either mini flouros or LEDs
- High prices for energy - gas and electricity - has made us more aware of our power usage and the need to reduce these. We have also installed more solar panels.
- I am more aware of what I can do.
- I conducted my own energy audit which highlighted areas where we were wasting energy. Acting on this information, our next bill indicated that we were using about 20% less energy.
- I have a smart meter and have become careful about usage during peak times
- I have always tried to conserve energy

- I have been practicing energy efficiency since the '70's
- I have done some things that has made my consumption less by changing the light globs to LED not using the oven but have bought a different cooker not using hot water to wash hands but using a hand wash with cold water not using warm water to wash clothes only using cold ECT....
- I have done what I can without purchasing expensive monitors.
- I have installed LED lighting where possible
- I have tried to energy efficient for years, there is nothing else I can change
- I notice that we consume less energy than the average household.
- I switch most things off, and when on holiday I switch off the hot water service
- I try and save as much as I can and AGL have the hide to hit me with a $1300 bill
- I try to conserve energy.
- I turn off unnecessary lights and power points, with the exception of the refrigerator of course. I use my microwave for most of my cooking, old electric stove is very slow. and uses way too much power. I DO have 2 minute showers most days, only when I wash my hair do I exceed the time.
- I used to use way more power with a heat pump that was old and not working proper but have recently put a new heat pump in and seems to use slightly less power
- If householders were more aware of how to use electricity the person paying the bill would be much nicer. Is 30 minutes on HOT the equivalent of 45 minutes on warm when using the clothes dryer? Which is more energy efficient?
- I'm doing the same as what I was doing two years ago. I don't drive a car, I only use hot water to have a shower and I travel by Public Transport or walk to get everywhere.
- Installed LED lights in main living areas, considering solar
- It has been a challenge to not give money to the people whom are trying to undermine my investment in solar panels
- It is difficult to change energy usage. I do not have tiered metering for my electricity so I can't run the pool pump or dishwasher at night to save money. I have installed a gas cook top and gas for heating and hot water but nowadays gas is becoming expensive too (the more you use the cheaper the rate is but being only two people my bill is just below the bulk rate). I only connect my second fridge at Christmas time when I have extra food for visitors otherwise my bill is too expensive. I have changed all my lights to energy efficient ones but this only has minimal effect on the bill. I will definitely purchase only energy efficient appliances (or as high a rating as possible in the future).
- I've always switched lights off that aren't needed, the same with appliances, long before it became 'trendy' often having to put up with ridicule by friends and family. As a result my energy bills are far less than a third of the average consumption
- I've always tried to make the best use of all the utilities I have and to also keep my costs down
- I've installed switches into power points that turn off appliances by pressing a remote control unit, all our appliances apart from the fridge are turned off automatically each night.
- Just changed from halogen down lights to LED
- LED lighting has helped
- Mainly due to lack of money
- More technical equipment on standby.
- Moved to a new home that now has a 6 start energy rating
- Much more energy efficient
- My household can NOT get any more energy efficient than it already is. If we get any more efficient we will be putting our health at risk.
- My household has not changed in the last two years so I would say everything has stayed the same. Our heating and all electrical appliances remain the same, the only things we may do is turn the lights off and occasionally switch power off from the switch rather than to leave TV / Audio on standby.

- Not as many people living here.
- Our children are growing and with that grows their energy usage - more computer, phone, laptop, iPad ...
- Our energy efficiency behaviour improved significantly several years ago following the installation of a smart meter. However, we are now starting to use more power because of increasing use of air conditioning.
- Pertinent to behaviour, we are putting more appliances on standby, and now using an inverter A/C plus low energy bulbs.
- Replaced all fluoro with LED bulbs
- Replaced CFL's with LEDs. Purchased plug in energy monitors.
- Resident in this house 13 months only
- Since energy saving light bulbs.
- Solar HWS installed about 10 years ago, 3Kw Solar Power generator installed 4 years ago. That's why only a "bit more energy efficient" (newer, more efficient, cheaper LED lighting installed). You should consider if you're asking the right question
- Solar panels have helped, plus we now use dishwasher and washing machine during the day.
- sold a property that was run with solar panels to a new property that will have panels in the future
- Somewhat
- The more I save on power the bill becomes more expensive
- Try hard as possible to change the way i consume energy in the home
- Use the tumble dryer more as it is easier.
- Used the aircon more than normal and some light on all the time
- Used to live on a boat for 12 years, forcing us to save el wherever we could.
- Use less electricity by only having one light on at night and switching hot water off every two day's
- We are able to look at the items that are high consumption and make sure we do not run them at the same time. We schedule the use better.
- We are always trying to improve our energy behaviours for the betterment of all.
- We are limited by budget in implementing the energy efficient strategies that we'd like to
- We are using only what we need; everything else is turned off.
- We do have solar panels
- We got solar which has significantly reduced our grid consumption
- We had solar installed at our previous home and read the meter daily to make sure we were keeping our electricity usage down. Our current property is too shaded for solar and the meter is not so easy to read. Energy Australia who I have been with since we moved in last August do not have the meter readings on the account so I have no way of checking which is very annoying.
- We had the solar panel put on, only 6, and have found that we are receiving some return, but it will take years to get back even our costs.
- We have a constant awareness of our energy consumption
- We have had an air conditioner installed in the last 18 months and my son uses the heater a lot more than previously.
- We have had solar panels installed, replaced an old vertical freezer with a more modern fridge/freezer and wash clothes more frequently in cold water. We are more conscientious at turning off unnecessary lights.
- We have installed LED light bulbs in our living/kitchen common area with 8 by 8 watt bulbs replacing 8 by 75 watt bulbs. We have multiple switch off boxes that gets turned off every time the TV and all associated electrical units are de-activated. All other household lighting has been switched to 15 watt bulbs.
- We have installed LED lighting. A new air con unit.
- We have used many of the ideas we have been told about.

- We installed a small solar power system in our home about 14 months ago to reduce our reliance on network power.
- We keep trying but don't have a lot of opportunity beyond what we are doing
- We now understand exactly how much the household is consuming at all times. We have altered our schedules and routines to utilise appliances when the PV solar power is providing to the household, over the grid supply. This ensures maximum efficiency of power usage.
- We stopped using heaters!! Also left Origin as kept falling off their green power plan without knowing it and swapped to Powershop
- We try to use energy during our cheapest part of the day
- We use as little as possible
- Well in the last 2 years we have built a house which now has a 6 star energy rating we also have a 4kw solar panel system.

Comfort with temperature – Summer (5.4)

- A little box fan is what we share and it only gets used in the lounge room. we do not all have one each for our bedrooms.
- Air con broken in April storms
- As yet do not have insulation in the ceiling - planning on replacing roof within 5 years.
- Bucket of cold water to keep the feet cool.
- But we cannot afford air conditioning
- Can get a bit warm
- Comfortable
- Comfortable except on very hot days and nights
- Depends on how hot it is outside and whether we are using fans or air con
- Evaporative air conditioning.
- Fortunately my house gets a beautiful north easterly breeze in summer so I leave all the windows open day and night to capture it.
- Fortunately we live where we nearly always get a sea breeze.
- I believe global warming is largely caused by the earth's proximity to the sun, in its orbit. But man is contributing by his destructive behaviour, and lack of concern.
- I conducted a test over the last summer and didn't use my air conditioning unit at all - during the previous summer, I had only used the a/c when temperatures went above 35c, compared to more frequently the summer before. During the last summer I used fans to circulate the air and found that while it was not quite as comfortable as having the a/c going, it did save on energy. Having doors and windows open 24/7 helped to allow air movement - prior to the last summer, I only opened them for a few hours to allow a cross breeze during the hottest part of the day.
- I don't like the hot weather too much summer is a hard time for me anything over 18 is warm but I don't use any fans or other coolers in the summer I open the doors and windows it seems enough most of the time.
- I have a split system installed
- I have fans in every room. I try to avoid going upstairs in the afternoons. I use black out curtains.
- I have reverse cycle ducted aircon over three zones. Only used the air con function 2 or 3 days last summer. My house benefits from a natural cooling sea breeze.
- I keep the windows shut and only get the sun about 4pm in the afternoon. I don't use a fan because I don't like them.
- I live on my own
- I need to close the blinds to stop excessive heat in sunny days and put on a fan in humid days.

- I'd prefer it cooler as I don't like heat, but have modified within financial budget, adding block-out curtains and shutters, sun awnings, and sleeping downstairs in a cooler bedroom when it is hot. I use fans at times, but avoid air-con most of the time.
- In an effort to economise we only use the aircon when the overhead fans just can't cope
- Increasing use of air conditioning for cooling
- Installed split air con 2 years ago-otherwise hot in summer/cold in winter
- It is difficult to keep the house warm in winter and cool in summer without air conditioning on but we manage with extra jumpers and or blankets and a electric fan with a moist towel in from to give some coolness.
- It's cheaper, quicker and more cost effective to chop trees down, build houses too close together, throw in air conditioning and a swimming pool than to build houses with eaves, cross ventilation, roof ventilation, wall, ceiling cavity and subterranean insulation.
- It's very hot upstairs as we live in a townhouse
- I use fans, no air con
- Keep all blinds and curtains drawn, and open house up after sun goes down
- Love to turn on aircon but unaffordable
- My ceiling fans do not work properly and I cannot afford to get them looked at and repaired or replaced as the age pension does not stretch far after the mortgage is paid. I live fortnight to fortnight and do not have any savings or superannuation that I could use to get them fixed so have to suffer in the heat
- My dwelling lacks adequate insulation
- My home is aligned north/south with good insulation. The western walls have only two windows each 120cmx45cm and louvered to allow some ventilation. Extractor fans 350cm in diameter are installed in the roof to take away any excess build up of heat within the roof space.
- My house does get very hot with only a air con in lounge it does not cool down whole house
- My house was almost designed to deal with summer heat to a point it is bearable
- My wife feels the heat during summer more than I do but we try to limit the use of our air conditioner as much as possible
- No air conditioner but have ceiling fans and get sea breezes
- Not at all comfortable at night and very comfortable in the day
- NSW govt did a good job of roof space insulation, leaving the packed down older stuff up there and putting the new on top, I now have a lovely cool home and only rarely have to use my little evaporative cooler. Usually a fan or two is all that's needed.
- OK, except on days over 35 degrees Celsius when we close up the passive air conditioning and put on the split system air conditioner during the hottest part of the day or arrange to go to a public place (library) to take advantage of the air conditioning there.
- On extreme high temp days (in excess of 35 degrees) I use the air conditioner and close the blinds until sundown and then employ ceiling fans for comfortable sleep.
- Our house appears to retain heat although we took advantage of the governments incentive a few years ago to install insulation. We don't have air con, although at the very hottest night, may turn on a stand up electric fan.
- Our house is generally comfortable except on the very hot summer days and we try not to use the ducted air conditioner as it uses too much power.
- Rarely comfortable
- Really hot here in summer
- seems my new unit is cold in winter but cool in summer so that's a bonus
- Spinal injury does let my body adjust to temperature changes heat affect me cold change are easy to adjust to because of cloths and can put on but I can’t remove my skin to cool down.
- There is the off, rather hot day, but to be expected in our country/climate.

- Too hot
- Upstairs is muggy of a night.
- Use a fan when needed, my unit is usually a little cooler in summer indoors than it is outdoors, so it is usually ok.
- Use a hand fan
- Use of aircon
- Using air conditioning
- Usually comfortable, but if sudden cold snap for 1 day not worth light wood heater
- We all argue as we're all different ages/ genders (girls are always cold, boys are always hot etc.)
- We close the house up in the morning on a predicted hot day and it is much cooler when we arrive home. We do use an air conditioner when necessary
- We decided to just put up with the weather, leaving the house shut up until 5 p.m. then opening it up... trying also to keep power costs down....
- We do not have air conditioning, but have thick stone walls and an insulated roof
- We do things to naturally reduce temperatures such as keeping curtains drawn and using external blinds
- We don't have air conditioning but have ceiling and floor fans. We also have shade trees.
- we feel the need to use A/C and fans far more than Qld born persons (we r from Vic)
- We have a northerly facing house, with good verandas and eaves and an ocean breeze most days. We don't use air con or fans.
- We have air con
- We have ducted evaporative air conditioning that is used most of the time but we do also have a wall mounted reverse cycle aircon that we use in very humid weather (about one day per summer)
- We have no air con but we have a pool
- We have no air conditioning so only extreme temps over a number of days gets a bit uncomfortable, but not beyond a fan or so
- We have no air-con so it's uncomfortable in summer
- We have split system air conditioning set at 22 degrees
- We installed aircon following the installation of our solar panels
- We live in a place which doesn't have a terribly hot climate.
- We only have ceiling fans in main bedroom and dining room and a couple of portable fans.
- We start with 23 degrees setting on the AC and as the outside temp rises through the summer we raise the temp to 25 degrees.
- We tend to keep the temp about 25C in a heat wave.
- We tend to run the air conditioning at least 12 hours a day in summer.
- We try to only use the aircon only in the day
- We use awnings to control the temperature and use our air conditioning less.
- We use evaporative air conditioning over refrigerative in our new premise. However, the PV solar has powered our portable 2.5 kW refrigerative air conditioner when there has been a lot of smoke or fires in the area and it was unsafe to use the evaporative aircon.
- We use fans only, no air-con
- We use fans where practical and only resort to the use of the Air Conditioner when temperatures are in the 30's and have the temperature set on 23 until the external temperatures fall below 30.
- When using ceiling fans or air conditioner
- Whilst the incidents of markedly increased heat is increasing ... the duration is manageable.

Comfort with temperature – Summer (5.4)

- A fireplace warms the small space of our house extremely well.
- After two or three days of 37-42 house does heat up
- Although my house does have pink batt insulation it does not have sarking under the roof tiles. A recent roof report on my roof because of storm damage revealed that my roof is quite old. As there is no sarking and the roof tiles are quite porous the moisture comes through the roof tiles when it rains and the roof space becomes very damp and cold and consequently my house is also very cold and difficult to heat and keep warm. I am about the have the ridge capping repaired and the roof tiled resealed so I will be interested if there is much of a difference next winter.
- Although the heating in this house is electric it is very efficient. One older type set into the old fireplace and thermostatically controlled, and one an oil column heater, not new but very good, 13 column in size. I do have an old fan heater, small, that I use in the bathroom. Don't panic, not put into bad position regarding water and electricity !!
- Being on the top of the Great Australian Divide, we experience colder nights than surrounding areas.
- But due to a health condition, we are going away during winter and not feeling it at home
- But we live in the hills and therefore need to use our air conditioner (for heating). Bit it is only on for short periods.
- Can get chilly on occasion, but not too bad overall.
- Cold but we use blankets and sleep in warm clothes
- Could be better
- Don't like to be cold
- Gas heating
- Good control
- Have wood heater going in winter in lounge, and renovating and installing refurbished 1940s wood cooker in kitchen
- I am disabled and need air conditioning use in summer and central heating is winter. These are considered essential.
- I can’t go anywhere having to be rugged up and public housing doesn't supply heating and the heat and cold go through the house due to the poorly building that SA housing build they home. The homes are built as cheap as possible and insulation isn't used.
- I don't feel the cold like most people most mornings the temperature in the house can be as low as outside to 2 degrees. I don't normally have a heater on in the morning or through the day only having one on in the evenings I would like a heater on more often sometimes but just can't afford the extra cost of running one if I do feeler cold I usually put a shirt and jumper on and put more on the bed, I do use a heater in the bathroom though
- I don't mind the cold and wear lots of thermal efficient clothes (I ski-tour so have lots), blankets on the lounge. I rarely use heaters and never use heat lamps in my bathroom. I heat an electric blanket for a while prior to getting in bed.
- I go outside to warm up in the day time, need air conditioner to heat rooms from late afternoon to bed time
- I have plenty of clothes to keep me warm. I don't have a heater because I don't like them.
- I need some sort of heating going on all winter months.
- I rely on gas heating.
- I rug up as my gas heater is very old and does not work properly
- I rug up then close and snake doors occasionally I use a heater
- I run my reverse cycle heating quite often in winter. I need to do that to have a comfortable internal temperature.

- I use an oil heater which is kept on permanently for 3-4 months of every year on 33%.
- If I'm cold I put on warmer clothes and use a blanket in preference to turning on the window
- In winter I feel the cold, I sometimes use heat packs to keep my feet warm because if my feet are warm I'm comfortable
- Increasing use of air conditioning for heating
- Inside my home is generally hot in summer and cold in winter. Last winter however, I didn't use my gas or electric heaters. Instead, when the temperature dropped, I either put on more clothing, or rugged up to keep warm.
- Internal ceiling fans are installed throughout the house to keep the circulation of cool air at the best possible temperature for individuals.
- It can be cool but we use no heating
- It gets very cold.
- It's a cold unit!
- Keep the heating to a minimum, rug up and carry a hot water bottle as my best friend.
- My house is double-bricks
- My split system does a good job
- Only comfortable because we use wood fire heater, otherwise would be very cold.
- Only electric bar heating.
- Only heating is the fireplace and it's not particularly effective
- Only issues are during the evening and overnight where the house gets cold
- Our house is completely open plan and tiled, with only blinds on the windows. It is *freezing* in winter - our gas heater died some years ago, and the oil heaters we have chew through electricity so they are used sparingly. Our house is very poorly designed in terms of temperature control.
- Our winters don't get very cold.
- Pretty good
- Really cold in winter in our area
- Run heater only on the coldest days - 0 degrees to 5 degrees
- Sit under a couple of blankets.
- Slow combustion heat all the way
- small heater in lounge room which doesn't use much electricity
- Sometimes feel the need for a heater, it does feel quite cold at times in winter in my unit.
- Sometimes use an electric throw
- The house is open plan and it's too expensive to heat so it's uncomfortable in winter.
- Try to avoid heating as much as possible. Bills still horrific
- Use aircon occasionally but a rug does the job
- Use of aircon
- Using air conditioning or gas heater ...
- Very, very rarely do we need to heat the house, it's easier to put on warm clothes.
- Warm climate and get northern sun mornings
- We all argue as we're all different ages/ genders (girls are always cold, boys are always hot etc)
- We can always put on a rug or blankets when we need if cold, or extra clothes.
- We do rug up a bit and we set the AC temp at 19 to 20 degrees.
- We do things to naturally keep more warm such as wearing appropriate clothing
- We have a combustion stove in our open plan living area, that we light in the evenings for about 3-4 months a year. Our living areas face north and are warmed by the sun during the day.
- We have a gas wall furnace for heating and keep the lounge at 20-21C
- We have a slow combustion fire.

- We have a wood fired heater which warms our entire home magnificently. We also save additional power by cooking on top of the wood heater.
- We have gas heating set at 20 degrees and sometimes turn it off
- We have grown accustomed to 1 to 2 Deg. lower temperatures.
- We have small heaters but again that is all we can afford.
- We have taken to using more clothing rather than upping the ambient temperature
- We have two wood fires
- We put on extra layers of clothing and on the coldest days we light the enclosed combustion heater using wood grown on the farm.
- We put on lots of clothes before we turn on the heating.
- We use sustainably obtained wood for our heater and wear extra warm clothing.
- We utilise natural gas heating during the winter months.
- With heating air con
- With the ac on
- You can always put on more clothes to get warm

Is climate change caused by human activity? (5.5)

- A load of crap
- A lot is through methane but you have to wonder without human demand for meat product, how many animals would survive normally. So essentially all down to us humans!
- A recent corrected application of the climate change model shows that we are responsible for 20% - “Yes, CO2 has an effect, but it’s about a fifth or tenth of what the IPCC says it is. CO2 is not driving the climate; it caused less than 20 per cent of the global warming in the last few decades”.
- All those climate scientists can't be wrong.
- Anyone who does not recognise that climate change is the sole responsibility of the human race has their head buried in the sand.
- Been happening since beginning of time and will continue.
- Climate always changing it has been changing for centuries
- Climate change is a cyclic and seasonal phenomenon
- Climate change is a cyclic phenomenon but human activity is exacerbating it. We could all do much better.
- Climate change is a debatable subject right now, some say it's proven and others say it's not. My view is that (speaking for my own state), land developers are clearing every tree/scrubs prior to a new subdivision that Perth has the longest city area stretch of any other Capital City in Australia. Construction of multi-rise affordable apartments should be the way to proceed as it's been shown by scientists that there is a saving in water and power consumption when housing is done this way. You can drive an hour or so North or South of Perth and all you see is house tops. From my school day studies it was made clear to students that trees/shrubs play an important role in making rain.
- Climate change is a normal cycle which has been occurring since the earth was formed. Human activity may have exacerbated it but nothing is going to stop it. Humans should now be attempting to mitigate the effects and adapting to it than spending billions monitoring it and trying to stop it. The human race will die out from the effects of other man-made problems before we die from global warming, e.g. the sea of chemicals we are awash in and genetically modified foods, as well as mosquito-borne diseases, viruses, etc.
- Climate change is caused by the Pollution, Carbon Dioxide and other gas emitted by car and factories.
- Climatic changes go in cycles

- Even if climate change is not caused by human activity I believe we should do everything we can to clean up our atmosphere and reduce our use of fossil fuels.
- Everywhere we have cut down the trees, and bulldozed the land, and it is leaving great tracts with nothing to hold it to, in case of flooding ... we have so much pollution it is unreal, when you look at what the businesses put out, went past Alcoa at Wagerup this week, and smoke going full pelt...
- High pollution in newly industrialised countries such as China and India.
- Human activity is exacerbating a natural cyclic trend
- Humans are not the only cause but their activities directly or indirectly accelerate climate change
- I am not in denial.
- I am sure that mankind has effected climate but we have a relatively short lived data base regarding weather trends over time. We know there have been several ice ages and I am unsure how much of what we are currently observing is man-made climate change. Having said that mankind should aim to significantly curtail its negative impacts on the environment
- I believe nature also changes the climate
- I believe strongly that climate change is the product of human activity such as pollution, cattle farming taking up one third of our planet, rainforest destruction and more. One only has to travel the globe and see the enormity of the destruction and pollution first hand.
- I can't help wondering whether the increase in temperature is cyclical - for all of our knowledge and records we cannot know the length of temperature cycles. That said, it seems obvious to me that everything has an effect and our lifestyle and behaviour can only result in a negative impact
- I know it is the big companies out there but they make a lot of money for the governments
- i need to learn more about climate change
- I think personally that the earth is going into one of its cycles but what we are doing is making that cycle happen a lot faster than it would normally happen I think in the coming years it will happen a lot faster than anyone thinks it is like a car on a hill with no break on it may start slowly but the momentum with a little push by a person soon make that car roll faster and faster that is what is happening with our climate
- I trust the scientific consensus
- If we didn't burn fossil fuel we most probably wouldn't have Climate Change
- If we were able to directly go back to the days of dinosaurs we would more than likely see weather patterns similar to today. Experts are gauging everything on data from the last 100 years and do NOT really know what temperatures were before then. I have seen weather patterns the same as today in my younger. To me it is just a normal pattern of nature.
- I'm still somewhat not fully convinced. Naturally human activity has some effect but not perhaps as much as some scientists believe.
- I'm sure that mankind is responsible for deforestation in many countries which is changing the balance of our environment
- It cannot be denied, even though a lot of people do say it's all a load of garbage, which is part of the problem also, we waste too much food and everything we buy is wrapped in PLASTIC. Not enough people recycle or reuse.
- it is a fact of life and it does exist and man had big hand in causing it
- it is hard to say it causes 100% impossible to know, but only good can come from a cleaner environment
- It is part human and a natural occurrence, but we have hurried it along.
- It's just another excuse to get money from the domestic user to to subsidize the real polluters
- It's only nature and we can't change that, if we look back in history we have had many changes around the world. Mankind smart as we may think we are we cannot change nature.
- It's typical of most human endeavours. Introduce something (leaded petrol) worry about the consequences decades later.

- Of course we contribute. But you know what they say? The rich are greedy and don't concern themselves with caring. You will find the "Lower socio economic people" are the ones who care the most and try their hardest to use less electricity, buy goods with less packaging and use green bins ... recycle.
- Politics get in the way of getting balanced information. I believe that the climate changes irrespective of any human activity. However, I also believe that human activity is adding to the rate of change. But to what extent I simply don't know.
- Rarely comfortable
- Science has not yet determined exactly what % of the human activity/abuse of the natural environs is caused by the humankind.
- Since it takes the entire human race on this planet, in 100 years, to match the CO2 put in the air by one volcano in one day, THEN I will believe we're having a greater effect. Mount St Helens lowered the temperature in the northern hemisphere for three years. The south American one affected Australia's temperature for at least a year. All it would take is for any northern hemisphere volcano to REALLY blow its stack, and Europe/Asia/North America would be in an ice age so fast, they'd be living off the land in 10 years. So would any volcano in the Pacific ocean's "Ring of Fire", so please, this planet will decide our future, not the human race.
- Storm unpredictable storms/weather conditions,
- The fact is, our climate is changing and we will have to adapt if we are going to survive. It looks like it is going to take some time before the majority of countries and governments (including the Australian government) on this planet get around to treating this threat seriously.
- The most important factor
- The nature of climate is that it is always changing, sometimes for the benefit of the inhabitants of the earth and sometimes not. How many people know that we are currently experiencing an Ice Age? Ice Age = polar caps
- The use of fossil fuels is not being replace as a carbon sink thus we add that CO2.
- There are arguments for and against. Since Tony Abbott insisted there was no such thing as climate change that convinced me there must be.
- There are other factors that cause these changes but humans can do much to help minimise or stall them.
- There is a multitude of factors but the pollution caused by man complicate the weather models (and poisoning the environment is just plain criminal anyway)
- This is not a debate! It's happening whether people believe it or not.
- Too easy to believe the arguments put forward by "experts" on BOTH sides
- Too many cars on the road. Too many new development coming up
- Too much scientific data around to ignore it.
- We are heading towards another ice age if anything.
- We have science backgrounds so are not fooled by the media's propaganda disputing climate change.
- We must change our habits.
- Whether climate change is happening or not, we have to change to renewable energies also to avoid other pollution besides carbon dioxide
- With all the crap that is put into the atmosphere from cars and factories and businesses of course human activity is at the root cause
- Without a doubt.
- World is aging and the season will also change. Someday the days will be humid and muggy temperature will increase but that is to be expected because the world won't last forever.

Control over electricity consumption (5.7.1)

- All lights and devices are switched off when not in use
- Can control some aspects of my consumption, some or much of it is unavoidable.
- Control is by the consumer.
- Cost savings measures in place, e.g. heat pump
- Due to the implementation of the above measures our electricity consumption has declined dramatically and we do feel in control.
- Due to the limitations of the age of the house and lack of insulation and little money to invest in improvements.
- During winter I have very little control as I have to have the place heated at all times.
- Educating the family within the house plays a big role in reducing energy consumption. For E.G It's easier to flick a switch than to close or open an awning.
- Electricity highly priced, and seem to be using too much and can't figure out why, all electric, but no cooking, or air conditioning, dishwasher etc., and using 15 kW day but on what???
- Good control
- How can I have any control? I need to use it. I can't use it any less. so when we do have to use the dryer because it's been raining for a week and we need a towel each, i feel horrible, i worry how much the bill will be.
- I always strive to use less power mostly so it is cheaper and I save money for other things I need rather than helping the environment although by using less power I am helping that as well.
- I believe we have control as to how much electricity we consume, but essentially we are used to living with lights on, TV on and computers on.
- I can control what I use, but my son is always putting the heater or fan on regardless of what I say. He has however, learned to turn off lights and close doors.
- I live alone
- I still have a bar fridge running, which I intend shutting down in the near future
- I try to limit my usage as much as possible because of cost
- I try to turn off all power at wall if not required
- I understand this is not the place for this, but nowhere else to suit on survey .. .Our home includes an outside building (a Barn) which has a third bedroom plus office area Insulated and including an A/C and Fan.
- I use low wattage globes in all my rooms and only turn them on when I'm in a room. As mentioned earlier I only use my Hot Water Heater when I want to have a Shower and I don't use any fans or heaters.
- I'd like to know when is a more efficient time to use my washing machine. We wash most days.
- I'm the only one who likes switching lights off, TV off, using less power (live with partner and two kids)
- In control
- It is the cost that is the problem
- It is very hard to change unless I get rid of the pool, install a smart meter, purchase new energy efficient appliances (which are themselves dearer than most!). All of these things would help but are beyond my budget so really I can't do anything to change things as they are now.
- It's only me
- I've installed LED lights in most fittings and turn off lights and power switches not required at the time. I do use kettles, fridges and white goods though, and like longish warm showers. I have exterior sensor lights which would use more power than my interior lights. My hot water is some sort of heat exchange system.
- Need electricity for the business/ computers

- Our electricity bills have decreased over the past 2 years due the solar panels and our awareness of minimizing our electricity usage.
- Our excessive use of air conditioning inflates our power usage considerably
- Roof, walls insulated, nearly all LED lights, Gas stove, gas/Solar HWS, 3Kw Solar generator, and no electricity payments for nine months (and that's including that 5KW air conditioner running a fair bit in summer. I thought I would be paying last quarter, but I didn't!!)
- Rug up or strip down depending on the temperature
- The only thing we can't control is the $ rate per day charged by the electric supply company for supplying the electricity.
- The thing's you can't turn off: fridge, freezer, NBN equipment, Foxtel box.
- There are times when you must use electricity when you would prefer not to.
- There is no room to move or discuss an alternative plan as there is one provider available to me in my state.
- There is only one person lives in this house and I am fairly good at controlling what I do. Rarely do I forget to turn off heaters or other appliances.
- Trying to limit high consumption units when possible - a bit hard on farm when pumping water during summer months
- We are as sparingly as possible
- We are aware of our usage and try to manage it, but there are limits.
- We are efficient - but efficiency costs
- We are looking into home automation equipment that can regulate the pool pump based on if the solar PV array is producing enough power to minimise grid power consumption.
- We are trying to keep the bills down, and make sure we turn off lights, and power switches when not used, boiling the jug and putting the spare hot water in a thermos so saving power a little ... using a crockpot, of a night, instead of during the day, to watch with power, they say you should also wash of a night to keep power down....
- We are very conscious about turning off lights, not having appliances on standby
- We can switch things off at the wall if we choose.
- We have control over what we use it for, it is just common sense not to waste it unnecessarily.
- We have recently installed solar and are now shifting power use to take advantage of that during the day. The only power use we are not perfectly on top of is the Tariff-2 hot water system.
- We have solar hot water, have replaced old appliances with more energy efficient ones. Light fittings replaced with fluoro or LED lighting.
- We limit our lighting at night generally have one upright floor lamp on in the lounge/dining area.
- We turn off lights, shade the windows, automatic standby power off switch for TV, minimise heating and cooling, full load in washing machine using cold water. have tried to draft proof windows and doors, good ceiling insulation, heavy curtains but only 2 pelmets.
- we use the washing machine and dishwasher at night to take advantage of off peak rates
- Year ago I wanted to install solar panels which the Body Corporate prohibited for insurance reasons.
- You have to cook, wash and feel comfortable. This requires some usage of electricity, one person needs as much as two or more as the living space is the same.

Control over household finances (5.7.2)

- Contract up for renewal may not be AGL if I can get a better deal somewhere else
- Government age pension, no super, no savings. Only in control because I'm not much of a consumer and forego any luxury and when there are no emergencies such as fridge breakdown etc.
- I am not extravagant
- I control the money in my household.
- I have just sold my home with gas hot water and I'm moving into a unit with electric hot water.
- I have Solar Panels but still have bills in winter
- I manage the household finances and these are kept on a very strict regimen with no breaches.
- I try to keep on top of household finances however this gets harder, being a single parent on one income with a child in private school, and I pay 100% of all expenses. I have to be very resourceful and creative and look at all ways of making extra income.
- I'm on a disability pension, the government controls that. and salvation army made sure they controlled it to by making me get money taken out each fortnight to pay the electricity
- If you can't pay cash you probably don't really need it, or wait till you can.
- It is annoying (as like phone bills) when you explain why bills are so high when all you get is a shrug of the shoulders and a "who cares". This scene is only overcome when children leave home and start paying their own bills.
- It's my responsibility to pay all household bills so I guess that means I have full control over my household's finances but I struggle constantly to keep out of trouble as I only have my own income (a disabled pension) with which to pay all these bills (my two daughters do pay some board which helps with food but both are studying and also on low incomes).
- My wife is the finance manager.
- No all seems to be straight forward
- Not always possible
- Not in full-time employment; varied and uneven low income
- Only me to consider.
- Our annual combined income is less than $40000 yet we usually save $400 a month, which is used mainly for medical expenses.
- Single white female with mortgage – it's a balancing act to make ends meet.
- Strict budget is followed as we are on a pension and carer's allowance
- The age pension does not stretch very far and the cost of living going up all the time and the pension does not (I do not consider 6.60 an amount to cover the cost of living increases) so it is always a battle to make ends meet
- Unexpected bills can be a problem. e.g. Vet bills
- We are self funded retirees
- We are self-funded retirees and we manage by always be on alert regarding our household finances
- We are very careful
- We are very poor
- We have tried to be more aware of our power usage, by changing all light globes to energy savers gas hot water and cook top. We also purchased a power saving smart TV.
- We keep a record of what we are spending and where it goes, and are cutting back where possible. we also make sure that we use what is in the cupboards, and try to grow a few of our own vegs to supplement where possible. swinging on to using rice which is much cheaper than some vegetables, and buying potatoes, rice, onions and where possible other items in bulk.
- We need to be aware what we can afford to buy but so far no problems with finances
- We would be in better control if we could forecast ever-rising costs.
- Yes, I already have a 4.5kW solar system since 2012 and I practice power saving most of the time.

Perceived consumption vs Australian average (5.8)

- 1 adult, 1 child. Use gas for cooking and kettle. Have a lot of BBQs
- Although there is a premium that an all electric household must use. 1 or 10 people will still use the one dining room light. Oven cooking for one is the same as for more etc.
- But the costs with this electric company are the highest in Australia but we have no chpice, as we have a government up here that does not care less about us.
- Depends on whether I have guests staying or not
- Don't know why except that we have a pool. We are replacing halogen lights as and when we can afford LED's.
- Don't use aircon a lot as other people do
- Even with health required heating and cooling, am ever aware of the costs particularly when apparent schemes to aid in the costs are extremely difficult to gain.
- have grid-connected solar
- have solar power and solar water
- Household daily consumption is 46.28 kWh
- I am a quadriplegic so need to use the heater and air conditioner to maintain the heat in my body as I can't maintain my body temperature
- I am single and so whatever is used is used by me.
- I am the only person living here and on different occasions do I have friends over
- I don't know what the Australian per person average is … but I'm sure we would use less than most.
- I have a swimming pool in my back yard and the pool filter must run for 2 hours daily from 1st May to 30th September 4 hours daily for all of October, November, March and April and 6 hours daily for all of December, January and February.
- I have a swimming pool which I don't really want but it was here when I bought the house 5 years ago. I find my bills are always higher than the Australian average and that is with only 2 people living in the home.
- I have an old hot water system which is not off peak.
- I have made a number of reductions and hope to be less than most.
- I have mainly 3 adults who live in this house and my bill compares to a one person household. I believe i should be getting rewarded for having a low carbon footprint. the people with high usage should be the ones who pay more and the low users should be getting rewarded with lower priced bills. This might give the higher users the incentive to use less.
- I have trailed a number of alternative options purely to save money of cost and have now being using a bright camping lantern at night when cooking, having my meals or reading a book which has brought down the cost somewhat. I do washing once per week instead of every second day or so.
- I keep my hot water heater turned off and only turn it on 30 minutes then turn it off and have my shower.
- I like to be online 24/7
- I live on my own on a pension I turn everything possible off, I rarely use the gas heater unless my fingers are turning blue, and only use the air con at night when I really have to have some sleep.
- I rang my electricity Co and they informed me that my 2500 watt heater was costing me approx. $5 an hour peak time, that is when I got home from work for an average usage of 4 hours per night. I saw this on my Our green graph. So I converted to Gas which cost me on $20 per 12 days on 4 hours per night. So in simple maths the heater cost me 4 hours @ $5 = $20 per night X 30 days = $600. My gas 30 days divided by 12 days = 2.5 X $20 gas = $50. Total electricity savings of $550, THANK YOU OUR GREEN HOME.
- I really would not have a clue as to whether I am the same as the Australian average, how could I given that there is never any Australian comparison given only similar households in my suburb.

- I save a lot of energy without any problems
- I turn off my hot water system, when go out for the day.
- I'm very aware of my electricity usage - single household
- I'm very careful with my use at all times as I'm a disabled pensioner and have to be careful how I spend my money
- In previous years my household has always been below average for a 2 person house, but my current flatmate has nearly doubled the amount used overall in the 9 months she's lived here.
- In winter a lot less as we use no heaters. Summer probably average as we have a desk fan running overnight
- Insulated house, solar hot water system, 3Kw solar power
- My bill is always more because I rely on motion detector security lights to go on whenever they detect any movement externally.
- My main cost is heating during winter due to my health problems.
- My son (aged 14) uses a lot more energy than most people, he has the heater on constantly during winter, spring and autumn so that the temperature of his room is always much hotter than a normal person would want it. I think that I use less than most people. Therefore the nett effect for the household is more than similar households.
- My winter bill was $1300 I live alone and I don't like how they say I owe that much
- On occasions
- Only me living in the house and i try hard not to waste power and money
- Only two of us, very careful of every new purchase and we have solar water and solar electricity.
- Pool filter use has not been as frequent as summer. Despite 95% of use is after 10pm, filtering 52,000 litres needs 8 hours 4 times per week at least.
- Really not too sure on this question.
- Refrigeration
- Run an IT business from home so can't shut down servers etc.
- Sometimes turn off my power to lower my consumption.
- Still haven’t worked out why or what as I live alone and usage doesn’t change my end but does on other end. Changing to monthly bills, to see if I can isolate the usage spikes. But find out that the last 2 bills have been $100 less than same time last year. but can’t access online bills to check as Energy Australia site is unreliable
- Stupid new meter
- Trying our best to save
- We are a pensioner couple who are always careful to keep our usage low, never leave anything on standby, rarely use the air con etc. We have also been away for a total of 13 weeks so far this year.
- We have 10 people in our home so it will always be more.
- We have a pool, otherwise our electricity consumption would probably be a bit less than average.
- We have a small house and with only two people, energy consumption is minimal
- We have a weatherboard house that has only just had a new roof installed with new insulation blanket so we were using our air conditioner a lot for cooling which will hopefully reduce as of beginning of October. Our last bill (16 Jul-14 Sept) compared us to homes with gas and no pool and we did not compare as favourably as we had been doing! and our average daily usage was about 3.5 KWH higher than the same time last year, but I don't know why!
- We live on a rural property and have extra electric products than a town household e.g. house and stock water pumps, electric fencing and have extra freezers for storage of home killed beasts
- We run minimal appliances / TV / no heating
- We try to keep it as low as we can
- We try to use less
- We try very hard to conserve as much energy as possible

- We use gas hot water and cooking. We use the sun to heat our house, due to north facing and a wood fire combustion heater on winter evenings, thus reducing use of electricity.
- We utilise appliances during the day so we utilise our PV solar electricity over pulling power from the grid. If the sun isn't out, the pool pump does not get switched on.
- We utilise solar energy when available for our utility usage.
- We watch what we consume.
- Well insulated house, low use of heating and cooling (modest temperature settings), solar hot water and 10kW of solar PV; electric car
- When I was married, our energy usage was excessive, with 3 aquariums and lots of computer equipment. Now that he's not here, our usage is far lower than average.
- With my bill it shows the average for a one person home I have always been below that and the last three bills I have been well below.

How closely do you look at your bill? (6.3)

- Always looking to check with last bills
- Always phone Ergon if I feel anything is out of proportion.
- As a sole occupant who is mostly not always here, I usually just glance at the amount and if similar to the others just pay it automatically
- As there is one provider there is not much I can do to shop around for a better deal
- Bills are sometimes hard to read and extract information from particularly user rates and discounts
- Can usually identify spikes in power usage
- Check to see if all my pre-payments have been applied
- Do not pay electricity bills
- Given that I have had an incidence a couple of years ago when the account was totally wrong due to the meter not being read properly it is just as well that I read my meter myself and have my consumption records going back to 1996 so when I look at my account I can tell if I need to contact synergy over possible stuff ups
- Have solar power of off-set expenditure.
- I always look as some discrepancies do occur. I like to know if I am using similar to the previous year.
- I always look at the bills to see if I have used less power or more power from the same time the previous year. My last three bills have shown I have used less
- I am always amazed at how much I use. I don't mean to be a heavy user.
- I am just appalled by the fact that we live in the largest country town in Australia with a population of over a 130,000 people and yet our state government will not regulate electricity here, so we are all stuck with just one supplier- Energex and they charge us the highest rates in the country, which is HARD when you only have a disability pension as income, but the Queensland government doesn’t give a damn about us.
- I do this but do not really understand them
- I find it still hard to work out how they have different rates at certain levels
- I follow info given on Powershop app and in its and your regular emails.
- I get $13 taken out of my Disability Pension and I also get a Pensioner Rebate so check both these assuming they have been added I don't do anything. Origin automatically take what is owing if anything out of my bank account.
- I have $60 per fortnight taken out of my pension automatically, paid into my provider account, that way I do not get too much of a fright when I receive the bill. always manage to pay anything over my 'contributions' for the quarter.

- I have noticed on a few of my bills they did not put my credits on it
- I have over the last 6 years logged daily consumption and daily cost from the information on the bill
- I have taken many measures to keep the bill down
- I keep a valuable economic chart that shows all of my transactions with my Power Supplier. In particular i list all of my actual payments to them and a record of the duration of my time with them in actual number of days. I then divide my total payments by the total number of days and arrive at a very accurate daily cost for power which is $3.66 per day net.
- I log my solar performance and use daily when at home as well as reviewing my bills
- I love having the information about my usage on my computer via the monitor so that I can check back to make sure that I'm only being charged for what I use and not by an estimated bill
- It keeps going up and up all the time the more I save on power the bill comes more expensive
- I show the grid to my children so they better understand how each item they switch on I/we all have to pay for. The more electricity I pay the less they get.
- I still find the bill confusing in regards to tariffs i.e. controlled load off peak 2?
- I use as little electricity as possible. Don't use my heater, air conditioner or dryer. I have enquired of my provider as to how I could reduce my electricity usage but have been advised that I use the minimum electricity and the majority of my bills is not the actual electricity.
- I would comment that quite a lot of my friends simply cannot understand their bills.
- I would compare with the energy co averages however they combine my usage and production to give me my average daily usage and it is grossly inaccurate.
- I'm with power shop so I can look at my usage daily if desired.
- Installing 3kW Solar system was intended, so I was told to ultimately pay for itself and reduce our overall electricity use. First year credits looked good and after that decreased to now we paid $274 last bill. Our Gross meter was changed to a Direct meter and my query has not been answered. Rebate was 68c Now 8c!
- It just keeps going up and up, candles looking good
- Just want to keep cost down.
- My usage varies so much, and cost has changed up and down so much I am dizzy.
- No matter how energy conscious we consumers are, the more the energy co's jack up the price. We replaced our air con system, old fridges and freezer with new tech and wait for it - our solar does not cover our bill any more. 20 grand down the gurgler. Electricity is a rip off.
- Not just for keeping expenses lower, but to do my best to reduce energy related environmental impacts.
- Retailers seem to change tariffs in the middle of a billing period just to confuse users to make it harder to study
- Since the Our Green Home connection I have been more aware of electrical consumption
- Since we have had the device fitted to the meter box, we are more aware of what we are spend on electricity.
- System was not installed as there was not enough room on the panel
- This unit has been a great help, as it's in real time
- Very practical and useful to monitor my power consumption, but unfortunately my power meter has been moved lately due to wiring upgrade and my monitoring device has been cut off
- We pay our bills via a regular fortnightly deduction with an occasional billed top up. Bills are directed to my husband
- We pay via an even pay system so same amount each fortnight.
- We try to understand our pattern of power consumption.
- Wish that there was more detail.

Importance of retailer attributes (6.5)

- Am more than happy with my now retailer Powershop and don't think of changing
- As much as possible transparency of charges, previous supplier was not giving me the govt rebate which pensioners are supposed to receive.
- As we reside in a manufactured home village we have no control over what supplier is used
- Best payment for solar generated by me.
- But no alternative retailer in Tasmania
- Do not have any available alternatives to our current supplier.
- don't intend to change
- Due to having one supplier it's difficult to arrange any form of concession of factor in any change unless I do that myself.
- Ergon Energy is the only electricity provider in my area.
- Govt. supply
- Green energy costs more. people like me can’t afford it. it should be MADE for rich people to use. Maybe if low users were rewarded then the high users would lower their consumption.
- Have solar PV deal with Origin in Qld. would not want to lose this by changing
- I am in the process of moving to Energy Australia taking up the One Big Switch offer
- I constantly keep checking the other companies and their charges to make sure I'm getting the best deal
- I have already changed once. I will stay with the current provider.
- I have been with Energy Australia for 60 years and see no reason to change.
- I have earned two $75 credits to my account by recommending Powershop to my family and friends and two people were successfully transferred to Powershop.
- I have no choice in supplier as I live in a residential park
- I live in WA where there is a monopoly on supplying electricity, therefore no chance of saving by using alternate supplier
- I think they are all much of a muchness
- I wasn't aware there was any choice in electricity retailer!
- I would prefer a government owned retailer
- It would be a lot easier to change retailers if all the rates for electricity and gas usage where similar in structure so you could compare prices of each supplier to ascertain which one provided the best cost factor
- It's all a con!
- Limited choices in regional Qld no matter the claims particularly for those with limited funds.
- My current supplier I have been with for over 20 years. I have had some disagreement with them but I feel that all energy suppler at not that much different in the long term. You may save a dollar here or there but in the long term they no differences in them money talks and no matter how long you are with them it makes no difference because SA has the highest tariff
- Reliability of supply and maintenance/ repair times I feel are important. Also the cost of the connection in each bill before usage.
- Reliability, we have 3 power stations, and I am regularly getting brown outs, and play havoc with pc and rest of power ... Seriously thinking of making Energy Australia paying for a laptop ad they keep damaging them.
- Synergy is the only option available.
- Synergy seems to have a monopoly in this area
- There is no other supplier
- They are all the same give or take a nano cent, it’s only the best solar feed in tariff that influences most users

- This question is totally irrelevant as we do not have any other electricity supplier in Perth
- We are in WA, so our options are extremely limited … anything would be helpful!
- We are unable to change without losing our single tariff.
- We do not have any options of electric suppliers here in Toowoomba as our government do not care that we pay the highest electric rates in Australia so we only have Ergon here and no competition so they charge us whatever they feel like.
- We don't have any other electricity retailer in Western Australia - we have no choice!
- We have no other electricity retailer in Far North Queensland other than Ergon which makes all of the above irrelevant and is why we get ripped off for the price of our power.
- We only have one supplier option here in Elizabeth Town Tasmania.
- where is the option about customer service? That is what I would consider the most important factor after price.
- Will they accept paying the full solar rebate
- With a good rebate on solar power it would need to be pretty good discount to change
- Your installation electrician was a brief of fresh air comparted to the misinformation we have received over 42 years we have lived this old timber home.

Taken part in concession programs (6.6)

- Am not sure where can I get information about these other payment schemes
- By annual concession I mean the government one for families
- Currently receive an energy supplement as a component of the Age Pension
- First one, really not heard of that, but do have the Govt. very small percentage reduction, done by the provider. No 3, not eligible not needed. No 4, so far not needed this one. No 5, I think the way I do it works well and see no reason to change it.
- Get a pensioner discount as well
- Had no need for this
- Heard of them, not eligible and don't need
- How do you apply for above benefit?
- I always ring as soon as i get my bill to get a 4 week extension as I only work part time and get paid monthly. I've never got enough to pay it off in advance
- I do get a low income concession
- I do get a pension concession which is not much compared to what the bills always are.
- I get a Pensioner Rebate is that a Medical related concession
- I got sick, was retrenched from my job and found myself requesting an extra two weeks on one of my bills. I have learnt to go without food or other things to pay for it.
- I had bill smoothing when with AGL
- I have credits from my solar so no need for relief.
- I have heard of a few of these schemes but haven't taken part because I am not eligible.
- I have heard of all of the above but have not taken part
- I have my own way of paying my bill, I have allocated an amount I pay each fortnight when my age pension comes in and if I am short of money(quite often) I adjust what I pay whilst still making an effort to have enough paid off the account so that I do not have to pay when the bill comes in
- I have not taken part, but I have heard of all those items.
- I have only taken advantage once (1) with the retailer provided payment plan that was with my last bill
- I once enquired about the medical rebate, as I am on a CPAP machine. The red tape was ridiculous and the rebate was about 8 cents a DAY. WOW that worth doing - not.

- I pay estimated monthly amounts by BPAY I receive the Qld Govt Electricity Rebate
- I pay fortnightly and I like to pay a little extra to try and stay in credit.
- I pay my electricity account by weekly BPay payments. That way I never receive a bill, I am usually in credit.
- I personally asked for the payment plan as the supplier refuses to read my meter more than once or twice a year and I have to stay home for 2 days to make sure I am here when they come otherwise they won't read it.
- I read my own meter then submit online, when I receive my bill, I ring up and ask under the hardship program to be allowed to make the payment in 2 monthly instalments.
- I think it would have been good if there had been a no option in the above question
- I think you can pay instalments.
- I ticked this option because I receive a pensioner rebate on my electricity bill.
- I understand medical related concession and hardship concession but don't require them or are relevant. Your options don't allow for this.
- I'm a retired, aged pensioner.
- I'm presuming you mean pensioner concession. Otherwise, answer would be no.
- My husband has a chronic medical condition and receives a medical concession
- never heard of these schemes/plans unless they have another name
- Never needed these or qualified for them
- Never taken part
- Not aware of how to qualify for medical (such as using nebuliser and air filters.
- Pensioner concession
- Presuming that this concession is for the pensioners
- Receive NSW Govt Household rebate
- The hardship programme was a few years ago that I was a part of that. I have also gotten electricity vouchers in the past from The Salvation Army and St Vincents, but now that they made me sign up to money getting taken out of my pension each fortnight, I no longer fall behind in my bills and they have been paid on time for about 2 years now. I just need vouchers now for food. They seemed to think the electricity was more urgent to be paid than buying food for myself and child. The retailer provided payment plan was utterly stupid, it didn’t help me at all, it wanted the same amount of money each week and STILL threatened to charge an overdue fee.
- The power cost in my state has increased above the inflation rate for the last 5-7 years, I mainly believe by the Government's poor economic planning/spending.
- There is an option missing from these alternatives: I've actually heard of them, but have never checked eligibility as I have no trouble paying the bill.
- There should be an option to say "ineligible" for the above question, as I am ineligible for medical related concession.
- These schemes should be known to the public.
- Vinnies and Salvos have helped in the past
- We are registered for the Age pension concession
- We get a small SA Govt concession
- We get pension concession
- We just pay the bill
- We work with our supplier for the best deal.

Appendix VI
The long hot summer

All Gadget participants were asked the open-ended question:

It has been a longer and hotter summer than normal in most of Australia. Have you done anything special to help cope with the heat? Has it cost you money?

The full text of all responses is contained below.

- A little but we have energy efficient appliances so was minimalised
- A small amount on the bill
- Added a number of shade sails around our house to protect the brick walls from direct sun
- Additional aircon. Yes it has cost as we usually rely on the afternoon southerlies.
- Air conditioning
- Air-conditioning is running more. This device has made me more conscious of how much electricity I'm using.
- Always. There is no such thing as a free summer.
- Carried out usual procedures to plan for the heat and reduce impact in the home as much as possible during the daytime and evenings
- Close curtains when sunny
- Closed the house up on hot days
- Cost was down
- Dressed accordingly. Only used air con on abnormally hot nights
- Fans been on a lot more especially at night, and yes it has cost us money
- Had LED lights, solar water heating, and solar power installed about 4 years ago, so, for this summer, no, I haven't done anything extra. In the last 15 months, I've only had to pay for one bill ($27). A 3Kw Solar generator has cut my electricity bills to zero. I've had a Current Cost three phase meter monitoring my power generation since installation, but it's indicative, not accurate and not sensitive to phase reversals. The OGH system is highly accurate (1%) and records phase reversals, so it's been a big help with my accuracy setup with the other monitoring system.
- Hasn't actually been hotter in Victor Harbor - well I don't think so - don't reckon we used our air conditioner as much this summer
- Hasn't really been a lot of change
- Have an evap cooler so it's not expensive to run.
- Have found out by using metres that if we turn on aircon earlier they don't work so hard in the main heat period and save daily costs.
- Have mainly used fans instead of air con as it is cheaper to do this
- Higher cost due to extra use of air conditioning over the hot summer period
- I do not use air conditioning and have old wood federation home with breezeway from front to back door and large sash windows for cross ventilation. Normally have sea breeze but extreme weather events and no breeze left me shutting house up and hosing down house to break the heat build up. So water bill has gone up.
- I have not done anything special as I enjoy the hot weather.
- I have outside blinds and I keep the air con set low and I don’t see an increase in power cost
- I have used ceiling fans and a floor fan. It has cost a little bit extra.

- I have used the air conditioner to control humidity and clean smoke haze particles from the air inside during the Lake McKenzie fires in Tasmania. Weeks of thick smoke haze and odd hot humid weather coming from the North ... almost monsoonal.
- I haven't done anything my summer bill was higher than I expected as my son used fans night and day left lights on and powered things
- I haven't changed anything
- I put in an air conditioner which uses quite a lot of power
- I ran my air conditioner this summer - something I didn't do during in the 2014 /2015 summer, and this was only on days where the temperature exceeded forty degrees centigrade. My electricity consumption was however up considerably due to use of pedestal fans to move air about my home as there weren't too many days where the temperature was under thirty degrees!
- Installation of solar panels on my roof
- Installed additional split system aircon in main bedroom. Yes.
- Installed ceiling fans lounge and family room to reduce reliance on air conditioner
- Installed ceiling fans, brought a portable air conditioner to cool bedroom down before bed also used it to take edge off on 30c plus days
- Installed custom made shades $500
- Installed dc led fanlights
- Installed fans to use until the air conditioning becomes a must
- Installed new air con unit
- It has cost me money as I have needed my air conditioner running more often which increased my power bill
- Kept curtains closed. Used fans instead of air con when not too hot.
- Limited computer use at home to avoid having to turn on an additional air conditioner. Also made sure to open up the house more in the late afternoon / evening when it became cooler outside than in, to help cool the house that way rather than through air conditioning.
- Maybe had air conditioner on more
- More aircon use.
- More fans.
- No because I close my windows, pull down the blinds to keep out the heat and when the sun goes down I reopen windows and all doors to allow the cooler air to come through the house
- No because I installed solar panels
- No change
- No we didn't do anything different.
- No we don’t have aircon but we have a pool
- No working in summer
- No, nothing special. Split system air conditioner ran throughout the day. We were able to keep our home at a comfortable temperature as we have a 5,2kw solar system. This is a massive help in keeping power costs down.
- No. Use fans and ventilation.
- None
- Nothing
- Nothing special.
- Nothing special. Did not use AC more than other years.AC is the appliance with the highest power consumption but as it is used mostly in daylight that is the time when the PV cells are producing most power.
- Nothing special. just got hot
- Only monitor nett energy use Grid/Solar when using air conditioning system

- Only run air conditioner on extremely hot days and only when my solar panels are producing energy. I'm guided by your Green Home monitor when solar energy is being produced.
- Only used air con in short bursts.
- Pull down external awnings, close curtains
- Recently had a split system put in kitchen as was using a portable air con so may reduce energy consumption now
- Reducing the use of electricity initially with a Smart Meter conditioned us to maximising use after 10pm. However, after installing 3Kw i.e.,12 Solar panels we faced our ascending years with a Gross meter and 66 cent rebate! WOW! However, the State Govt decided to improve our overall system by removing the gross and installing a direct meter with a new 6 cent rebate. So much for clean energy paying for itself before I die !
- Roller shutters on all windows, cost thousands but worth it
- Run a/c. Of course!
- Run my air conditioner a lot - even though it doesn't work very well and bought a fan. So yes it has cost me money
- Sit in front of a fan
- Summer is not yet over in my area and I think I may have made money with my solar panels.
- Swim in the pool more often! Have the ceiling fans on more often at minimal cost.
- The A/C has had a beating
- The use of air-conditioning has put the overall bill up
- Use air conditioner less and on lower setting
- Use fans more and get wife to open more windows to create a cross flow
- Use of air conditioner
- Used a ceiling fan and pedestal fan more often. Probably but the humidity is unbearable.
- Used air conditioner more and caused higher expenses
- Used air conditioning wisely or used fans when solar system not producing electricity. Focused more on using the electricity from the sun. It was good to see the result on the graphs. I haven't spent any money other than for electricity used.
- Used ceiling fans for rooms temporarily occupied and a/c for longer occupation. Obviously over normal costs for cooling.
- Used different settings on a/c to reduce costs.
- Used the air conditioner a bit more than usual
- Used the air conditioner more but turned hot water system for 3-4 days
- We are using an inverter air conditioner with the thermostat set to 26 degrees to minimise the running costs.
- We have evaporation cooling – it's low power consumption
- We have lived on a boat using 12 volt system for 12 years before now. No one can teach us about saving both water and power. It has been very interesting however to visualis the actual consumption.
- We have tried to restrict use of our air conditioner to daylight hours, as far as possible, to use solar power rather than network power.
- We have used ceiling fans most of the summer. Kept blinds closed, we have only used our ducted air conditioning a few times. We have saved money by doing that.
- We have used the aircon less as it is one of the biggest users of power, beside the hot water
- We have used the cooling system for longer periods which has cost us a bit more, but that is to be expected.
- We installed a pool! That cost us a lot of money
- We only used the portable a/c for 4 or 5 nights and the extra consumption was worth the expense of a few extra dollars.

- We took the cost on the chin. We are lucky to have solar to help the cost.
- We were able to see on the website how our power usage increased on hot days. It helped us implement some passive heat management tools like windows shades and increased foliage to minimise the use of air conditioning.
- We've been careful about use of air-conditioner, only using it later in the evening and for short periods.
- Window tint on west side windows. Closable vents to the outside from upstairs rooms. Planted suitable trees on the NW side of our home. Shade cloth permanent screens on NW. ends of our N. facing balconies. $ budget for all this approx. $600 and 3-5 days of own labour. These have all made a significant difference
- With Our Green Home it has helped to keep costs down, summer has cost us a little more but Our Green Home has helped
- Yes I have had to use the aircon more.
- Yes it`s cost me some money because I needed the air conditioner on for longer.
- Yes, enclosed the patio although this was done mainly for winter.
- Yes, I have had to have my fans on a lot. I will be getting an air conditioner. I can’t handle the heat anymore
- Yes, running the air con longer
- Yes, used air conditioning.

Appendix VI
Comments on the Project

All Gadget participants were asked the open-ended question:

Do you have any comments about the Our Green Home project?

- A great project and gave us a great insight into our usage and allowed us to fine tune this by watching and changing inefficient appliances
- A lot of statistical analysis is required? I am a retired electrical engineer
- A total waste of time and money as it didn't work at all
- A worthwhile exercise in being able to see how my household used electricity and change a few habits e.g. used dishwasher during the day to use solar energy instead of from the grid at night.
- AGL meter readers didn't understand it and I was overcharged by a large amount. Ausgrid came about six months after installation and unknown to me disconnected the metre. So a waste of time and money.
- All in all, this appeared to be a successful project, however, the choice of equipment MAY need to be reconsidered in light of the "teething troubles" that were experienced
- As a result of our participation in the project we have replaced all quartz/halogen lighting with LED lights, replaced second refrigerator, pool pump and chlorinator, pond pump, Xmas lights etc. with more efficient replacements and disposed of a bar fridge resulting in much lower power bills. Thank you very much. A very useful tool.
- Currently having an access problem to your site. Have been in touch with support and waiting on their response.
- Every home should have one installed, especially if they have renewable energy systems installed
- Good
- Great in theory.
- Great now need to get more info, Will you still operating the system or will it shut down?
- Great real time data
- How does it actually work? and how does it save me money?
- I am a frugal with electricity and all my utilities as I live on a fixed income. However as I age and weather events become more extreme I am considering solar energy and or installing a couple of ceiling fans. This project has been good for letting me know how and when I need electricity.
- I am sure it could be useful but I expect those who have been interested to have it installed are already motivated to save energy. Most people don't know about OGH and many would be to busy benefit from it if they did.
- I believe it to be an interesting initiative giving users the means to plan appliance usage.
- I feel it was a total waste of government funding! I did not get any customer service!
- I found it useful to monitor my expenses and saw me reducing my bill by several hundred dollars.
- I have enjoyed using and introducing it other people as an aid to understanding energy usage, thanks for the chance to participate
- I have found it to be very interesting and a very helpful tool in managing power usage to keep costs down.
- I have found it very helpful to see my power use-age and also how my solar power system is working. A great idea and some friends wished they had known about it.

- I have yet to compare the usage monitored by the green home monitors against the meter fitted by Synergy I believe they may reveal that we have been paying too much for our electricity.
- I need to use it more for planning especially now that I am about to get solar panels.
- I thank you for a worthwhile, well conducted and ongoing useful setup.
- I think it has been a great and interesting project. But it is too hard to get the system in synch with my power bill, I mean the cost for the 3 monthly bill being the same as what the Our Green Home is, both costs are completely different it would help immensely if they were both the same or in other words if the Our Green Home monitor showed the same amount at the end of the bill cycle as the bill.
- I think it is useless and I am at the point of telling you that I am going to turn it off. It only tells me my total consumption for the week and I can determine that by reading the meter on a regular basis. It does not tell me how much each device is using unless I turn everything off but that one device and then I could get the same information from the meter anyway. It loses connection internal (whether it is your devices or my network I am not sure) so I cannot trust the data anyway. Again, the graph only gives me total consumption for a particular time and unless I can remember what I was doing at the time the information is of little help. The only way to do this is to keep a diary noting what devices are on every 30 mins and that I cannot be bothered doing. So, unless I am missing something, I think it is a total waste of time.
- I think that it should be expanded - it's a great education.
- I was expecting more out of it, there was not a lot I could use it for and it has not changed how we live but maybe we were already doing everything possible to keep electricity costs down.
- I was glad to take part in the survey.
- I was never able to determine which appliances were using the most electricity. This was one of the main reasons why I signed up for the project. It has made me more mindful of how much power I use overall, and I have been able to check on the accuracy of my power bills.
- I'm not sure I am the best candidate because I am aware and usually quite frugal with my use. Perhaps it should go to a family more in need? I don't mind either way.
- installation was smooth. the device unreliable and the data collected (the way it is)...insufficient. It has done nothing to assist with our energy usage (only aided reporting)
- Is there any possible way we could check whether your device is interfering with my phone service whilst running along with the internet?
- It has been great! Thanks a lot!
- It has been very helpful.
- It has help to keep tack on what we spend on electricity n the appliances that use more electricity
- It has highlighted which appliances use most power and has had the effect of being more aware when using these appliances
- It is a great Idea and has helped me a lot
- It is a great initiative and would like to continue to participate but with electronics not functioning that is not possible.
- It is a great project. Everyone should have one.
- It is a shame it is finished
- It wasn't convenient to use. Where it was installed in our bedroom it had flashing lights during the night so we disconnected it.
- It would be nice if it were possible to break down the usage of individual appliances - or at a minimum, different GPO circuits and Lighting.
- It’s good to see how much energy I am using every month
- It's been a total disaster as far as I'm concerned
- It's just a great thing to have
- Mainly it was interesting to find out which appliances used more electricity

- Need to setup pilot systems to trial of solar power storage systems to allow excess generation to be stored and used at peak energy requirement times e.g. when using A/C at night
- No help was given when asked
- No, but thank you!
- No, other than it's been useful to understand our energy usage. This sort of functionality should be built into every homes energy meter
- Now that you are no longer monitoring it and sending through reports, how do I monitor it from here? Please advise.
- Occasionally the weekly report previous week's usage did not match. I did ask if turning off my modem (silly question) would affect? no response.
- Our Green Home project has given good insight into power consumption of various appliances. Financial savings have not been as great as we had already changed time of use of some appliance and reduced power consumption significantly following previous installation of a smart meter several years ago.
- Overall it has been an interesting experience
- Please, Please, Please, supply some contact details.
- Sadly because the electrician never installed it properly, the monitor never worked.
- Some issues with weekly email details.
- Still not totally sure how to use it
- Thank you for helping us to reduce carbon foot-prints
- Thank you love to know my energy consumption
- Thanks for installing the system and enabling us to be part of this survey.
- The app is rubbish. It really needs updating, otherwise a great system.
- The best thing we have had installed and saved us a fortune on our power bills.
- The main problem is educating house members (female) how to regulate air con temperature and using natural means of cooling
- The product and the weekly reports have enabled me to reduce my costs as much possible.
- Unreliable monitoring device prone to sudden total failure.
- Very good product
- Very good project highly recommended.
- We are very conscious of keeping Energy and water use to lowest point through sensible Management at all possible, practical levels. Our Green Home project has added to overall family and friends' overall attitudes towards improving our Energy consumption
- We have 1.5 Kw solar panels and solar hot water, but the monitor has helped fine tune when and how we use electricity. We learned to cook in bigger batches and freeze. k. We have really appreciated being able to do something positive, little though that may be. Thank you for this opportunity and doing what you do.
- What do we do with the monitoring device now? Will it still be working and if so would like to know how to use it
- Worthwhile project
- Would be great for people who aren't aware of usage, but we are quite thrifty with ours. Turning TV off at mains, hanging clothes out to dry, etc, so didn't impact on us much.
- Would it be possible to provide help with people like me (electronics technicians with very good computer skills) setting up the monitoring system to go to my computer, rather than through the OGH website. Maybe turn the experience with Saturn South into a commercial venture for homeowners, rather than be a Government sponsored program (or has that already been done with HabiDapt and e*star)
- Would like more support info.
- You tried do a good job but it didn't work as well as it should. Thanks very much anyway!